



APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/617,050	12/09/2014	8909094	00684.003330.18	1149

5514 7590 11/19/2014  
FITZPATRICK CELLA HARPER & SCINTO  
1290 Avenue of the Americas  
NEW YORK, NY 10104-3800

### ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

#### **Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)** (application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Yusuke Yamada, Ibaraki-ken, JAPAN;  
Yutaka Ban, Tokyo, JAPAN;  
Katsuya Murakami, Ibaraki-ken, JAPAN;  
Fumio Tazawa, Chiba-ken, JAPAN;  
Hironori Minagawa, Ibaraki-ken, JAPAN;

GPI EXHIBIT 1002  
GENERAL PLASTIC v. CANON  
IPR2016-01360

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit [SelectUSA.gov](http://SelectUSA.gov).

**PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 or Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

5514 7590 08/01/2014  
**FITZPATRICK CELLA HARPER & SCINTO**  
 1290 Avenue of the Americas  
 NEW YORK, NY 10104-3800

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/617,050	09/14/2012	Yusuke Yamada	00684.003330.18	1149

TITLE OF INVENTION: SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	11/03/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEE, SUSAN SHUK YIN	2852	399-106000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). <input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached. <input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b>	2. For printing on the patent front page, list (1) The names of up to 3 registered patent attorneys or agents OR, alternatively, (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
	1 <u>Fitzpatrick, Cella, Harper &amp; Scinto</u> 2 _____ 3 _____

**3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)**

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE **CANON KABUSHIKI KAISHA** (B) RESIDENCE: (CITY and STATE OR COUNTRY) **Tokyo, Japan**

Please check the appropriate assignee category or categories (will not be printed on the patent) :  Individual  Corporation or other private group entity  Government

4a. The following fee(s) are submitted: <input checked="" type="checkbox"/> Issue Fee <input type="checkbox"/> Publication Fee (No small entity discount permitted) <input type="checkbox"/> Advance Order - # of Copies _____	4b. Payment of Fee(s): ( <b>Please first reapply any previously paid issue fee shown above</b> ) <input type="checkbox"/> A check is enclosed. <input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached. <input checked="" type="checkbox"/> The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number <u>50-3939</u> (enclose an extra copy of this form).
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**5. Change in Entity Status** (from status indicated above)

Applicant certifying micro entity status. See 37 CFR 1.29

Applicant asserting small entity status. See 37 CFR 1.27

Applicant changing to regular undiscounted fee status.

**NOTE:** Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

**NOTE:** If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

**NOTE:** Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

**NOTE:** This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Scott D. Malpede/ Date November 3, 2014

Typed or printed name Scott D. Malpede Registration No. 32,533

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13617050
<b>Filing Date:</b>	14-Sep-2012
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Filer:</b>	Lawrence A. Stahl/Rizalina Mendiola
<b>Attorney Docket Number:</b>	00684.003330.18

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
Utility Appl Issue Fee	1501	1	960	960

**Extension-of-Time:**

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>960</b>



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	20583984
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Lawrence A. Stahl/Denni Godfrey
<b>Filer Authorized By:</b>	Lawrence A. Stahl
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	03-NOV-2014
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	10:50:06
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$960
RAM confirmation Number	8688
Deposit Account	503939
Authorized User	GODFREY, DENNI L.

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

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Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	IFTransmittal00684003330_18 USC700.pdf	144307 be0e340944425209464fe787dd43127caf3 6ed10	no	1

### Warnings:

### Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30709 05ad3871475af786a21248a43862b62941b 63c05	no	2
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### Warnings:

### Information:

**Total Files Size (in bytes):** 175016

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

#### **New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

#### **National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

#### **New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/617,050 09/14/2012 Yusuke Yamada 00684.003330.18 1149

5514 7590 10/28/2014
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

EXAMINER

LEE, SUSAN SHUK YIN

Table with 2 columns: ART UNIT, PAPER NUMBER

2852

Table with 2 columns: MAIL DATE, DELIVERY MODE

10/28/2014

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

**Corrected  
Notice of Allowability**

<b>Application No.</b> 13/617,050	<b>Applicant(s)</b> YAMADA ET AL.	
<b>Examiner</b> SUSAN LEE	<b>Art Unit</b> 2852	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

- This communication is responsive to *IDS filed after Notice of Allowance*.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
- An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
- The allowed claim(s) is/are 22-74. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/oph/index.jsp](http://www.uspto.gov/patents/init_events/oph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
- Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a)  All    b)  Some    \*c)  None of the:
- Certified copies of the priority documents have been received.
  - Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

- CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
 including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
- DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- Notice of References Cited (PTO-892)
- Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 10/22/2014
- Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
- Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
- Examiner's Amendment/Comment
- Examiner's Statement of Reasons for Allowance
- Other \_\_\_\_\_.

Art Unit: 2852

The present application is being examined under the pre-AIA first to invent provisions.

***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 10/22/2014 was filed after the mailing date of the Notice of Allowance on 8/1/14. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUSAN LEE whose telephone number is (571)272-2137. The examiner can normally be reached on Mon. - Fri., 9:30-7:00, Second Monday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Lindsay can be reached on (571) 272-1674. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2852

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SUSAN LEE/  
Primary Examiner, Art Unit 2852

sl

Receipt date: 10/22/2014

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

13617050 - GAI: 2852

Pat. 13617050 (01-18)

Approved for use through 07/31/2012. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050
	Filing Date	2012-09-14
	First Named Inventor	Yusuke Yamada
	Art Unit	2852
	Examiner Name	Susan S.Y. Lee
	Attorney Docket Number	00684.003330.18

U.S. PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
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FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	0 853 260	EP	A2	1998-07-15	KONICA CORP.		<input type="checkbox"/>
	2	1 006 415	EP	A1	2000-06-07	SHOWA MARUTSUTSU CO. LTD.		<input type="checkbox"/>

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050	13617050 - GAU: 2852	
	Filing Date		2012-09-14		
	First Named Inventor	Yusuke Yamada			
	Art Unit		2852		
	Examiner Name	Susan S.Y. Lee			
	Attorney Docket Number		00684.003330.18		

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	Brazilian Office Action dated September 9, 2014, in related Brazilian Patent Application No. P10216075-7 (with English translation).	<input checked="" type="checkbox"/>
	2	Brazilian Office Action dated September 5, 2014, in related Brazilian Patent Application No. P10200483-6 (with English translation).	<input checked="" type="checkbox"/>
	3	Brazilian Office Action dated September 9, 2014, in related Brazilian Patent Application No. P10216078-1 (with English translation).	<input checked="" type="checkbox"/>
	4	Brazilian Office Action dated September 9, 2014, in related Brazilian Patent Application No. P10216077-3 (with English translation).	<input checked="" type="checkbox"/>
	5	Brazilian Office Action dated September 9, 2014, in related Brazilian Patent Application No. P10216076-5 (with English translation).	<input checked="" type="checkbox"/>
	6	Brazilian Office Action dated September 9, 2014, in related Brazilian Patent Application No. P10216074-9 (with English translation).	<input checked="" type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button **Add**

**EXAMINER SIGNATURE**

Examiner Signature	/Susan Lee/	Date Considered	10/26/2014
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.



<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050
	Filing Date	2012-09-14
	First Named Inventor	Yusuke Yamada
	Art Unit	2852
	Examiner Name	Susan S.Y. Lee
	Attorney Docket Number	00684.003330.18

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

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U.S.PATENT APPLICATION PUBLICATIONS						Remove
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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FOREIGN PATENT DOCUMENTS							Remove	
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1	0 853 260	EP	A2	1998-07-15	KONICA CORP.		<input type="checkbox"/>
	2	1 006 415	EP	A1	2000-06-07	SHOWA MARUTSUTSU CO. LTD.		<input type="checkbox"/>

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050
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	First Named Inventor	Yusuke Yamada
	Art Unit	2852
	Examiner Name	Susan S.Y. Lee
	Attorney Docket Number	00684.003330.18

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>
	1	Brazilian Office Action dated September 9, 2014, in related Brazilian Patent Application No. P10216075-7 (with English translation).	<input checked="" type="checkbox"/>
	2	Brazilian Office Action dated September 5, 2014, in related Brazilian Patent Application No. P10200483-6 (with English translation).	<input checked="" type="checkbox"/>
	3	Brazilian Office Action dated September 9, 2014, in related Brazilian Patent Application No. P10216078-1 (with English translation).	<input checked="" type="checkbox"/>
	4	Brazilian Office Action dated September 9, 2014, in related Brazilian Patent Application No. P10216077-3 (with English translation).	<input checked="" type="checkbox"/>
	5	Brazilian Office Action dated September 9, 2014, in related Brazilian Patent Application No. P10216076-5 (with English translation).	<input checked="" type="checkbox"/>
	6	Brazilian Office Action dated September 9, 2014, in related Brazilian Patent Application No. P10216074-9 (with English translation).	<input checked="" type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button **Add**

**EXAMINER SIGNATURE**

Examiner Signature	Date Considered
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050
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	First Named Inventor	Yusuke Yamada
	Art Unit	2852
	Examiner Name	Susan S.Y. Lee
	Attorney Docket Number	00684.003330.18

**CERTIFICATION STATEMENT**

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

- See attached certification statement.
- The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- A certification statement is not submitted herewith.

**SIGNATURE**

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Scott D. Malpede/	Date (YYYY-MM-DD)	2014-10-22
Name/Print	Scott D. Malpede	Registration Number	32,533

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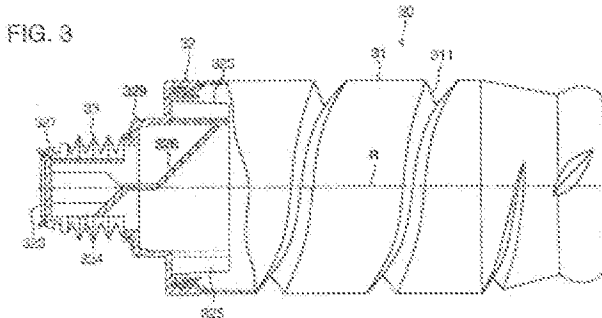
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(54) **Developer cartridge and developer replenishing apparatus**

(57) A toner container for use in an image forming apparatus having a toner receiving section, comprises a cylindrical container body in which toner is stored, the cylindrical container body having a toner discharging end and provided with a spiral rib provided on its inner circumferential surface so that toner is conveyed toward the toner discharging end by the spiral rib when the cylindrical container body is rotated, the cylindrical container body further having a cylindrical portion with a

discharging port on the toner discharging end; and a sleeve member mounted around the cylindrical portion so that the discharging port is closed by the sleeve member, the sleeve member movable in the axial direction of the cylindrical portion so that when the toner container is attached to the toner receiving section of the image forming apparatus, the sleeve member is moved so as to open the toner discharging port.



EP 0 853 260 A2

Description

## BACKGROUND OF THE INVENTION

This invention relates to a developing apparatus for electrophotographic recording, and in particular to a toner container which contains toner in its cylinder-shaped container body and discharges the toner with rotation, and a toner replenishing device which is fitted with the container and replenishes toner therein to a toner storing portion by rotating the container.

Heretofore, there has been such type of means for replenishing toner from the toner container (toner cartridge) to the toner storing portion in the image forming apparatus as the following: every time when toner is to be replenished, the toner container is attached to the image forming apparatus to replenish whole toner in the container to the storing portion, and it is took away from the apparatus mainframe after the replenishing is finished. However, in the above-mentioned type of replenishing method, the toner may overflow out of the storing portion in case of excessive replenishment, because the whole toner is fed at a time to the storing portion, and therefore some means must be provided for preventing the excessive replenishment.

It is difficult to prevent the above-mentioned excessive replenishment of toner, and although some means for preventing the excessive replenishment could be provided in the apparatus mainframe on occasion, it resulted in the higher-costed and larger-sized apparatus. Thus, it has been developed a device of the type that a toner container which has a coil-shaped protrusion inside is attached to the apparatus mainframe, and is rotated around its center axis to cause the toner to be discharged through a toner discharging opening to replenish the toner storing portion with it (Japanese laid open patent H7-295358 etc.). This type of device has such advantage that any means for preventing the aforesaid excessive replenishment is not necessary, because the toner container is attached to the apparatus mainframe at all time, and it enables a timely replenishment of toner to the toner storing portion by rotating the toner container on occasion that the toner amount in the storing portion decreases.

However, in the above-mentioned toner replenishing device, the function is effected by mating the toner discharge opening provided at the end surface of the toner container with the toner receiving opening provided at the end surface of the toner storing portion, so that the exact positioning of the above-mentioned discharge opening and receiving opening is required. Moreover, it has such disadvantage that toner is easy to leak from the joint portion of the toner discharging opening and the toner receiving opening on exchanging the toner container. Further, the aforesaid toner container and the aforesaid toner replenishing device to be fitted with the toner container have many subjects to be considered such as how to feed efficiently the toner in its

container to the toner storing portion.

## SUMMARY OF THE INVENTION

The subject of this invention is to solve the aforesaid problems concerning the toner container and the toner replenishing device which supplies the toner from said container to the developing means.

The toner container of this invention to solve the above-mentioned problems has a spiral rib or a coil-shaped protrusion on the inner surface of the container body and discharges the toner contained in it by rotation, having a projected portion at an approximately central part on the end surface of the container, said projected portion having an opening provided on its outer surface approximately parallel to the center line of the cylindrical body, a scooping-up means to scrape the toner upward with the rotation of the container above its center axis, and a guiding portion to guide the toner which is scooped up by said scooping-up means to said opening.

According to another aspect of the invention to solve the aforesaid problems, the toner container has a coil-shaped protrusion on the inner surface of the cylindrical container body and discharges the toner contained in it by rotation, having a cylindrical portion projected at an approximately central part on the end surface of the container, said projected portion having an opening for discharging the toner provided on its outer surface approximately parallel to the center line of the cylindrical body, and a closing member which is concentric with said cylindrical portion, surrounds the periphery of said cylindrical portion, and moves parallelly to the center line of the cylindrical body to open/close said opening.

According to an aspect of the invention to solve the aforesaid problems, the toner replenishing device is mounted with a toner container which has a coil-shaped protrusion on the inner surface of the container body and replenishes the toner contained in the container to a toner-storing portion which stores the toner by rotating said toner container, said toner container having a projected portion at an approximately central part on the end surface of the container, said projected portion having an opening provided on its outer surface approximately parallel to the center line of the cylindrical body, said toner container also having a scooping-up means to scrape the toner upward with the rotation of the container above its center axis and a guiding portion to guide the toner which is scooped up by said scooping-up means to said opening, and replenishes said toner storing portion with the toner by rotating said toner container to drop the toner particles from said opening of said projected portion of said toner container through the toner replenishing opening of said toner guide means.

According to another aspect of the invention to solve the aforesaid problems, the toner replenishing

device has a toner container having a cylindrical body to contain toner and discharging the toner from the opening provided on the peripheral surface of the body; a toner guiding means which is mounted with said toner container, receives the toner at the opening provided at the position facing to said opening of said toner container, and guides it through a toner feeding path to discharge it from the toner replenishing opening, and a toner storing portion which receives the toner to store, the toner being discharged from said toner container, guided through the toner feeding path, and discharged from said toner replenishing opening, and replenishes said toner storing portion with the toner by rotating said toner container to drop the toner particles from said toner replenishing portion of said toner container through the toner replenishing opening of said toner guide means.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-sectional view showing the construction of a color printer, an example of the color image forming apparatus equipped with a plurality of toner replenishing devices;

Fig. 2 is a perspective view showing a plurality of the toner containers and a plurality of the toner storing portions, and a part of plural developing units;

Fig. 3 is a partially cross-sectional, side view of the toner container;

Fig. 4 is a partially exploded, side view of the toner container;

Fig. 5 is an exploded perspective view of the toner discharging portion of the toner container;

Fig. 6 shows a cross-sectional view showing the container mounting portion and the toner container as they are spaced apart;

Fig. 7 is a cross-sectional view showing the toner container mounted to the container mounting portion;

Fig. 8 is a cross-sectional view showing the toner container and the toner replenishing device according to another aspect of the invention;

Fig. 9 is a cross-sectional view of the toner container shown in the Fig. 8 mounted to the toner replenishing device;

Fig. 10 is a cross-sectional view showing the construction of a color printer, an example of the color image forming apparatus equipped with a plurality of the toner replenishing devices of the third example of practice of the invention and a plurality of the developing units;

Fig. 11 is a perspective view of the toner replenishing devices mounted with the toner containers shown in the Fig. 10;

Fig. 12(a) shows a cross-sectional view of the container mounting portion and the toner container shown in Fig. 10 as they are spaced apart, Fig. 12(b) shows an enlarged partial cross-sectional

view of said container, and Fig. 12(c) shows an enlarged partial cross-sectional view of the container mounting portion;

Fig. 13 is a cross-sectional view of the toner replenishing device with the toner container mounted to the container mounting portion;

Fig. 14 is an enlarged partial cross-sectional view of the toner container and the container mounting portion; and

Fig. 15 is a cross-sectional view through A-A of the toner container and the container mounting portion shown in Fig. 13.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Proceeding the explanation of the embodiments of the invention, the construction of a color printer, an example of the color image forming apparatus equipped with plural sets of the toner replenishing devices of this invention and the developing units, and its operation will be explained with reference to the cross-sectional view showing the construction of Fig. 1.

The color printer is a color image forming apparatus which has a mode of operation as the following: color images formed on the image forming member with one color image superposed on another are transferred to a sheet of transfer paper at a time to form a full color image at the transfer station, and then it is picked off from the surface of the image forming member.

In Fig. 1, 10 is a photoreceptor drum, the image forming member, composed of an OPC-photoreceptor (organic photoconductor) coated on a drum-shaped base member, which is grounded and driven clockwise as shown in the figure. 11 is a scorotron charging device which gives the peripheral surface of the photoreceptor drum a uniform electrostatic charge of a high potential  $V_H$  with a grid which is kept at a grid potential  $V_G$  and a corona discharging of a corona discharging wire. Before this charging with the scorotron charging device 11, the charge on the peripheral surface of the photoreceptor is eliminated by exposure to PCL (pre-charging lamp) 12 composed of a photodiode or other proper means in order to eliminate the memory effect of the photoreceptor due to previous printings.

After the uniform charging on the photoreceptor drum 10, the imagewise exposure process based on the image signal is done by the imagewise exposure means 13. As regards the imagewise exposure means 13, the main-scanning is done as the following: the light beam emitted from the light source of a laser diode goes through a rotating polygon mirror 131, an f $\theta$  lens 132, and a cylindrical lens 133, with its path deflected by a reflection mirror 134, reaches to the surface of the photoreceptor; thus the latent image is formed together with the rotation of the photoreceptor drum 10 (sub-scanning). In this mode of practice of the invention, the light is emitted corresponding to the letter part of the original

document, so the reversal latent image is formed, in which the potential on the photoreceptor surface corresponding to the letter part is made low as  $V_L$ .

Around the periphery of the photoreceptor drum 10, there is provided a developing apparatus 20 composed of the developing units 20Y, 20M, 20C, and 20K, each having inside a two-component developer composed of one of the toners of yellow (Y), magenta (M), cyan (C), and black (K) respectively and carrier material.

First, the yellow, the first color, development is done with a rotating developer carrying member (developing sleeve) 21 which has magnets inside and holds the developer. The developer is composed of carrier beads, each of them composed of a ferrite core and a coated layer of insulating resin on it, and the toner particles, each of them composed of polyester resin as main material, a pigment corresponding to the color, and a charge control agent, micro-particles of silica or titanium oxide adhering on it, forms a layer with a thickness between 100 and 500  $\mu\text{m}$ , regulated with a layer forming means, and is carried to the developing region.

The spacing from the developing sleeve 21 to the photoreceptor drum 10 at the developing region is 0.2 - 1.0 mm, which is a little larger than the developer layer thickness, and an AC bias voltage  $V_{AC}$  and a DC bias voltage  $V_{DC}$  overlapped on it is applied to the spacing. Because the DC bias  $V_{DC}$ , high potential  $V_H$ , and the toner charge has the same polarity, the toner particles which are given the chance of taking off from the carrier beads by the AC bias  $V_{AC}$  will not deposit on the area having the high potential  $V_H$  which is higher than the DC bias  $V_{DC}$ , but deposit on the area having the low potential  $V_L$  which is lower than the DC bias  $V_{DC}$  to make a visible image (reversal development).

After the first color image was made visible, then the second color magenta image forming process starts. Again the uniform charging with the scorotron charging device 11 is done to form the latent image corresponding to the image data of the second color using the integewise exposure means 13. The charge elimination by PCL 12, which was made in the first color image forming process, is not practised this time in order to prevent the toner scattering due to the sudden lowering of the potential of neighboring area.

In the photoreceptor surface area, which is again charged to a high potential  $V_H$  overall, as regards those areas that have no image of the first color, the latent image is formed just like the first color and developed, but on those areas where the first color toner particles have been deposited, due to the light shielding by the deposited toner particles and the charge of the toner particles which they have originally, the latent image of potential  $V_H'$  is formed and developed in accordance with the potential difference between the DC bias  $V_{DC}$  and the potential  $V_H'$ . In these overlapped areas by the first and second color images, if the first color image is formed with the latent image of low potential  $V_L$ , the color balance between the first and the second will be

lost, and hence the first color images exposure is sometimes so reduced as to make the potential intermediate value  $V_H'$  to satisfy the following inequality  $V_H' > V_H > V_L$ .

For the third color cyan and the forth color black the image forming process like that for the second color magenta is carried out; the four color visible image is formed on the peripheral surface of the photoreceptor drum 10.

The toner replenishing device 40, which replenishes the fresh toner of each color controlled to each of the aforesaid developing units 20Y, 20M, 20C, and 20K, is composed of a plurality of the container mounting portions 41Y, 41M, 41C, and 41K, to each of which each of the toner containers (hereinafter referred to as the containers) 30Y, 30M, 30C, and 30K are able to be mounted or dismounted respectively, a plurality of the toner storing portions 42Y, 42M, 42C, and 42K, which store temporarily the toners in said container 30Y, 30M, 30C, and 30K, and a plurality of the toner feeding portions 43Y, 43M, 43C, and 43K, which feed the toners in said toner storing portions to the aforesaid developing units 20Y, 20M, 20C, and 20K.

On the other hand, a sheet of transfer material (transfer paper etc), which is conveyed out from the paper feeding cassette 50 with a half-moon-shaped roller 51, goes through a pair of paper feeding rollers 52 and 53 and stops once in the vicinity of a registration roller pair 54, and is fed to the transfer region with the rotation of the registration roller pair 54 at the moment of the proper timing of the transfer.

In the transfer region, the transfer means 60 is pressed to contact the periphery of the photoreceptor drum 10 synchronized with the transfer timing, hold the fed transfer material sheet p to contact the drum to transfer the multicolored image at a time.

Next, the transfer material sheet p is processed by the pick-off means 61 to eliminate the charge on it, picked off from the peripheral surface of the photoreceptor drum 10, conveyed to the fixing apparatus 70, where the toner is fused by the heating and pressing with the heat roller (upper roller) 71 and the press roller (lower roller) 72, then discharged onto the receiving tray 80 provided out side the printer body by the paper ejecting rollers 81 and 82. In the meanwhile, the aforesaid transfer means 60 is retracted apart from the photoreceptor periphery after the passing through of the transfer sheet p to be ready for the next toner image forming.

On the other hand, the photoreceptor drum 10 from which the transfer sheet p is picked off is subjected to the charge elimination process by the charge eliminating device 14, the residual toner particles on it removed to clean its surface by pressing the blade 151 of the cleaning apparatus 15, is again subjected to the charge elimination by the aforesaid PCL 12 and charging by the scorotron charging device 11 to enter into the next image forming process. Further, the aforesaid blade 151 moves to be retracted from the photoreceptor



periphery immediately after the cleaning of the photo-receptor surface. The waste toner scooped off by the blade 151 into the cleaning apparatus 15 is discharged with the screw 152 and then stored in the collecting container for the waste toner which is not shown in the drawings.

Fig. 2 is a perspective view showing a plurality of the toner containers 30Y, 30M, 30C, and 30K, a plurality of the toner storing portions 40Y, 40M, 40C, and 40K, and a part of plural developing units 20Y, 20M, 20C, and 20K. Each of the container mounting portions 41Y, 41M, 41C, and 41K has each of the four toner containers 30Y, 30M, 30C, and 30K respectively placed parallelly on about the same plane and enables them to be mounted or dismounted. They are constructed to operate in such a controlled manner that upon decreasing of the amount of any toner in said developing units 20Y, 20M, 20C, and 20K, the corresponding toner in said toner containers 30Y, 30M, 30C, and 30K is replenished. Because these toner containers 30Y, 30M, 30C, and 30K all have almost the same construction, hereinafter the explanation will be given with reference to the container 30 as the representative of the containers 30Y, 30M, 30C, and 30K.

Now in reference to the Fig. 3 - Fig. 7 the first example of practice of this invention will be disclosed. Fig. 3 is a partial cross-sectional side view of the container 30; Fig. 4 is an exploded side view of said container; and Fig. 5 is an exploded perspective view of said container.

The container 30 is composed of a cylindrical container body 31 containing the toner inside, a fixed cover 32 fixed said container body 31, and a container opening-or-closing cover 33 which is capable of expansion and contraction.

One side of the container body 31 is opened as to form an opening 312. A guide portion (toner conducting portion) consisting of a coil-shaped protrusion 311 is formed on the inner surface of said container body 31, and the toner contained in the container body 31 is guided along the coil-shaped protrusion 311 to move to the direction of the opening 312. 313 is an engaging portion of a V-shaped groove provided on the cylinder surface in the vicinity of said opening 312, fitted closely with an engaging portion 322 of convex shape provided in the vicinity of an opening 321 of said fixed cover 32, which will be explained later, to make both engaging portion units, so as to fit the opening 312 and the opening 321 of the fixed cover 32.

On one side (right-hand side in the drawing) of the fixed cover 32, there are provided an opening 321 which is opposite to the opening of the aforesaid container body 31 and the engaging portion 322 of convex shape provided in the vicinity of the opening 321, and by joining and fixing the opening 312 of the container body 31, the both openings 312 and 321 communicate with each other. At the approximately central part of the other side (left-hand side) of the fixed cover 32 is formed a pro-

jected portion. The bumping portion 323 at the extreme end surface of said projected portion contacts with an opening-or-closing cover of the container-mounting portion 41, which will be explained later. On the outer peripheral surface of said projected portion is provided through its wall, a plurality of openings (openings for replenishing) 324, for the purpose of discharging the toner in the aforesaid container body 31 to accumulate it in the toner storing portion of the toner replenishing device 40, which will be explained later.

Inside the fixed cover 32 are placed and fixed the scooping-up portion (paddle) 325 composed of 2 - 4 plate members to scrape up the toner above the center axis of rotation R of the container 30 and the toner guiding portion 326 made of sloping surface to move-to-guide the toner scooped up by said scooping-up portion 325 to the aforesaid opening 324.

On the peripheral surface of the above-mentioned projected portion of the fixed cover 32, protruded claw portions are formed at three points. The first protruded claw portion 327 provided in the vicinity of the aforesaid bumping portion 323 of the projected portion engages with an engaging portion 331 provided in the vicinity of the left end portion, with regard to the drawing, of the aforesaid container opening-or-closing cover 33, being able to hold or disengage with the engaging portion 331. The second protruded claw portion 328 is fixed to engage with an engaging portion 332 provided in the vicinity of right end portion, with regard to the drawing, of the aforesaid container opening-or-closing cover 33.

The third protruded claw portion 326 engages with a container-slipping-off preventing portion 444 of the driving-force transmitting member 44, which will be explained later, being able to engage or disengage with the preventing portion 444.

The above-mentioned engaging portion 331 provided in the vicinity of the left end portion, with regard to the drawing, of the aforesaid container opening-or-closing cover 33 is able to be engaged or disengaged with the aforesaid first protruded claw portion 327. The middle part of said container opening-or-closing cover 33 is formed like a bellows and is capable of expansion and contraction in the direction of the center axis of rotation. Said container opening-or-closing cover 33 is formed like a bellows by blow molding method, and is fixed (fused to bond) to the aforesaid second protruded claw portion 328 by ultrasonic bonding. This bonding may be made by an adhesive.

Fig. 6 is a cross-sectional view showing the aforesaid container 30 before mounting to the container mounting portion 41 of the toner replenishing device 40, that is, as it is spaced apart from the container mounting portion 41; and Fig. 7 is a cross-sectional view of the container 30, the container mounting portion 41, the toner storing portion 42, and the toner feeding portion 43, with said container mounted to the container mounting portion 41.

The driving-force transmitting member 44 is sup-

ported, being capable of rotation, with two parallel upright wall 421 and 422 making up the aforesaid toner storing portion (toner hopper) 42. At the position which is opposite to the aforesaid bumping portion 323 of the container 30 and inside said driving-force transmitting member 44, the opening-or-closing cover 45 of the toner-replenishing device is placed and urged with a coil spring 46. The container-slipping-off preventing portion 444 is composed of a plurality of arms projected from the right-hand side, with regard to the drawing, of the driving-force transmitting member 44, each of the arms having an engaging claw at the end portion. Said container-slipping-off preventing portion 444 engages with the aforesaid third protruded claw portion 329 of the container 30, being capable of engaging and disengaging. Further, at the approximately central part, with regard to the direction of the center axis of rotation, of the driving-force transmitting member 44, a plurality of openings (toner discharging openings) 441 is provided through the peripheral wall. Furthermore, at the shaft part in the neighborhood of the left-hand side, with regard to the drawing, of said driving-force transmitting member 44, the container rotating gear 47 is fixed. Said container rotating gear 47 is driven to rotate with a drive source which is not shown in the drawings.

The aforesaid container is held by the container mounting portion 41 to be guided on its guide platform 411 to the left direction, with regard to the drawing, until the bumping portion 325 at the extreme end of the container 30 contacts with the right-hand side surface of the aforesaid opening-or-closing cover 45 of the toner replenishing device. Corresponding to successive moving of the container to the left direction, with regard to the drawing, the opening-or-closing cover 45 of the toner replenishing device is compressed against the force of the coil spring 46, gradually to open the openings (toner discharging openings) 441; when the aforesaid driving-force transmitting member 44 engages with the third protruded claw portion 329 to be joined to it, the opening 441 comes to the full-open state.

In this process of moving of the container 30, the bumping portion 325 of the aforesaid container opening-or-closing cover 30 capable of expansion and contraction bumps the inner wall 442 of the aforesaid driving-force transmitting member 44, prevented from going forward, and upon further moving of the container, the engaging portion 361 at the extreme end of the container opening-or-closing cover 30 disengages from the first protruded claw portion 327 at the extreme end of the container 30, to gradually open the openings (openings for replenishing) 324 on the side of the container 30; and at last when the aforesaid driving-force transmitting member 44 engages with the third protruded claw portion 329 to be joined to it, the openings 324 comes to the full-open state.

On the outer surface of the rotary shaft portion 443 projected to the left, with regard to the drawing, out of the aforesaid driving-force transmitting member 44, the

aforesaid container rotating gear is fixed to make them united. The central portion of the shaft of the driving-force transmitting member 44 is hollow, a through hole 448 being formed. Said through hole 448 is made in order that when the container 30 is mounted to the container mounting portion 41, the air in the opening-or-closing cover 45 for the toner replenishing device, compressed by the bumping portion 325 at the end of the container 30, may exhaust to the outside of the toner replenishing device. Accordingly, because the air flow does not come into the toner hopper when the container is being mounted and the opening-or-closing cover 45 for the toner replenishing device is being opened, the toner in the hopper will never be scattered.

After the container 30 and the driving-force transmitting member 44 has been engaged and joined in the above-mentioned manner, the aforesaid openings 324 on the side of the container 30 and the opening 441 on the side of the toner replenishing device 40 are brought into the state of being open to each other. On driving the gear 47 to rotate by the drive source, the container 30 and the driving-force transmitting member 44 which are united with the gear are driven to rotate as a united body; thus the toner contained in the container body 31 of the container 30 is propelled with the coil-shaped protrusion 311 to the direction of the opening 312, then scooped upward by the scooping-up portion (gaddle) 325, next sliding down the slope of the toner guiding portion 326 by gravity to be ejected out of the openings 324, and further, passing through the openings (toner discharging openings) 441 of the driving-force transmitting member 44, received in the hopper of the toner storing portion 42.

The amount of the toner received in said toner storing portion 42 is detected by a photo-detector means, and when it reaches to the predetermined value, the driving of drive source is stopped to cease the replenishing of the toner from the container 30.

Moreover, while aforesaid container 30 is rotated by the driving-force transmitting member 44 to replenish the toner to the toner storing portion 42, even if a predetermined amount of the toner becomes stored in the toner storing portion 42, continuing of the rotation of the container will not make any problem, because the toner is not replenished in this state in spite of the continued rotation of the container 30.

The toner received in the hopper of the toner storing portion 42, is fed into the feeding screw 431 fixed to the feeding-screw gear connected to a drive source, which is not shown in the drawing, conveyed in the toner feeding portion 43, and is replenished to the aforesaid developing unit 20.

Fig. 8 and Fig. 9 are cross-sectional views showing the second example of practice of this invention; Fig. 8 is a cross-sectional view showing the container 30 before mounting to the container mounting portion 41 of the toner replenishing device 40, that is, as it is spaced apart from the container mounting portion 41; and Fig. 9

shows a cross-sectional view of said container 30 as it is mounted to the toner replenishing device 40.

The toner replenishing device in this mode of practice of the invention has the same construction as that shown in the above-described Fig. 3 - Fig. 7, and only the container 30 has a different construction. Further, the same marks are used for this matters in Fig. 5 and Fig. 9 too, as long as they have the same function as those in said Fig. 3 - Fig. 7.

Furthermore, only the different points from the aforesaid example of practice will be explained.

Inside the aforesaid fixed cover 32, the toner discharging portion 341 having a hollow cylinder shape is formed unitarily. On the inner side of said toner discharging portion 341, a coil-shaped protrusion 342 is formed. At the position near the end of one side of said toner discharging portion 341, the position being also in the vicinity of the opening 312 of the container body 31, a toner introducing opening 343 is provided through its wall. At the position in the vicinity of the aforesaid bumping portion 323 on the other side portion of the toner discharging portion 341, the toner discharging opening 344 is provided through its wall. Further, in the vicinity of the aforesaid toner introducing opening 343 inside the aforesaid fixed cover 32, the scooping-up portion (peddle) 325 is formed unitarily.

When the container 30 is mounted to the toner replenishing device and driven to rotate, the toner contained in the container body 31 of said container 30 is propelled by the coil-shaped protrusion 311 to the direction of the opening 312, then scooped upward by the scooping-up portion (peddle) 325, next sliding down the slope of the scooping-up portion 325 by gravity to be introduced through the toner introducing opening 343 into the toner discharging portion 341 having a hollow cylinder shape, wherein the toner moves to the left direction, with regard to the drawing, guided by the coil-shaped protrusion 342 along the center axis, then discharged from the toner discharging opening 344 in the opened state as the container opening-or-closing cover 33 has already been retracted, finally the toner passes through the opening 441 on the side of the aforesaid toner replenishing device 40, and is received in the hopper of the toner storing portion 42.

Hereinafter with reference to Fig. 10 - Fig. 15, the third example of this invention will be disclosed. Fig. 10 is a cross-sectional view showing the construction of a color printer. Fig. 11 is a perspective view of the toner replenishing device 30 mounted with the toner container 30Y, 30M, 30C, and 30K.

Each of the container mounting portions 91Y, 91M, 91C, and 91K has each of the four toner containers 30Y, 30M, 30C, and 30K respectively placed parallelly on about the same plane and enables them to be mounted or dismounted. Each of the toner storing portions 97Y, 97M, 97C, and 97K stores each color toner respectively, and upon decreasing of the amount of any toner in said developing units 20Y, 20M, 20C, and 20K, the corre-

sponding toner is replenished in a controlled manner.

Because these toner containers 30Y, 30M, 30C, and 30K all have almost the same construction, hereinafter the explanation will be given with reference to the container 30 as the representative of the containers 30Y, 30M, 30C, and 30K; the container mounting portion 91 is referred to as the representative of container mounting portions 91Y, 91M, 91C, and 91K; and the toner storing portion 97 is referred to as the representative of the toner storing portions 97Y, 97M, 97C, and 97K.

Fig. 12 (a) shows a cross-sectional view of the aforesaid container mounting portion 91 of the toner replenishing device 30 and the toner container 30 before mounted, that is, as they are spaced apart; Fig. 12 (b) is an enlarged partial cross-sectional view of said container 30; and Fig. 12 (c) is an enlarged partial cross-sectional view of this container mounting portion 91.

The container 30 is composed of a cylindrical container body 31 containing the toner inside, a fixed cover 32 to fit the side surface, in the direction of the rotation axis, of said container body 31, and a container opening-or-closing cover 33 which is fixed at its one end to the aforesaid container body and capable of expansion and contraction.

An opening is provided on the projected portion of one side, with regard to the direction of the rotation axis, and is closed and fixed by the aforesaid fixed cover 32.

A guide portion (toner conducting portion) consisting of a coil-shaped protrusion 311 is formed on the inner surface of said container body 31, and the toner contained in the container body 31 is guided along the coil-shaped protrusion 311 to move to the direction of the fixed cover 32.

On the peripheral surface of the aforesaid projected portion of the container body 31, a plurality of openings (toner discharging openings) 312 for discharging the toner in the container body 31 is provided through its wall, the toner conveyed through the container mounting portion 91 of the toner replenishing device, which will be explained later, to be received and accumulated in the toner storing portion 97.

On the end side (left-hand side with regard to the drawings) of the fixed cover 32, a flut bumping portion 321 is formed, and contacts the opening-or-closing cover 34 (for the mounting portion) of the container mounting portion 91. Further, a ring-shaped projected portion is formed on the peripheral surface of the aforesaid fixed cover 32 unitarily, engages, being capable of engaging and disengaging, with the engaging portion (free end) 331 provided in the vicinity of the left end, with regard to the drawing, of the aforesaid container opening-or-closing cover, which is capable of expansion and contraction. The open surface at the right-hand side, with regard to the drawing, of the aforesaid container opening-or-closing cover 33 is a fixing portion (fixed end) 332 which is fixed with close contact to the

peripheral surface of the aforesaid container body 81. Said fixing portion 832 is bonded or welded to the container body to make both united.

The aforesaid container opening-or-closing cover 83 is made of polyethylene resin, is formed by blow molding method, having flexibility, with its outer surface formed to have a plurality of folds like a bellow, and is capable of expansion and contraction in the direction of the rotation axis R. The inside of the container opening-or-closing cover 83 forms a through hollow space.

The aforesaid container mounting portion 91 is composed of an outer cylinder member 92, an inner cylinder member 93, the mounting-portion opening-or-closing cover 94 capable of expansion and contraction, a coil spring 95, and the container rotating gear 96. Said outer cylinder member 92 and said inner cylinder member 93 are formed unitedly, and making up the toner guiding means which receives the toner discharged out of the container 80, and conveys it to replenish the aforesaid toner storing portion 97 with it.

The rotary shaft portion 921 to the left-hand side, with regard to the drawing, of the aforesaid outer cylinder member 92 is supported, being capable of rotation, by the two parallel upright walls which makes up the aforesaid toner storing portion (toner hopper) 97. At the end of said rotary shaft portion 921, the container rotating gear 96 is fixed. Said container rotating gear 96 is driven to rotate by a drive source which is not shown in the drawings.

The central portion of the aforesaid rotary shaft portion 921 is hollow, with a through hole 922 formed therein. Said through hole 922 is made in order that when the container 80 is mounted to the container mounting portion 91, the air in the mounting-portion opening-or-closing cover 94, compressed by the bumping portion 921 at the end of the container 80, may exhaust through the exhausting hole 923 to the outside of the toner replenishing device 90.

On the peripheral surface of the aforesaid inner cylinder member 93, a plurality of openings (toner discharging openings) 931 is provide through its wall. Said openings 931 communicates with the toner conveying path 924 formed by the aforesaid outer cylinder member 92 and inner cylinder member 93, and further with the aforesaid toner storing portion 97 through the toner replenishing opening 925 provided at the side of the outer cylinder member through its wall.

The engaging protrusion 932 projecting inward at the entrance portion on one side of the aforesaid inner cylinder member 93 engages with the end portion (free end) 942 at the entrance of the aforesaid mounting-portion opening-or-closing cover 94 to prevent the slipping off. Further, the engaging wall portion 933 at the other side of the inner cylinder member 93 is fixed (fused) with the engaging portion (fixed end) 943 at the innermost side of the mounting-portion opening-or-closing cover 94 by ultrasonic bonding. This bonding may be substituted by fixing with an adhesive.

The aforesaid mounting-portion opening-or-closing cover 94 is made of the polyethylene resin and is formed by blow molding method, having flexibility, with its outer surface formed to have a plurality of folds like a bellow, and is capable of expansion and contraction in the direction of the rotation axis R. The inside of the mounting-portion opening-or-closing cover 94 forms a through hollow space. The aforesaid coil spring 95 is placed in said space, being capable of expansion and contraction. Said coil spring 95 extends the mounting-portion opening-or-closing cover 94 by pressing it from the inside. The end portion at the entrance side of the mounting-portion opening-or-closing cover 94 is urged with the aforesaid coil spring 95, but it is a free end, being movable by an external force in the direction of rotation axis R.

Fig. 13 is a cross-sectional view of the toner replenishing device with the toner container 80 mounted to the container mounting portion 91, that is, a cross-sectional view showing the container 80, the container mounting portion 91, toner storing portion 97, and the toner feeding portion 98; Fig. 14 is an enlarged partial cross-sectional view of the toner container 80 and the container mounting portion 91; and Fig. 15 is a cross-sectional view through A-A of the toner container 80 and the container mounting portion 91 shown in Fig. 13.

The aforesaid container 80 is held and placed on the guiding platform 911 of the container mounting portion 91 to be moved to the left direction, with regard to the drawing; the bumping portion of the extreme end of the container 80 is made contact the right side of the aforesaid mounting-portion opening-or-closing cover 94.

Corresponding to successive moving of the container to the arrow mark direction, with regard to Fig. 12, in this process of moving of the container 80, the convex portion of the container opening-or-closing cover 83 bumps the entrance wall 934 of the aforesaid inner cylinder member 93, prevented from going forward, while the bellow portion of the container opening-or-closing cover 83 is compressed, the engaging portion 831 of the container opening-or-closing cover 83 disengages with the bumping portion 931 to be spaced apart; further, the fixed cover 82 presses the mounting-portion opening-or-closing cover 94. Due to this, the mounting-portion opening-or-closing cover 94 is compressed against the coil spring 95, thus the aforesaid opening (toner discharging opening) 931 is gradually opened to reach to the full-open state. This opening 931 in the full-open state comes to the same position as that of one of the openings 812 of the aforesaid container body 81, and that enables the discharging of the toner in the container body 81 to the opening 931 through the openings 812.

In reference to Fig. 15, the openings 812 are provided at four positions of the container body 81 through its wall, and protrusions 813 are provided at two positions on its periphery. Said protrusions 810 are fitted to

some of the concaves 935 provided at four positions on the inner wall of the inner cylinder member 93. When the outer cylinder member 92 which makes a united portion with said inner cylinder member 93 is driven to rotate with the container rotating gear 98 linked to a drive source, the container body 81 linked to the concaves 935 of the inner cylinder member 93 is also driven to rotate together.

In the vicinity of each of the aforesaid openings 931 provided at the four positions on the inner cylinder 93 through its wall, each of paddles 936, which sum to four in all, is protruded. Said paddles 936 are skewed to the direction of the rotation axis R, and cause the toner conveyed through the toner feeding path 924 to be discharged smoothly. Said paddles (scooping-up portion) 936 scoop up the toner ejected from said openings 931 and convey it in the toner feeding path 924, and then discharge it through the toner replenishing opening 925.

The toner discharged from the toner replenishing opening 925 passes through the opening 973 in the upright wall 971 of the toner storing portion 97, and is received in the hopper.

The amount of the toner received in said toner storing portion 97 is detected by a photo-detector means, which is not shown in the drawing, and when the amount of the replenished toner reaches to a predetermined value, the driving of drive source is stopped to cease the replenishing of the toner from the toner storing portion 97.

Moreover, while aforesaid container 80 is rotated by the driving-force transmitting member 44 to replenish the toner to the toner storing portion 97, if the height of the toner heap in the toner storing portion 97 reaches to the same level as the toner heap in the container, continuing of the rotation of the container 80 will not cause to make any problem such as blocking of the toner, because the toner is not replenished in this state in spite of the continued rotation of the container 80.

The toner received in the hopper of the toner storing portion 97 is fed into the feeding screw 932 fixed to the feeding-screw gear 931 linked to the drive source, not shown in the drawing, conveyed through the toner feeding portion, and replenished to the aforesaid developing unit 20.

In reference to Fig. 12 (a) and Fig. 13, above the container 80, container mounting portion 91, and the toner storing portion 97, a cover member 912 is arranged fixedly. At the entrance side of said cover member 912, an elastic member 913 for preventing slipping off of the container mounted is fixed and engages with the step portion 814 of the container body 81. Further, said elastic member 913 for preventing slipping off may be formed unitedly with a portion of the cover member 912. Furthermore, it is possible to make said elastic member 913 for preventing slipping off usable also as the member for preventing wrong mounting when the plural number of containers 80Y, 80M, 80C, and 80K are mounted to the prescribed container mounting portion

91Y, 91M, 91C, and 91K.

## EFFECT OF THE INVENTION

(1) The feature of the toner container according to one aspect of this invention is that it has an opening provided approximately parallelly to the center line of its cylindrical body on the periphery of the projected portion at approximately central part of its side, a scooping-up portion to scrape up the toner by rotating the container above the center axis of its rotation, and a toner guiding portion to guide the toner scooped up by the scooping-up portion to the opening.

First, because the opening is approximately parallel to the center line of the cylindrical body, the toner can be discharged by gravity with good efficiency.

Further, the opening is provided on the periphery of the projected portion at approximately central part of the side of the container, and the toner is guided to the opening by the aforesaid scooping-up portion and toner guiding portion; thus the toner can be dropped from the position near the center axis of rotation of the container, that results in being capable of keeping a good amount of the toner stored in the toner storing portion. Furthermore, because the toner is conveyed up to the position of a certain degree of height, it is possible that the structure of the toner replenishing device is simplified.

(2) The toner container of this invention has a container opening-or-closing cover capable of expansion and contraction provided in the vicinity of its opening portion to open or close the opening. The opening-or-closing cover capable of expansion and contraction such as this has a good sealing function because the toner inside never leaks out as long as the end of the cover is firmly pressed while closing; the users are never smeared with the toner on the occasion of the mounting or dismounting of the container.

(3) The feature of the toner container according to another aspect of this invention is that it has a toner scooping-up portion to scrape up the toner by rotating the container above the center axis of its rotation, and a toner discharging portion which is provided inside the peripheral surface of the container, receives the toner scooped up by the aforesaid scooping-up portion and falling down, and guides the toner by the coil-shaped protrusion provided in the inner surface of the toner discharging portion to the aforesaid opening of the container to discharge. By making the container have such construction, it is not required that the toner replenishing device to be mounted with the container has a function to discharge the toner in the container, hence it is possible to simplify the structure of the apparatus. Further, the toner is scooped up above

the center axis of rotation of the container to a certain position, is received as falling down, and then is guided by the coil-shaped protrusion to the opening of the container to be discharged, thus the toner can be dropped from the position near the center axis of rotation of the container, hence a good amount of the toner to be stored in the toner storing portion is secured. Furthermore, it is possible to make the efficiency of toner replenishing good.

(4) In accordance with this invention, the opening-or-closing cover of the container and that of the toner storing portion is opened or closed linked with the operation of mounting or dismounting of the container. By making the construction such as this, an additional operation to open or close each cover is not required and hence the troublesome operation is omitted.

(5) The third example of practice is an invention relating to a toner replenishing device which replenishes toner to a toner storing portion by rotating the toner container. The toner replenishing device is provided with a toner guiding means which guides the toner discharged from the opening provided at the peripheral surface of the toner container from a neighboring position of the periphery of the toner container to a position in the vicinity of the rotation axis of the toner container, the toner ejected therefrom to the toner storing portion. First, owing to placing the opening on the peripheral surface of the toner container, the toner is discharged with the best efficiency by the action of gravity upon rotating of the toner container, that enables discharging of the toner with no residues in the toner container. In addition, the structure of the toner container is simple, hence the cost for exchanging the container to be made several times for replenishing the toner to the image forming apparatus can be suppressed, this is effective for both the manufacturer and the users. Further, by providing such a toner guiding means as has the above-mentioned structure, though the toner container is adopted for the purpose of making the size of the apparatus smaller, the toner storing portion provided at the position beside the container, it is possible to secure a good amount of the toner stored in the toner in the toner storing portion, hence it is also possible to prevent such problems as lowering of the image quality and so forth, even during the exchanging of the toner container because of the lessening of the amount of the toner in the container.

(6) According to this example of practice, the opening-or-closing cover is provided at each of the openings, hence the toner leaking on the occasion of exchanging the toner container mounted can be prevented; further, by making the structure such that the cover is opened or closed on the occasions of the operation to mount or dismount the toner container, the operation to open or to close is

omitted, and hence time is also saved.

(7) According to this example of practice, a portion for transmitting driving force to rotate the toner container is provided at the toner guiding means, hence the space is effectively used, contributing to making the size of the apparatus smaller.

(8) Further, this example of practice has the feature that the scooping-up portion which scooping up the toner introduced through the opening of the toner guiding means above the axis of rotation of the toner container is provided in the toner feeding path of the toner guiding means, it is possible to cause the toner to fall down from a position higher than the rotation axis of the container to the toner storing portion, hence a good amount of the toner received and stored in the toner storing portion is secured. Furthermore, it is also possible to make the efficiency of storing and replenishing of the toner good.

#### Claims

1. A toner container for use in an image forming apparatus having a toner receiving section, comprising:

a cylindrical container body in which toner is stored, the cylindrical container body having a toner discharging end and provided with a spiral rib provided on its inner circumferential surface so that toner is conveyed toward the toner discharging end by the spiral rib when the cylindrical container body is rotated, the cylindrical container body further having a cylindrical portion with a discharging port on the toner discharging end, and

a sleeve member mounted around the cylindrical portion so that the discharging port is closed by the sleeve member, the sleeve member movable in the axial direction of the cylindrical portion so that when the toner container is attached to the toner receiving section of the image forming apparatus, the sleeve member is moved so as to open the toner discharging port.

2. The apparatus of claim 1, wherein the sleeve member is a retractable member so that the sleeve member returns so as to close the discharging port when the toner container is detached from the toner receiving section of the image forming apparatus.
3. The apparatus of claim 2, wherein the sleeve member is a bellows.
4. The apparatus of claim 1, further comprising:

a scooping member to scoop toner above the rotation axis of the cylindrical container body

when the cylindrical container body is rotated, and a guide member to guide the scooped-up toner to the discharging port.

5. The apparatus of claim 1, wherein the cylindrical portion is provided with spiral rib on its inner circumferential surface and a receiving port through which the scooped-up toner is dropped into the cylindrical portion, and wherein the toner is conveyed from the receiving port to the discharging port by the spiral rib when the cylindrical portion is rotated together with the cylindrical container body.

6. An apparatus for supplying toner to an image forming apparatus, comprising:

a toner container comprising

a cylindrical container body in which toner is stored, the cylindrical container body having a toner discharging end and provided with a spiral rib provided on its inner circumferential surface so that toner is conveyed toward the toner discharging end by the spiral rib when the cylindrical container body is rotated, the cylindrical container body further having a cylindrical portion with a discharging port on the toner discharging end;

a sleeve member mounted around the cylindrical portion so that the discharging port is closed by the sleeve member, and

a toner receiving section having a recess, wherein the sleeve member is movable in the axial direction of the cylindrical portion so that when the cylindrical portion is inserted into the recess, the sleeve member is moved so as to open the discharging port and the toner is supplied to the toner receiving section through the discharging port of the toner container and the recess.

7. The apparatus of claim 6, wherein the recess is a cylindrical recess and the recess is provided with a toner receiving part, and the toner is supplied to the toner receiving section through the toner receiving part.

8. The apparatus of claim 7, wherein the cylindrical recess is rotatable, on the outer circumferential surface of the cylindrical recess is provided a scooping member to scoop toner above the rotation axis of the cylindrical recess when the cylindrical recess is rotated with the cylindrical container body and the scooped-up toner is guided along the outer circumferential surface of the cylindrical recess.

9. The apparatus of claim 6, wherein the sleeve member is bellows and the bellows is retracted so as to open the discharging port when the cylindrical portion is inserted into the recess.

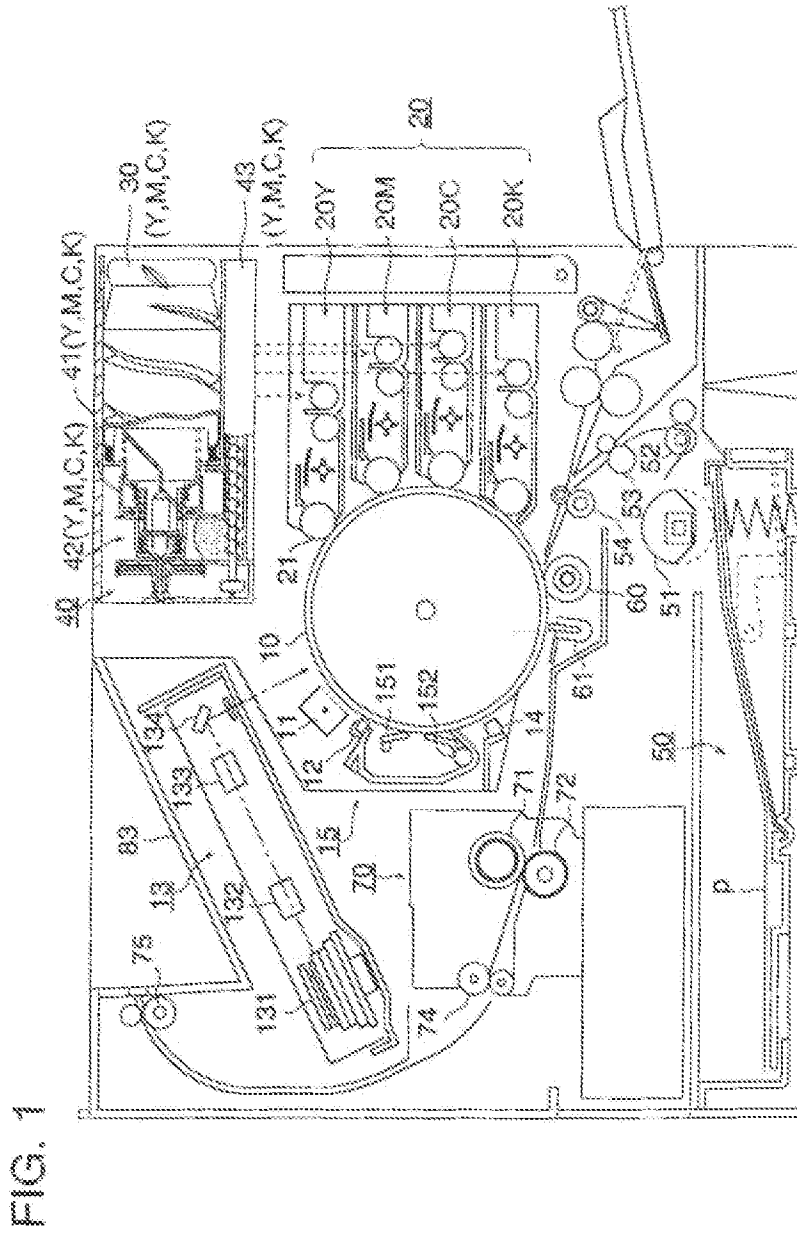
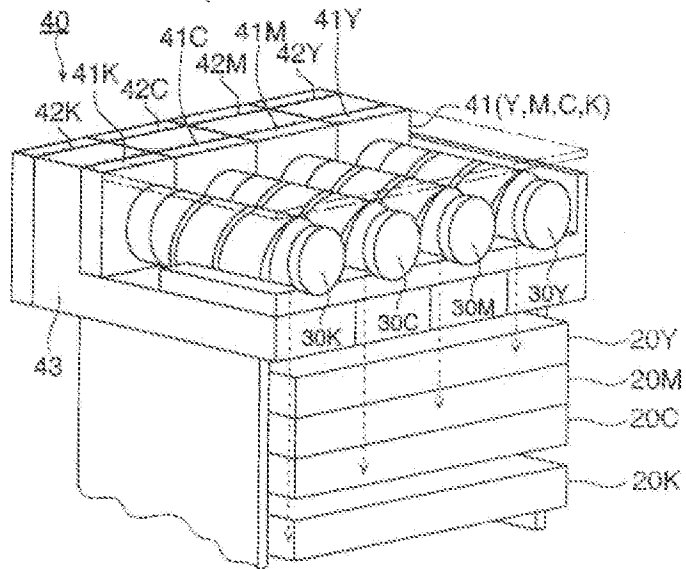
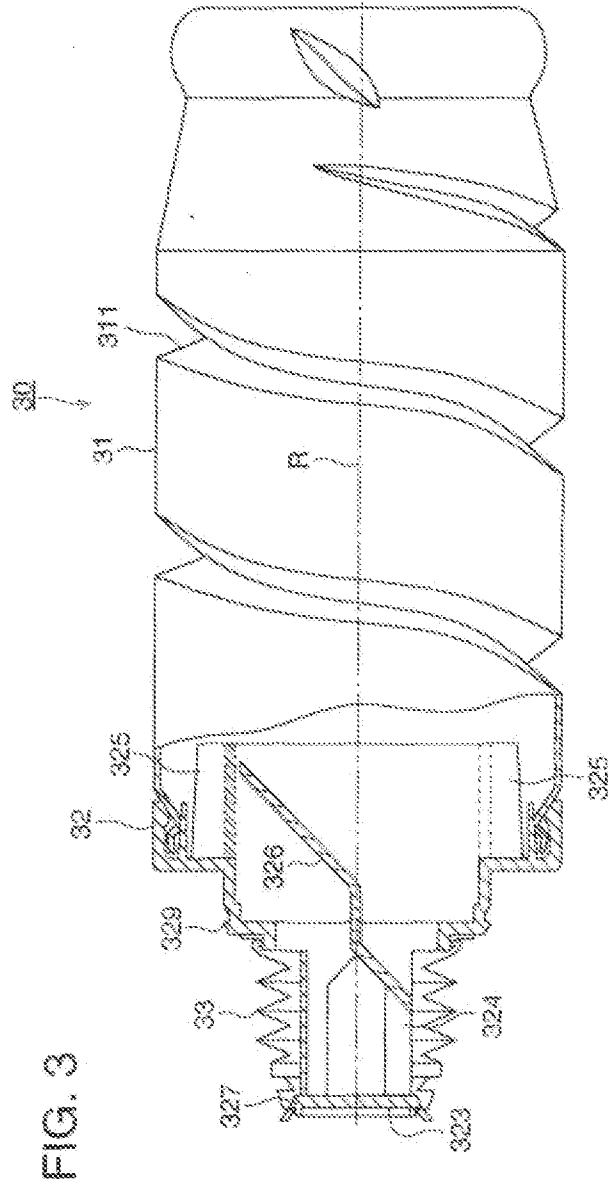




FIG. 2





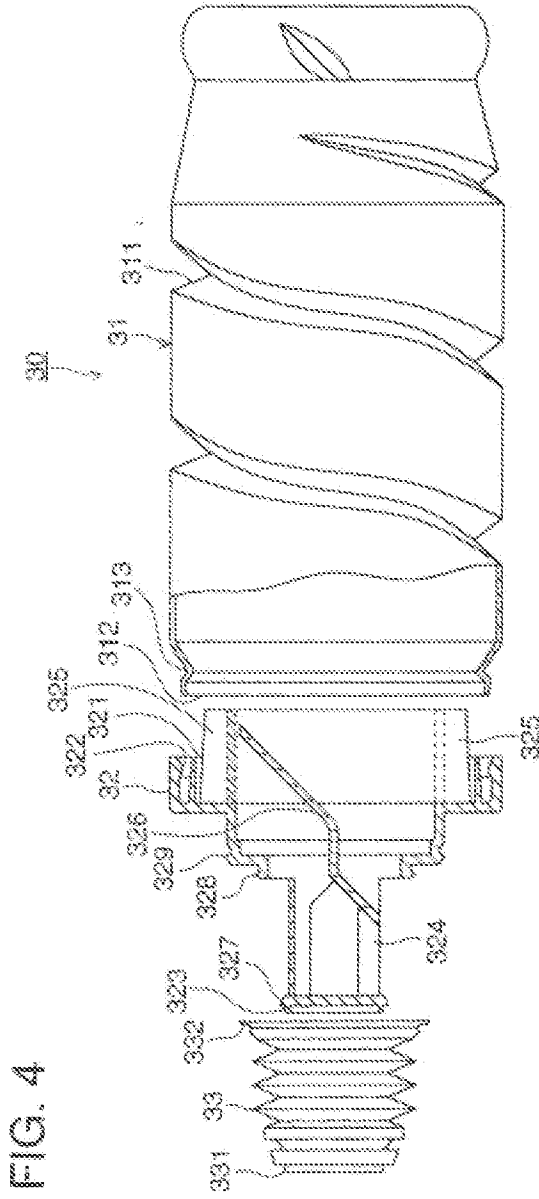
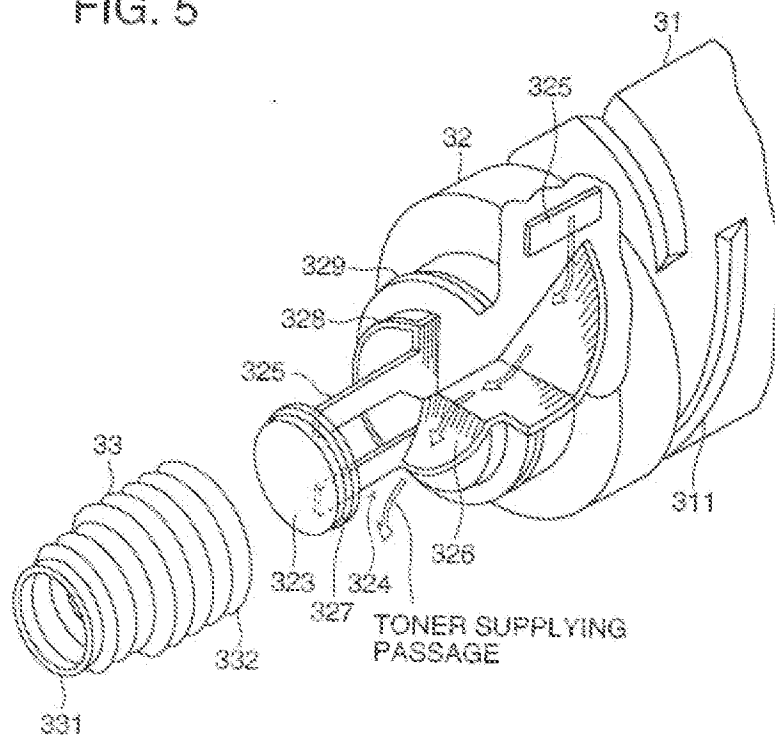


FIG. 4

FIG. 5



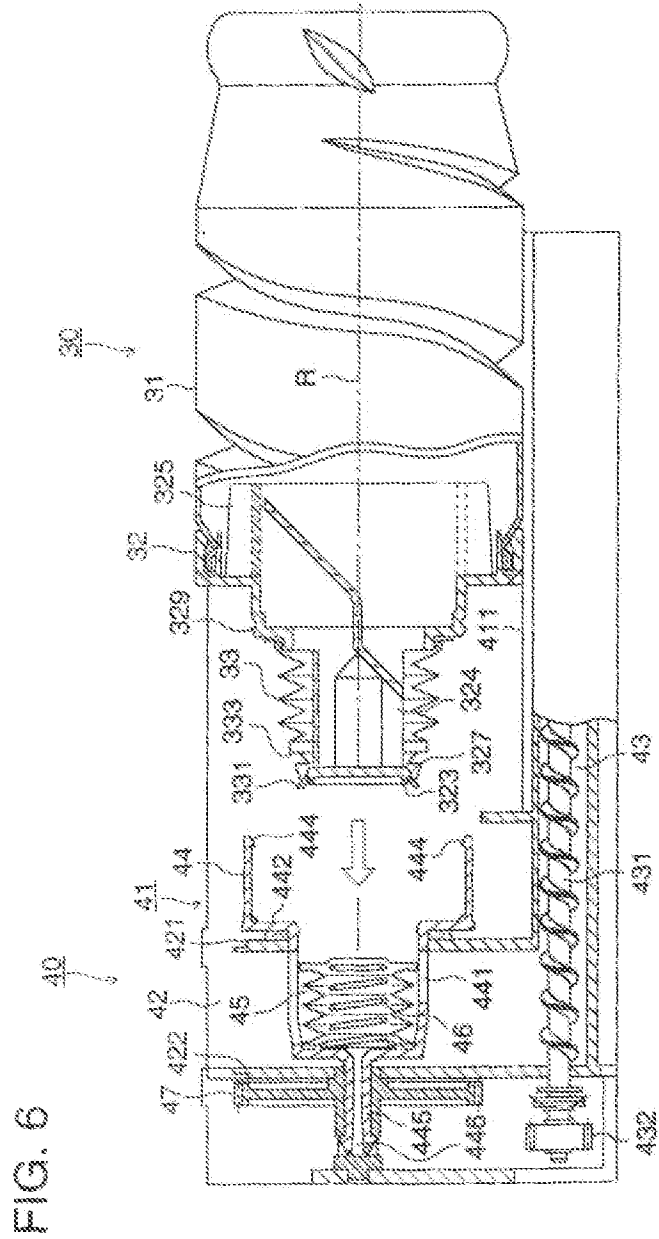


FIG. 7

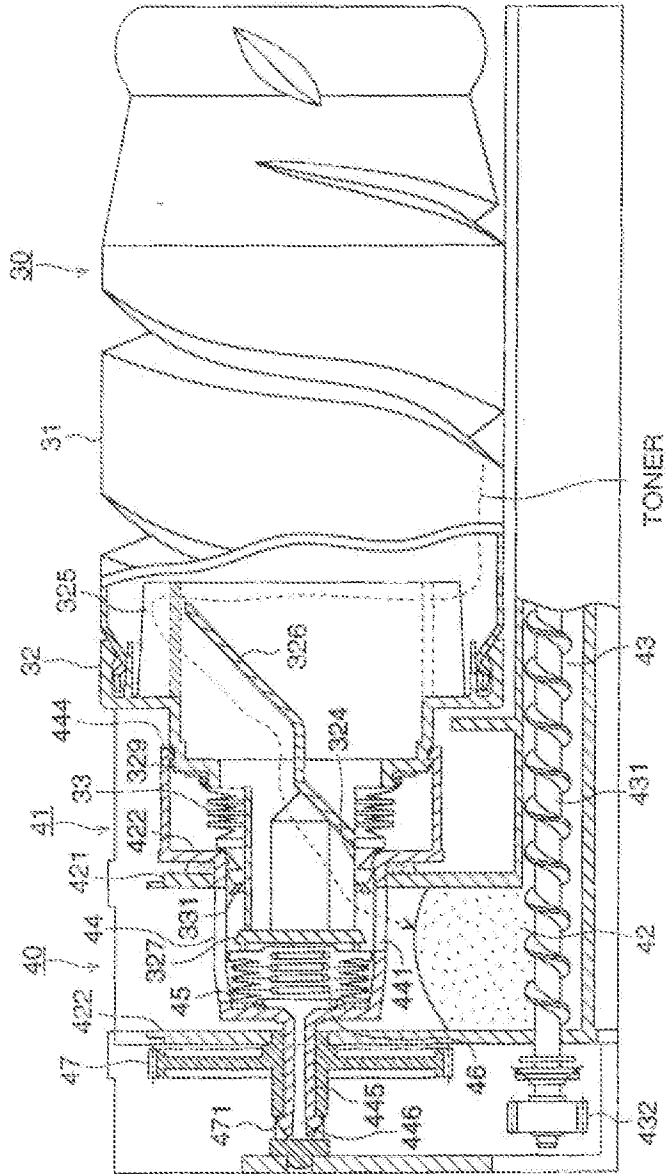


FIG. 8

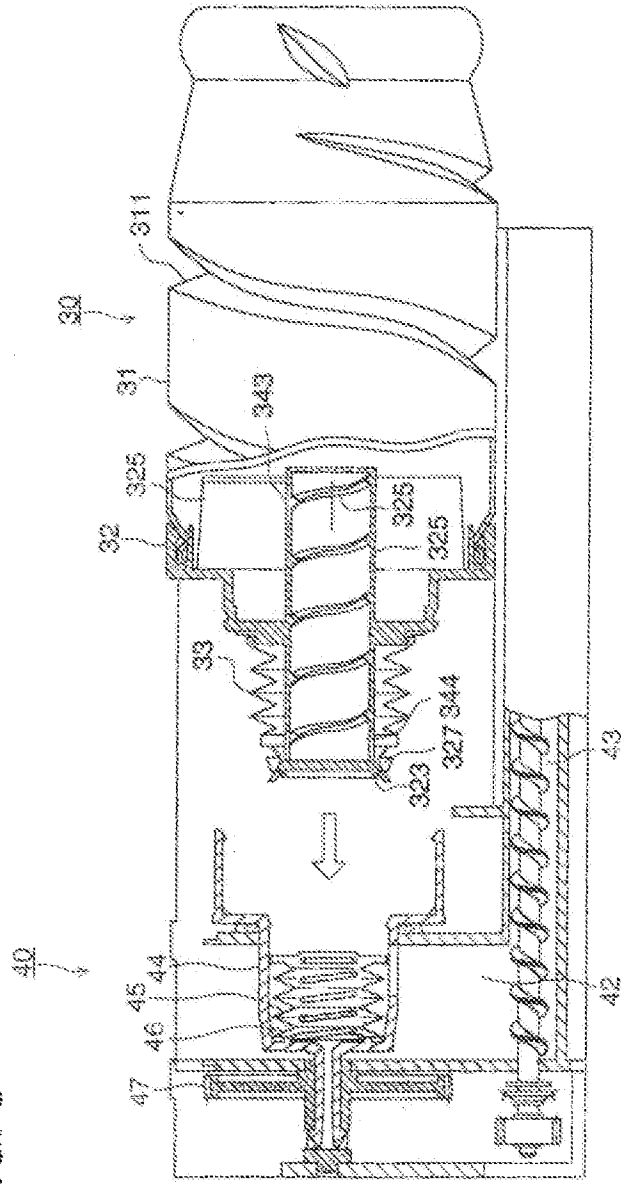


FIG. 9

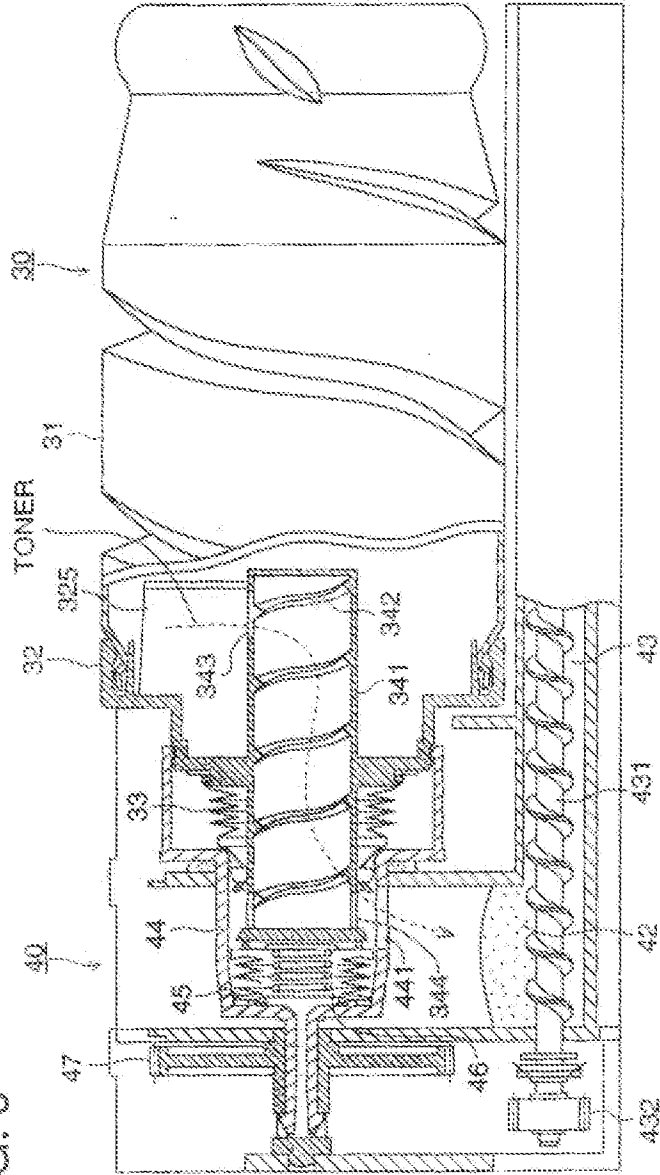




FIG. 10

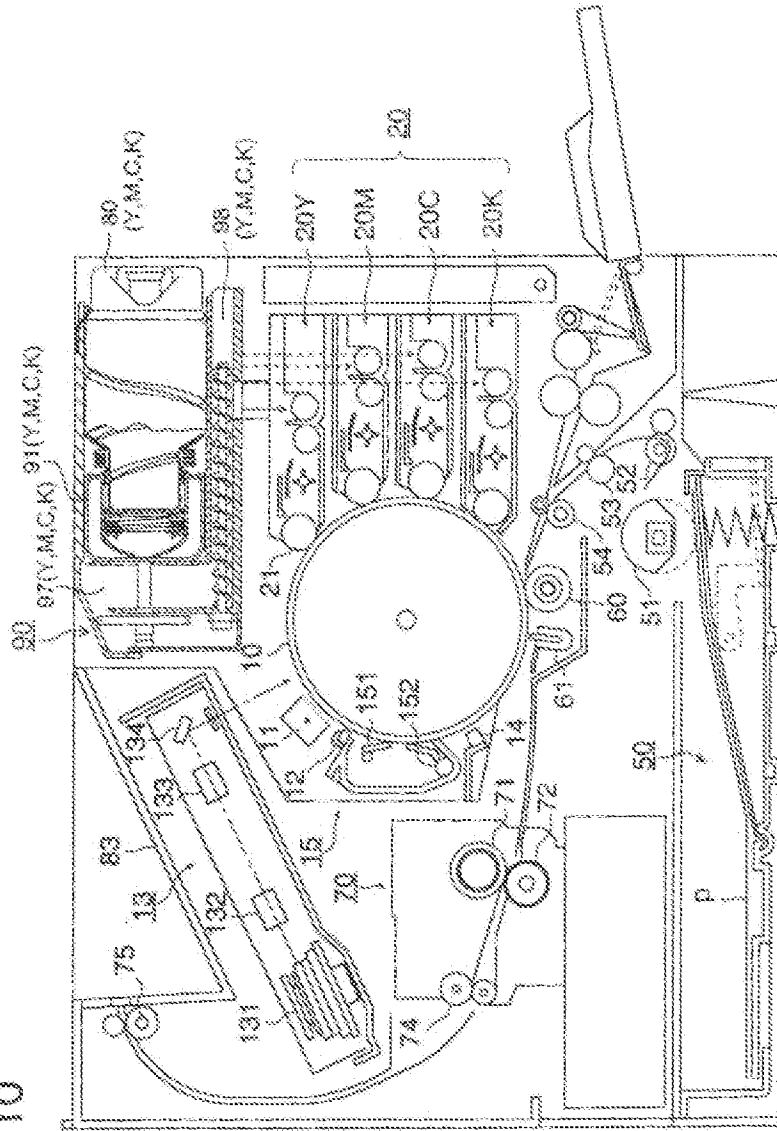
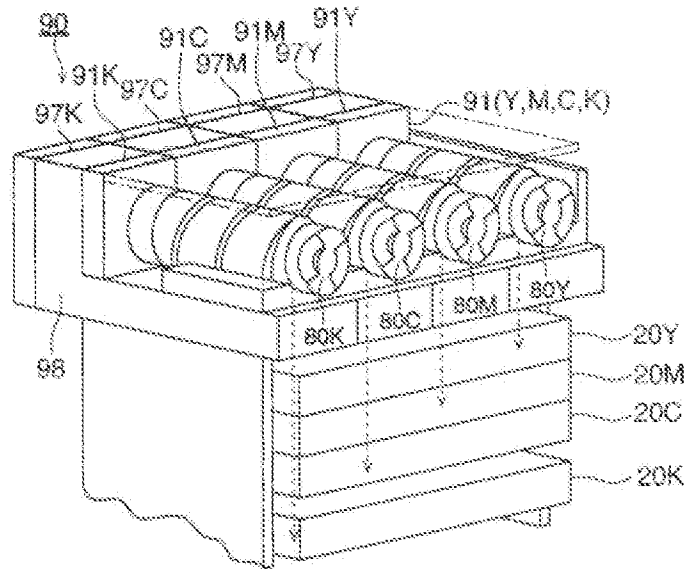


FIG. 11



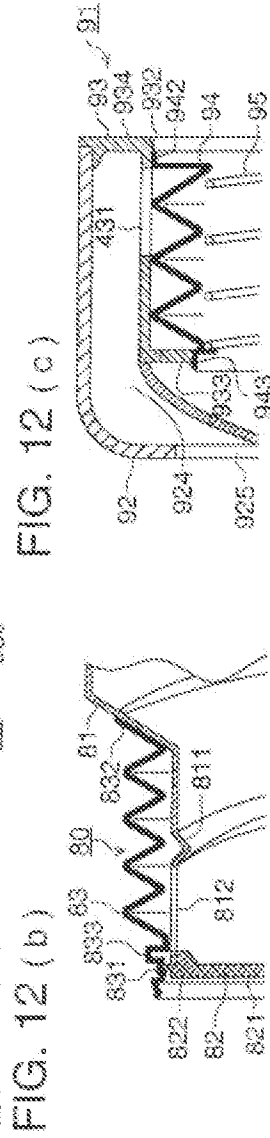
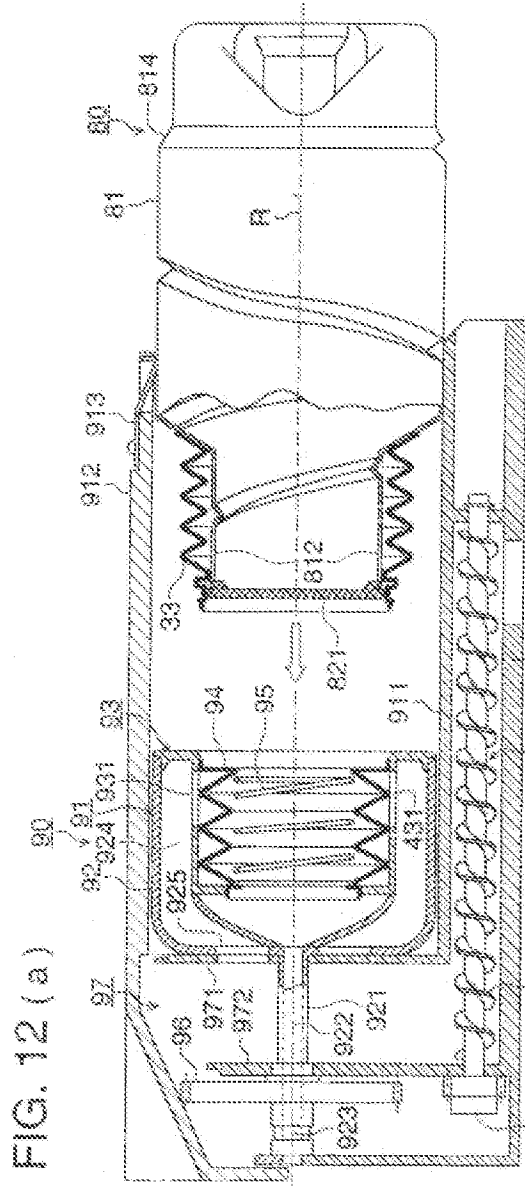


FIG. 13

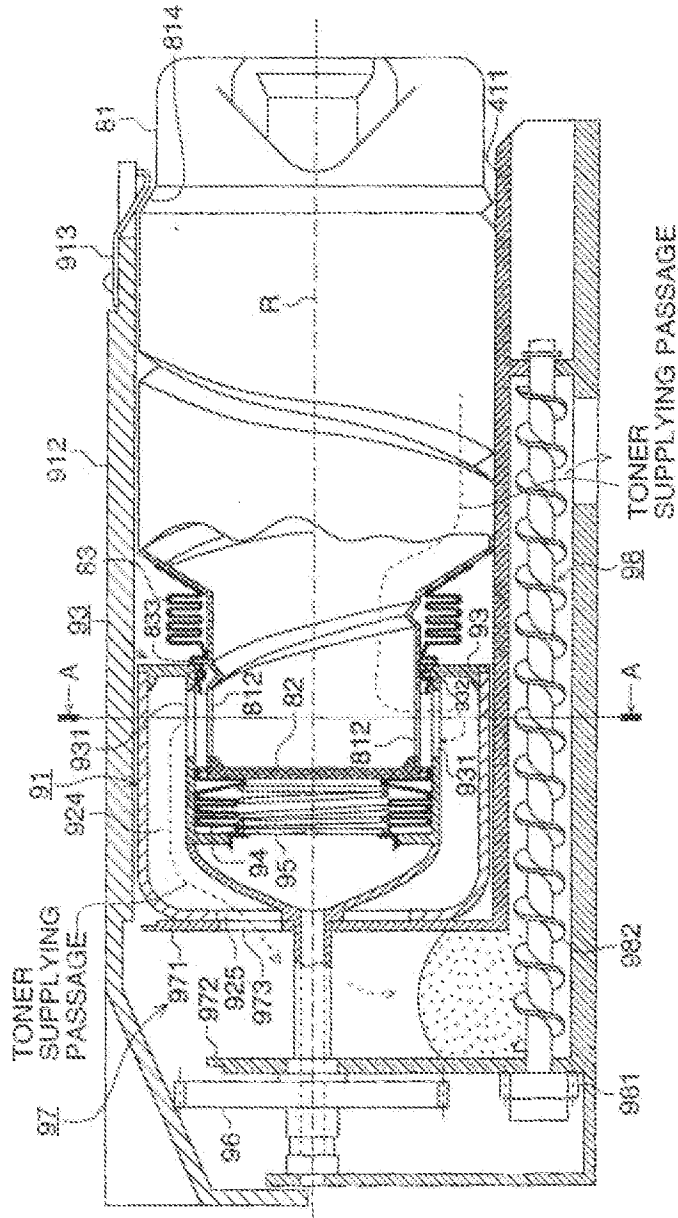


FIG. 14

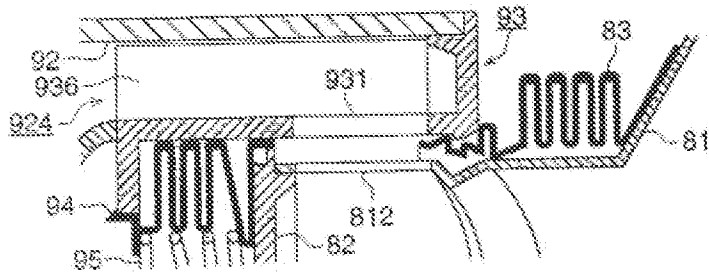
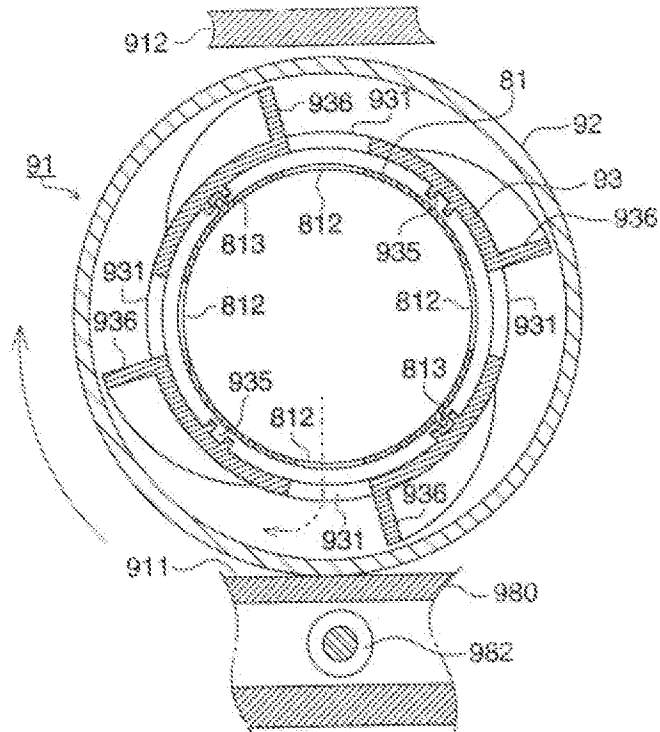
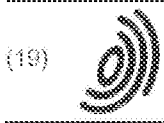
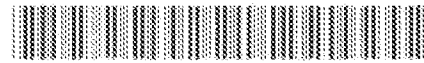


FIG. 15





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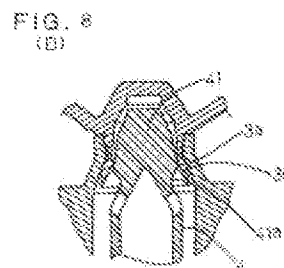
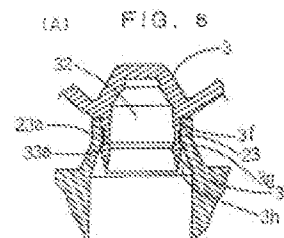
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(54) **TONER CARTRIDGE AND MECHANISM FOR OPENING AND CLOSING COMMUNICATION PORT OF THE SAME**

(57) A toner cartridge is provided which may surely and easily open and close a toner outlet when only the amount of toner corresponding to the amount used up in the device such as copying machines is supplied from the toner cartridge in sequence as needed, and which may preserve the toner without deterioration for a long period of time. By introducing toner through a toner discharge member 201 of the toner container 204, the toner container 204 is filled with the toner. A valve body 206 of the toner discharge member 201 includes a main fitting portion 209 of closing the outlet 208 by fitting in the outlet 208, and a connecting portion 213 adapted to be connected with a valve body operating member 211 of the device such as copiers. If the valve body operating member 211 of the device descends, the connecting member 213 moves together with the valve body operating member 211 by contact with the latter to achieve a fitting connection between the main fitting portion and the outlet 208, thereby to ensure a closing to the outlet.



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## Description

### Technical Field

[0001] The present invention relates to a toner cartridge for supplying powder or liquid toner (including printing ink) to the developing device such as a copying machine, printer, or printing machine, and the opening and closing mechanism for pass-through of same.

### Background Art

[0002] Powder or liquid toner as an electrophotographic developer for use in the copying machine, printer, or printing machine is generally contained in a toner cartridge for further supply of same to the device such as the copier. The toner is transferred from the toner cartridge into the toner reservoir of the copier. A structure has been used for this purpose such that a seal is affixed to the toner outlet, and the seal is removed when the toner is supplied. However, with said structure, once the seal has been peeled off, the outlet can not be closed again.

[0003] Toner cartridges have been proposed wherein the toner outlet is provided with a valve body which is biased by a spring in a direction of its blocking passage (Japanese Patent Applications laid open Nos.60-80878, 7-44005, and 8-137229). With these devices, however, it is necessary to mount a spring in the toner container. This renders the structure complex, and if the toner cartridge is subjected to a great vibration during transportation, there is a risk of the spring coming loose to such an extent that a trace of toner may leak out.

[0004] Said Japanese Patent Application laid open No.7-44005 disclosed a toner cartridge wherein the toner outlet is put in a closed position by fitting a valve body in the outlet prior to use of toner, and the toner outlet is opened by pushing up the valve body to open it when the toner is used. However, once the outlet has been opened, the fitting position can not be retraced. Therefore, the outlet can not be closed completely during the operation. In this connection, in case the form is taken of supplying toner from the toner cartridge in sequence dependent on the amount of toners consumed, there may incur a risk of toner leaking little by little from the outlet with no valve fitted therein. The Japanese Patent Application laid open No.7-44005 proposed an arrangement such that the closed position of the outlet by the valve may be retained by magnetic force. The necessity of mounting an additional member such as a magnet will unavoidably involve extra production cost.

[0005] In the past have been used toner containers chiefly made of hard synthetic resins which may remain unchanged in volume irrespective of the consumption of toners. However, in case toners are supplied in sequence from the toner cartridge in accordance with

the toner consumption, a certain amount of toner may be left over within the toner container for a long period of time. In that case, the toner is apt to deteriorate because the toner remains exposed to the air inside the toner container for a long time.

### Disclosure of Invention

[0006] In this view, the present invention provides for its object a toner cartridge which may surely and easily open and close the toner pass-through.

[0007] Another object of the present invention is to provide a toner cartridge which may prevent deterioration of toner in the toner container for a long period of time even if the form is taken of supplying toners in sequence from the toner cartridge according to the amount of toners used up.

[0008] Further object of the present invention is to provide a toner cartridge which may surely and easily open and close the pass-through, and in particular, is suitable for a supply system in which each toner loss may only be compensated for by replenishment of fresh toners.

[0009] Further object of the present invention is to provide an opening and closing mechanism of the pass-through in the toner cartridge, which is of a relatively simple structure but may readily open and close the pass-through, and securely maintain the closed position once the pass-through has been closed.

[0010] In order to solve the above-mentioned technical tasks, the present invention provides the following means.

[0011] A first invention of the present application provides a toner cartridge comprising a toner container containing of powder or liquid toners for use in developing device, and a connecting member for supplying the toners from said toner container to the developing device, characterized in that the connecting member includes a pass-through and a valve body for opening the pass-through provided in the connecting member when a valve body operating member of the developing device is at work, and closing the pass-through when the valve body operating member is at rest, and that the toners may be discharged from the opened pass-through.

[0012] The connecting member so called here functions as a toner discharging member and its pass-through serves as a toner outlet when the toners are discharged from the toner cartridge, while the connecting member functions as a toner filling member and its pass-through serves as a toner fill opening when the toner cartridge is filled with the toners (this applies to the following inventions).

[0013] A second invention of the present application provides the toner cartridge in accordance with the first invention, characterized in that the toner container is provided with a shrinkable portion of shrinking according to the loss of toners in the toner container.

[0014] In the first and second inventions of the present application, when a toner supply is needed in the developing device such as copiers, the valve body operating member of the developing device is operative to open the outlet to supply toner. As soon as the supply of a desired quantity of toner is finished, the valve body operating member of the developing device is put in a non-operative position, and the pass-through is closed by the valve body, thereby to head off any possible leakage of toner from the pass-through. The valve body operating member may be arranged such that it may actuate the valve, moving to or away from the valve body, or it is put in the operating or nonoperating position by the cartridge moving to or away from the valve body operating member while the valve body operating member itself is stationary in a location. The actuation of the valve by the valve body operating member may be automatically achieved, and the switchover of the operating position to the nonoperating position and vice versa may be manually carried out.

[0015] With the second invention of the present application, since the toner container is provided with a shrinkable portion of shrinking according to the toner loss, the internal volume of the toner container is decreased as the toner is discharged. This may place a check on entry of air into the toner container, and thus, even if the toner supply is kept suspended for a long time, any deterioration of toners in the toner container can be prevented.

[0016] A third invention of the present application provides a toner cartridge in accordance with the second invention, characterized in that the toner container may be filled with toner by pouring toner through the connecting member when the shrinkable portion of the toner container is in the shrink position, and that the valve body has a main fitting portion of closing the pass-through by fitting into the pass-through, and a connecting portion of connecting with the valve body operating member so that when the valve body operating member of the developing device relatively proceeds to an undischarged position, the connecting portion displaces together with the valve body operating member while the former is held in connection with the valve body operating member, whereby the main fitting portion is fitted with the pass-through.

[0017] In the third invention of the present application, since the toner container is filled with toner by injecting toners through the outlet when the shrinkable portion of the toner container is in the shrink position, toners can be put into the toner container which does not almost contain air. Referring to a bag made of resilient synthetic resin and called pouch, it may be filled with some content by injecting the latter through a location other than the outlet before it is sealed by hot welding. Specifically, filled contents are probably involved in hot welded zones. For example, if the filled contents are liquid or fine particles and its quantity is thick on the ground, said contents may reach the welded zones. In

particular, in case of the fine particles, floating powders may be involved in the welded zones. Then, a sufficient welding can not be performed. Particularly, in case the toner is of a liquid type, if hot welding is carried out with the liquid involved, the liquid expands according to the change of temperature so that there is a high possibility of a sufficient hot welding being unobtainable. This necessitates the provision of a sizable gap between the filled contents and the hot welded zone of a synthetic resin pouch. As a result of it, a space necessary for the performance of thermal welding must be provided, which makes it difficult to completely fill the entire container with the content, thereby resulting in a sealing with air-packed space. Contrary to this, this invention can almost fully fill the container with toners because the toner container may be filled with toners in a condition where little air occurs in the container. Therefore, a long-term preservation of toner could never cause any change of properties to the toner. Moreover, since the filling takes place when the air rarely remains within the container thanks to the complete shrinkage of the shrinkable portion of the toner container, it is unnecessary to eliminate air from or introduce air into the container at the filling time. This enables speedup of the filling operation.

[0018] Additionally, in the third invention of the present application, the valve body has a main fitting section of closing the pass-through by fitting with the pass-through, and a connecting portion of connecting with the valve body operating member so that when the valve body operating member of the developing device relatively proceeds to an undischarged position, the connecting portion displaces together with a valve body operating member while the former is held in connection with the valve body operating member, whereby the main fitting member is fitted into the pass-through. Consequently, the pass-through is strongly sealed by the fitting between the main fitting member of the valve body and the pass-through (in particular, by a forced fitting operation which is performed by deforming the constituent materials of at least one of the both members to be fitted to each other). Said forced fitting operation may be completed not by a spring but by moving the valve body by means of the connection of the connecting portion of the valve body and the valve body operating member.

[0019] Thus, the connection of the connecting portion and the valve body operating member may preferably provide a connection of the valve body and the valve body operating member which may be performed by fitting of the main fitting portion into the pass-through, especially, with a strength which can constitute a forced fitting. The examples of specific means to achieve such a purpose are the forced fitting of the connecting portion and the valve body operating member, the provision of a receiving hole on one of the members and a projection on the other one, or the connection of the both members by screws and magnetic force.



**[0020]** In the first, second and third inventions of the present application, a direct connection of the pass-through and the storing section such as the toner reservoir at the developing device's side through a peripherally closed discharge pathway in the form of a cylinder is advantageous in that toners can be prevented from scattering in the device and that toners can be introduced into the storing section such as the toner reservoir at the developing device's side to the exclusion of the air from outside. As an example of concrete means for achieving the purpose may be illustrated a valve body operating member at the developing device's side which is in the shape of a hollow cylinder so as to also serve as a discharge pathway so that when the valve body is in an open position, the hollow cylindrical valve body operating member may communicate with the toner container. Alternatively, if the valve body operating member does not function as a discharge pathway, the peripherally closed discharge pathway such as a cylinder may be put to or fixed into the pass-through.

**[0021]** The fourth invention of the present application provides a toner cartridge as defined in the described inventions characterized in that the toner container includes a second connecting member other than said connecting member, and that the second connecting member may selectively conduct circulation of fresh air so as to adjust the pressure inside the toner container.

**[0022]** When the toner container is filled with toners or toner are discharged from the container, the fourth invention makes it possible to make adjustment of the air within the container to ensure that a smooth filling or discharging of toners will take place.

**[0023]** A fifth invention of the present application provides a toner cartridge as defined in the described inventions characterized in that the toner container receives toners injected from the connecting member until the toner container is filled with the toners, and then, the discharge of the air within the toner container may be executed by an air discharge means of discharging the air from the container without allowing an outflow of the toner.

**[0024]** In this fifth invention, the discharge of the air within the container can be also made after toners have filled the container in, whereby adjustment of the pressure within the container and prevention of deterioration of the toners can be effectively achieved.

**[0025]** A sixth invention of the present application provides an opening and closing mechanism for the pass-through of the toner cartridge, characterized in that a connecting member of the toner cartridge for supplying powder or liquid toner for developing device from the toner cartridge comprises a main body provided with a pass-through, a valve body for opening and closing the pass-through, moving to or away from the pass-through, a fixing means for fixing the valve body to ensure that the valve body holds the outlet in the closed position, and a valve body operating member for moving

the valve body between the opened and closed positions by contact with the valve body.

**[0026]** With the sixth invention of the present application, when the supply of toner is needed in the developing device such as copiers, the connecting member is opened by the action of the valve body operating member for supply of toner. If a desired supply of toner is finished, the valve body operating member is put in a nonoperating position so that the connecting member is closed by the valve body, thereby preventing any leakage of toner from the connecting member. The valve body operating member may be arranged such that it may actuate the valve, moving to or away from the valve body, or it is put in the operating or nonoperating position by the cartridge moving to or away from the valve body operating member while the valve body operating member itself is stationary in a location. The actuation of the valve by the valve body operating member may be automatically achieved, and the switchover of the operating position to the nonoperating position and vice versa may be manually carried out. The valve body operating member may be separate from or integral with the valve body. The toner container may be provided with the shrinkable portion of shrinking according to the loss of toners within the toner container, but it may be of a deformable type which is made from hard resin. However, a toner container with the shrinkable portion decreases its internal volume as toners are discharged. This may advantageously avoid any entry of air into the toner container, and prevent any deterioration of the toner even if the supply of toner remains suspended for a long period of time.

**[0027]** A seventh invention of the present application provides an opening and closing mechanism for the pass-through of the toner cartridge characterized in that the connecting member of the toner cartridge for supplying powder or liquid toners for developing device from the toner cartridge comprises a body including a pass-through, a valve body for opening and closing the pass-through by moving to or away from the pass-through, a retaining means for retaining the valve body in a position to render the pass-through closed, and a valve actuating member formed integral with the valve body for moving the valve body between opened and closed positions, said valve actuating member being provided to stretch over the areas in and about the pass-through, and that the valve body operating member arranged outside the pass-through puts the valve actuating member in motion so as to move the valve body between opened and closed position.

**[0028]** With the seventh invention, the valve body and the valve actuating member for actuating the valve body are formed integral with each other, and the valve body operating member is designed to operate the valve actuating member.

**[0029]** A eighth invention of the present application provides the opening and closing mechanism for the pass-through of the toner cartridge as defined in any of

the sixth and seventh inventions, characterized in that the valve body operating member is provided in the developing device, the valve body operating member acts to put the valve body in an opened position only when the developing device is in need of supply of toners, and the valve body operating member acts to put the valve body in a closed position when the supply of toners comes to end.

[0030] The eighth invention makes it possible to completely prevent the air from flowing into the toner container by means of an arrangement such that the valve body is opened only when the developing device needs the supply of toners, and closed when the supply of toners is over.

[0031] A ninth invention of the present application provides the opening and closing mechanism for pass-through as defined in said sixth to eighth inventions, characterized in that a working member for moving the connecting member and the valve body operating member relatively to and/or away from each other is provided in the developing device by displacing at least one of the connecting member and the valve body operating member for manual or automatic control of said working member.

[0032] The working member of the ninth invention causes more simple coupling and non-coupling of the connecting member of the toner cartridge and the valve body operating member at the side of developing device.

[0033] The toner cartridge in accordance with the respective inventions of the present application implies a cartridge for supplying powder or liquid toner (including printing ink) to various kinds of developing/printing devices such as the copier, printer (laser printer, inkjet printer), and printing machines (hereinafter referred to as the developing device). The developing/printing devices include a system in which a reservoir is provided of storing toners which have been supplied from the cartridge, and a system in which there is not provided a reservoir, but the toner cartridge functions as a toner reservoir instead, too. The present invention is applicable to any system.

[0034] The first and second inventions of the present application provide a toner cartridge wherein the outlet can be surely and readily opened and closed, and in particular, as the quantity of toner corresponding to that of toners used up in the developing device may only be supplied from the toner cartridge in sequence, and additionally, the toner discharge pathway may be used as a toner filling pathway, whereby the toner filling operation can be surely and easily carried out. Moreover, toners may be supplied to the storing section such as a toner reservoir of the copier etc., by establishing a direct connection of the latter with the outlet, thereby preventing the toner from scattering within the system as well as the entry of air into the system when the toner filling takes place so that toners maintaining its high quality may be supplied.

[0035] In accordance with the second invention of the present application, in addition to the above-described effect, since the shrinkable portion of the toner container is adapted to shrink according to the loss of toner, no space will be formed in any place of the toner container, thereby affording protection of toners against contact with air so that any deterioration of toners within the toner container can be arrested for a long period of time.

[0036] With the third invention of the present application, in addition to the effects of the first and second inventions, the valve body can be surely fitted to the outlet only by a simple motion of the valve body operating member of the developing device rather than biased by a spring to ensure that the outlet will be made airtight by a simple structure and operation. Additionally, the toner container can be almost completely filled with toners by pouring the toners through the discharge member with the shrink member of the toner container kept in the shrink position, so that the toner may be preserved without any quality change for a long time and the filling operation can be conducted with higher speed.

[0037] In the fourth and fifth inventions, adjustment of pressures inside the toner cartridge can be made, and deterioration of toners can be avoided by discharging the air from the container.

[0038] The sixth invention of the present application provided the opening and closing mechanism for the connecting member of the toner cartridge wherein the connecting member can be easily opened and closed by a relatively simple structure, and once the connecting member has been closed, such a closed condition can be securely maintained.

[0039] In the seventh invention of the present application, the valve body and the valve body operating member of operating the valve body are formed integral with each other, and the valve body operating member is adapted to impel the valve actuating member to action.

[0040] In the eighth invention of the present application, the valve body is opened only when the developing device needs the supply of toners, and closed when the supply is over, so that the entry of air into the toner container can be fully prevented. In the ninth invention of the present application, the working member provided in the developing device may cause more simple coupling and non-coupling of the connecting member of the toner cartridge and the valve body operating member of the developing device.

#### Brief Description of Drawings

[0041]

Fig.1 is a front view of a toner cartridge in accordance with one mode of practice of the present invention,

Fig.2 (A) is a plan view of a discharge member of

said cartridge, fig.2(B) is a longitudinal section view of the discharge member, and fig.2(C) is a sectional view of a valve body operating member of the device such as copiers,

Figs.3(A), (B), and (C) are sectional views showing toner discharge procedure steps in said cartridge, Figs.4(A) and (B) are views explanatory of the internal structures of toner cartridges in accordance with another mode of practice of the present invention,

Fig.5 is a perspective view of the discharge member of a toner cartridge in accordance with further mode of practice of the present invention,

Fig.6 is a sectional view of the discharge member of a toner cartridge in accordance with another mode of practice of the present invention,

Fig.7 is a sectional view of the discharge member of a toner cartridge in accordance with further mode of practice of the present invention, (A) showing a closed position, and (B) an opened position,

Figs.8(A), 8(B), 9(A), 9(B), and 9(C) are sectional views explanatory of the courses for the operations of the valve body;

Fig.10 is a semi sectional view of the discharge member of a toner cartridge in accordance with further mode of practice of the present invention,

Fig.11 is a perspective view of the discharge member of a toner cartridge in accordance with further mode of practice of the present invention, and

Fig.12 is a perspective view of a toner cartridge in accordance with further mode of practice of the present invention,

Fig.13 is a plan view of the toner cartridge in accordance with another embodiment of the present invention;

Fig.14 is a view explanatory of part of a slide lever serving as a working member in accordance with the embodiment of the present invention;

Fig.15 is a view showing part of the slide lever serving as working member in accordance with the embodiment of the present invention, and explaining the state in which it is at work;

Fig.16 is a plan view of the slide lever in accordance with the embodiment of the present invention;

Fig.17 is a front view of the slide lever in accordance with the embodiment of the present invention;

Fig.18 is a side view of the slide lever in accordance with the embodiment of the present invention; and

Fig.19 is a view explanatory of the working member in accordance with further embodiment of the present invention.

#### Best Mode for Carrying Out the Invention

[0042] Now, the best mode for carrying out the present invention will be illustrated together with the accompanying drawings

[0043] First, a toner cartridge in accordance with a

first mode of practice will be described with reference to figs.1 to 3.

[0044] This specific toner cartridge comprises a toner container 1 containing powder or liquid toner for use in developing devices, and a discharge member 2 for supplying for supplement the toner from said toner container to the developing device.

[0045] In this mode of practice, the entire toner container 1 is a shrinkable member of shrinking according to the amount of toner reduced in the toner container. Specifically, the toner container as a whole is constituted by a resilient bag called "pouch". The bag is made of synthetic resin film. The film may be of a single layer, or a composite film composed of several kinds of films built up in layers. Alternatively, the bag may be a paper bag or cloth bag having resin film layers formed therein-side, or the so-called bag-in-box such as a paper box contained in a container which is more rigid than the film.

[0046] The discharge member 2 is located in a proper position in the toner container 1. Referring to Fig.1, since the toner container 1 is a pouch which has been heat-sealed all therearound, the discharge member 2 is provided in the middle of a heat-sealed portion 11, but it may be disposed in a corner portion 12 or the central portion 13 of the bag.

[0047] The discharge member 2 comprises a base portion 21 securely fixed to the container 1 by a proper fixing means such as welding or bonding, and a valve body 3 arranged such that it may move to or away from the base portion. The base portion 21 is formed with a guide passage 22 communicating with the interior and exterior of the toner container 1. The guide passage 22 is provided with an outlet 23 which is closed by said valve body 3. In this example, the valve body 3 is placed in the inner side relative to the outlet 23 (inward of the toner container 1).

[0048] The valve body 3 has a main fitting member 31 formed on the outer periphery thereof for closing the outlet 23 by fitting in the outlet 23. That is, in this example, the valve body 3 represents the main fitting member on its outer periphery, and the entire outlet 23 is a main receiving member. There is provided in the middle portion of the valve body 3 a connecting portion 32 of forcibly fitting onto a valve body operating member 4 of the developing device such as copiers. More specifically, a distal end 41 of the valve body operating member 4 is a sub fitting portion, and the connecting portion 32 of receiving the distal end 41 of the valve body operating member 4 is a sub receiving portion. Said forced fitting is realized by deformation of at least one of the sub receiving portion 32 and the sub fitting portion 41. Particularly herein, the distal end 41 of the valve body operating member 4 includes a narrow part 41a into which may fit a ridge 32a formed inside the connecting portion 32.

[0049] The valve body 3 may be separate from the base portion 21 of the discharge member 2, but in this

example, it is formed integral with the latter so as to be guided by a guide portion 5. This guide portion 5 is composed of struts 51, 51 provided on the base portion 21 and arm portions 52, 52 extending from the struts 51 inward. In this example, the struts 51 and arm portions 52 are formed on either side of the base portion respectively, but they may be one, or three or more. The arm portion 52 is pivotable at its base end relative to the strut 51, while it is pivotable at its distal end relative to the valve body 3. In this example, as shown in fig.2, when the valve body 3 is in the connection with the outlet 23, the distal end of the arm portion 52 is positioned below the base end, but as shown in fig.3(C), when the outlet 23 is out of contact with the valve body 3, and thus in the opened position, the distal end of the arm portion 52 is above the base end.

[0050] Furthermore, in this example, the struts 51, 51 extend beyond the arm portions 52 and further upward, and a stopper 53 is laid between both extensions of the struts 51, 51 on the level above the arm portions 52. If the valve body 3 has come to an elevated position, the stopper 53 abuts the valve body 3 to prevent the valve body 3 from going further upward. Other means to check further rise may be used. Therefore, this stopper 53 is not always essential.

[0051] Next, the valve body operating member 4 in the developing device will be described. Whenever a sensor detects the amount of developer in the developing device or of ink in the toner reservoir of a hopper, which has been used for a piece of paper, the valve body operating member 4 starts up so that toners will be discharged from the cartridge. Also, every time a predetermined amount of toner used is caught by a sensor, the valve body operating member 4 is put in motion to allow discharge of toners from the cartridge for further supply of the amount of toners corresponding to the amount of toners used up within the reservoir of the hopper. In this example, the valve body operating member 4 is actuated to approach the valve body 3 when the discharge of toner is needed, while it is separated from the valve body 3 and thus in the rest position when there is no need for toner to be discharged.

[0052] The valve body operating member 4 may be used as a separate one from a toner discharge pathway, but in this example, it also has the function of the toner discharge pathway.

[0053] Specifically, the valve body operating member 4 takes the shape of a shaft, so as to be received by the guide passage 22 of the discharge member 2, having a toner discharge pathway 42 formed therein and an opening portion 43 extending from the toner discharge pathway 42 to the outside and provided near the distal end of the valve body operating member 4. The distal end 41 of the valve operating member 4 is, as aforementioned, received by the connecting portion 32, and includes narrow part 41a which is adapted to fit onto the ridge 33a of the connecting portion 32. The opening portion 43 is formed on the base end side of

the narrow part 41a. So to speak, the opening portion 43 makes it possible to allow the toner container to communicate with the inside and outside thereof when the main fitting portion 31 is out of contact with the outlet 23 (in an opened position). In this example, in the opened position, the opening portion 43 is positioned inward of the outlet 23 (the inner side of the toner container).

[0054] There is provided sealing means such as an O-ring 44 in a proper position of the outer periphery of the shaft of the valve body operating member 4 at the base end side of the opening portion 23. A seal is formed by said sealing means between the valve body operating member 4 and the guide passage 22 of the discharge member 2. This sealing means is not always necessary, but the sealing means may completely avoid any leakage of toners which fell short of the discharge pathway 42 from the opening portion 43.

[0055] Next, the supply method for toner by means of the toner cartridge will be explained. First, the cartridge as shown in fig.1 is placed in position in the developing device. At this initial stage, the valve body operating member 4 and the discharge member 2 stand separated from each other, or as shown in figs.3(A) and (B), the valve body operating member 4 and the discharge member 2 are in close connection with each other, and the toner outlet 23 is kept in a closed position by the valve body 3. In other words, the outlet 23 and the main fitting portion 31 are in a fitting relation with each other. In particular, it is preferable that such a fitting relation provides a forced fitting where the main fitting portion 31 is so forcibly fitted into the outlet 23 that the outlet 23 is deformed so as to expand the diameter of thereof. Said forced fitting may be effected by elastic deformation of the outlet 23. Deformation of at least one of the outlet 23 and the main fitting portion 31 will suffice.

[0056] In the supply of toner, the valve body operating member 4 approaches the valve body 3, and further goes upward until the outlet 23 is disconnected from the main fitting portion 31 (figs.3(B) to (C)). In this example, the disconnection between the outlet 23 and the main fitting portion 31 immediately gives rise to a connection between the connecting portion 32 of the valve body 3 and the distal end 41 of the valve body operating member 4. This resultant fitting is necessary for the closing operation of the valve body 3 but not for the opening operation of same.

[0057] If the valve body operating member 4 further thrusts up the valve body 3, the arm portion 52 ascends with the result that such an elevated position may be retained. In this state, the valve body 3 is apart from the outlet 23 and thus in the opened position, and the opening portion 43 of the valve body operating member 4 is located in an inward position relative to the outlet 23 so that toner in the container is ready to be discharged through the toner discharge pathway 42 to the outside.

[0058] In this example, because the discharge member 2 is provided at the lower portion of the toner

container 1, and arranged such that it may proceed to an opened position by elevating the valve body member 4, the toner will fall by gravity from the opening portion 43 of the valve body operating member 4, past the discharge pathway 42, and to the toner reservoir such as hoppers. However, it is possible to discharge toners by applying pressure to the toner container. In that case, it is also possible to provide the discharge member 2 on the upper portion or lateral side of the toner container 1. In any case, the toner container 1 may be deformed according to the amount of toner contained therein so as to maintain itself airtight.

[0059] Particularly, in this example, as the valve body operating member 4 has the function of toner discharge pathway, too, it may supply toner without introducing air from outside during the discharge of toner.

[0060] When the supply of a desired quantity of toner is over, the valve body operating member 4 retreats to proceed to the state as shown in fig.2, fig.3(A), or fig.3(B). That is, the valve body operating member 4 goes back together with the valve body 3 on the ground that the valve body operating member 4 is designed to join the connecting portion 32 of the valve body 3 when such a retreatment takes place. Then is reached the position in fig.3(B), namely where the outlet 23 and the main fitting portion 31 have come in contact with each other, thereby resulting in the toner discharge being stopped. The strength of a fitting connection between the distal end 41 of the valve body operating member 4 and the connecting portion 32 (sub receiving portion 32) is higher than the force required for fitting the main fitting portion 31 into the outlet 23 (main receiving portion 23), and thus, a forced fitting connection may be established between the outlet 23 and the main fitting portion 31 in case the valve body operating member 4 is brought into connection with the connecting portion 32 of the valve body 3.

[0061] If the valve body operating member 4 is further retreated, the connection between the valve body operating member 4 and the connecting portion 32 of the valve body 3 is dissolved as shown in fig.3(A), and as shown in fig.2, the both members 3 and 4 proceeds to a separate position. In any position, a fitted connection between the main fitting portion 31 of the valve body 3 and the outlet 23 may established by retreatment of the valve body operating member 4 with the connecting portion 32 of the valve body 3 coupled therewith. This connection may ensure the prevention of toner leakage, and besides, since the discharge member 2 can be molded integrally from resin, the production cost may be cheapened. Moreover, a simple operation such as advancement and retreatment of the valve body operating member 4 may enable discharge of toner and prevent any leakage of toner.

[0062] In the above example, when the valve body operating member 4 of the developing device proceeds relatively to a discharge position, the connection between the main fitting portion 31 and the outlet 23 is

dissolved with the connecting portion 32 and the valve body operating member 4 kept in the fitting connection with each other. The fitting connection between the connecting portion 32 and the valve body operating member 4 does not completely need to be executed in this stage but in the next stage when the valve body operating member 4 of the developing device proceeds relatively to non-discharge position. Also, in the above example, the connection between the connecting portion 32 and the valve body operating member 4 is designed to be removed at the time when the main fitting portion 31 has been fitted into the outlet 23, but the connection between said both members is preferably maintained. That is, once the connecting portion 31 has been connected with the valve body operating member 4 when the cartridge is mounted in the developing device, in every toner supply operation, the valve body 3 may be opened or closed with such a connection retained, and it is preferable that said connection between the connecting portion 32 and the valve body operating member 4 be broken when the cartridge is removed from the developing device.

[0063] Fig.4 illustrates a variation of the toner container. In the previous mode of practice, the entire toner container is shrinkable dependent on the amount of toners consumed within the toner container. In the example as shown by fig.4, a larger half of the container constitutes a shrinkable portion 102. Specifically, the toner container 101 comprises shrinkable said portion 102 and a nonshrinkable portion 103 having a discharge member 2. The nonshrinkable portion 103, which is made of soft resin, is rigid against collapse under the atmospheric pressure, while the shrinkable portion is made of soft resin and resilient enough to deform under the atmospheric pressure. The shrinkable portion 102 is resilient to such a degree that it may stick to the inside of the nonshrinkable portion 103, whereby the shrinkable portion 102 shrinks according to the amount of a toner used up therein and without allowing entry of air until the shrinkable portion 102 is finally put in touch with the nonshrinkable portion 103 (no internal space exists).

[0064] A toner container 111 as shown in fig.4(B) has a nonshrinkable portion 112 formed by a cylinder having a fixed internal configuration. A shrinkable portion 113 is fitted in the nonshrinkable portion 112 so that it is slidable relative to the nonshrinkable portion 112. The toner container 111 tends to shrink in its internal volume by the shrinkable portion 113 sliding axially. A discharge member 2 is provided in the nonshrinkable portion 112.

[0065] In any of the both examples in figs.4(A) and (B), the contour of the toner container may be formed by nonshrinkable members 104, 114. In fig.4(A), the nonshrinkable member 104 is disposed outside of the shrinkable portion 102 to connect with or integral with the nonshrinkable portion 103. An air guide passage 105 is provided in the nonshrinkable member 104.

[0066] Referring to fig.4(B), the nonshrinkable member 114 is disposed outside of the shrinkable portion 113 to connect with or integral with the nonshrinkable portion 112. An air guide passage 115, however, is provided in the nonshrinkable member 114. Next, another practicable modes of the discharge member are as follows. These modes of the discharge member are adaptable to the above-described toner containers. In the following modes of practice, portions or parts substantially identical to those in the previous modes of practice shall have like symbols and no further explanation added thereto.

[0067] In an example as shown by fig.6, the position of the opening portion 43 is different from that in the previous mode of practice. In the previous example, when the valve body 3 is in the opened position where it is separate from the toner outlet 23, the opening portion 43 of the valve body operating member 4 is placed in an inner position relative to the outlet 23 so that the toner within the container may be discharged from the toner discharge pathway 42 outward. With this example, in the opened position, the opening portion 43 of the valve body operating member 4 is located in an outer position relative to the outlet 23. That is, a liaison portion 131 which is smaller than the outlet 23 in diameter is interposed between the opening portion 43 and the distal end 41 of the valve body operating member 4 fittable in the connecting portion 32 of the valve body 3. In this example, when the valve body 3 is urged to separate from the outlet 23 into an opened position, the liaison portion 131 comes flush with the outlet 23 so as to enable toners to pass between the outlet 23 and the liaison portion 131 to flow out. Then, the outflows run through the opening portion 43 and the toner discharge pathway 42 to the outside. The present example is substantially the same as the previous mode of practice in the relationships between the main fitting portion and the main receiving portion, and the sub fitting portion and the sub receiving portion; and the strength of forced fitting between each pair of the portions.

[0068] Fig.5 illustrates an example in which the valve body 3 of the first mode of practice is formed separate from the outlet 2, except that the present embodiment is substantially the same as the previous embodiment in the relationships between the main fitting portion and the main receiving portion, and the sub fitting portion and the sub receiving portion; and the strength of forced fitting between each pair of the portions. In this example, members for guiding the valve body 3 to a proper sliding are provided on the base portion 21 so as to surround the valve body 3. Specifically, a plurality of guide columns 121 are mounted perpendicular to and on the base portion 21. This arrangement enables the valve body 3 to move axially without any lateral motion under the guidance of the guide columns 121. A simple contact between the guide columns 121 and the valve body 3 will suffice. However, the concrete structure for guidance may be suitably changed for

example, there may be provided in the valve body 3 holes in which the guide columns 121 are slidably mounted.

[0069] Fig.7 is a sectional view in accordance with further practicable mode of the present invention. (A) showing a closed position, and (B) an opened position.

[0070] In the example of fig.2, there is provided stopper 53 between the struts 51, 51. This example is different from the example of fig.1 in that the stopper is not provided. The valve body 3 is connected with the base portion 21 and two arm portions 141, 141. These arm portions 141, 141 may change their forms from the in-curved position as shown by fig.7(A) to the upward spreading position as shown by fig.7(B). The arm portions 141, 141 are strong and resilient to such a degree that they may permit the valve body 3 to move up and down in a vertical direction and support the valve body 3. This example is also substantially the same as the previous embodiment in the relationships between the main fitting portion and the main receiving portion; and the strength of the forced fitting between each pair of the portions.

[0071] The fact that the valve body 3 lowers from the state as shown in fig.7(B) to that as shown in fig.7(A) to close the outlet 23, when the connection between the connecting portion 32 of the valve body 3 and the distal end 41 of the valve body operating member 4 is not released will be further explained.

[0072] First, in the state of fig.7(B), the connecting portion 32 of the distal end 41 of the valve body operating member 4 and the valve body 3 still remain in contact with each other.

[0073] Next, as the valve body operating member 4 goes down, the valve body 3 moves downward, too.

[0074] When the lower end portion 3e of the valve body 3 approaches the outlet 23 to enter the latter, the lower end portion 3e joins with the inner periphery of the outlet 23, and then, the lower end portion 3e will be exposed to a force on a portion extending from its outer periphery to the center of its interior, whereby the lower end portion 3e of the valve body 3 will be subjected to a force from the inner periphery of the outlet 23, said force being inclined to squeeze the lower end portion 3e to reduce the inner diameter of the latter. As a result, the strength in fitting of the distal end 41 of the valve body operating member 4 and the connecting portion 32 of the valve body 3 will get so strong that there is no risk of the distal end 41 slipping from the connecting portion 32 of the valve body 3.

[0075] Thus, the lower end 41 of the valve body operating member 4 is transmitted downward, keeping a secured contact with the valve body 3, so as to enable the main fitting portion 31 of the valve body 3 to surely fit with the outlet 23.

[0076] Now, the movement of the outlet 23 for opening and closing will be described in further detail with reference to figs.8 and 9, which are enlarged views of the main movements of main portions as shown in fig.7.

[0077] Fig.8(A) shows the valve body 3 which is in fitting relation with the outlet 23. In this state, the valve body operating member 4 is not shown in this view of drawing because it is located far beneath the valve body 3. In such a fitting relationship, the seal face 3f of the peripheral portion of the valve body 3 is closely attached to the inner periphery of the outlet 23 to give a highly airtight or watertight sealing. A shoulder portion 3g at valve body's side of the lower portion 3e of the valve body 3 overhanging the exterior is in engagement with a shoulder portion 23a at outlet's side of the lower portion of the outlet 23 overhanging the interior. This may prevent any sudden release of the valve body 3 from the outlet 23.

[0078] As shown by fig.8(B), the valve body operating member 4 goes upward and enters the connecting portion 32 within the valve body 3. Since the outer diameter of the distal end of the valve body operating member 4 is smaller than the inner diameter of the lower end portion 3e of the valve body 3 (particularly, the inner diameter of the ridge 33a protruding to the inner periphery of the lower end portion 3e), the distal end 41 can gain easy entry. And the distal end 41 of the valve body operating member 4 increases gradually in outer diameter from the most distal end to a narrow part 41a to become larger than the inner diameter of the lower end portion 3e of the valve body 3. Therefore, as the valve body operating member 4 advances, the lower end portion 3e of the valve body 3 deforms so as to expand outwardly, thus resulting in expansion of its inner diameter. In this connection, a proper space 3h is provided between the lower inner wall surface of the outlet 23 and the lower end portion 3e of the valve body 3 to permit eventual expansion of the lower end portion 3e of the valve body 3 (see fig.8(A)).

[0079] As the entry of the valve body operating member 4 goes further, the lower end portion 3e of the valve body 3 enters the narrow part 41a of the valve body operating member 4 until the expanded lower end portion 3e returns to the original state, as shown in fig.9(A).

[0080] As the entry advances further, the valve body 3 disengages from the outlet 23 with the lower end portion 3e of the valve body 3 resting in the narrow part 41a of the valve body operating member 4, as shown in fig.9(B). At this time, because the lower end portion 3e of the valve body 3 is inside the narrow part 41a of the valve body operating member 4, the engagement of the shoulder portion 3g at valve body's side in the lower end portion 3e of the valve body 3 and the shoulder portion 23a at outlet's side in the outlet 23 may be dissolved moderately.

[0081] Finally, as shown in fig.9(C), the opening portion 43 of the valve body operating member 4 is adapted to be positioned inwardly of the outlet 23, thereby enabling discharge of toners.

[0082] When the outlet 23 is closed by the valve body 3, the process is performed in a reverse way to the

above-described; the valve body operating member 4 is pushed downward from the position as shown by fig.9(C). Then, the lowermost end of the lower end portion 3e of the valve body 3 can enter the outlet 23 without strain now that the inner diameter of the opening end of the outlet inside of the toner container is designed to be larger than the outer diameter in the lowermost end of the lower end portion 3e of the valve body 3.

[0083] As illustrated by fig.9(B), the outer diameter of the shoulder portion 3g at valve body's side in the lower end portion 3e of the valve body 3 is larger than the inner diameter of the outlet 23. Thus, if the valve body operating member 4 is pushed further downward, the lower end portion 3e of the valve body 3 will deform inwardly by receiving a force from the inner wall of the outlet 23 so as to enter the narrow part 41 of the valve body operating member 4. This action grows larger as lowering of the valve body operating member 4 increases further, and the narrow part 41a of the valve body operating member 4 surely engages with the lower end portion 3e of the valve body 3. This will result in avoidance of the valve body 3 coming off the valve body operating member 4.

[0084] Further lowering of the valve body operating member 4 may cause the valve body 3 to abut against the end portion of the outlet 23 to ensure that the valve body 3 will stop its descent(see fig.9(A)). With the lowering of the valve body operating member 4 being further increased, the lower end portion 3e of the valve body 3 expands outwardly, followed by disengagement of the narrow part 41a from the projection 33a protruding to the inner periphery of the lower end portion 3e of the valve body 3 (fig.8(B)), thereby causing a return to the original state (fig.8(A)).

[0085] Fig.10 is a perspective view of a main portion of the toner cartridge in accordance with further mode of practice of the present invention.

[0086] A discharge member 201 in accordance with this mode of practice, which is made of synthetic resin, includes a substantially cylindrical base portion 202 having a flange portion 203 formed on the lower end thereof. The base portion 202 is fixedly secured to a toner container 204 by hot welding. In the drawing, arm portions 205, 205 rise from the both sides of the upper end of the base portion 202 to extend toward the center therebetween respectively. There is provided a valve body 206 connected in series with the distal end of the arm portions 205, 205.

[0087] A through-guide passage 207 is provided extending in a vertical direction in the middle of the base portion 202 of the discharge portion 201. The upper end of the guide passage 207 provides an outlet 208, whose lower end forms an engaging step 208a.

[0088] A main fitting portion 209 with which the valve body 206 is formed is adapted to engage with the outlet 208 (i.e. a sub fitting portion). Namely, the outer periphery of the lower end of the valve body 206 consti-

tees main fitting portion 209. An engagement of this specific main fitting portion 209 of the valve body 206 with the engaging step 208a of the outlet 208 may lead the outlet 208 into a closed position. In this case, the both arm portions 205, 205 resiliently bend in response to the vertical movement of the valve body 206 and has a sufficient strength to support the latter.

[0088] Inside of the valve body 206 is provided a connecting portion 213 which is connected with the distal end of a valve body operating member 211 which acts to give directions for toner discharge, and an engaging step 214 is formed extending in a peripheral direction in the lower part of the inner periphery of the connecting portion 213.

[0089] The valve body operating member 211 for supplying toners to the toner container 204 is like a rod in shape, having a tip-connecting portion 212 (sub fitting portion) formed on the distal end portion thereof so as to be received by the connecting portion 213 of the valve body 206. An engaging groove 215 is formed extending in a peripheral direction in the lower part of the tip-connecting portion 212 so that the engaging groove 215 may engage with the engaging step 214 of the valve body 206. The valve body operating member 211 serves as a toner discharge means, too, including a toner discharge pathway 215 formed longitudinally of its center, and a plurality of opening portions 216 formed extending in a peripheral direction a little below the tip-connecting portion 212.

[0091] The lower part of each opening portion 216 is a little larger than the upper part of same in outer diameter, and its outer diameter is substantially identical to the inner diameter of the guide passage 207 of the discharge portion 201.

[0092] The valve body operating member 211 goes up until the step portion 217 formed around the entire periphery is brought into contact with the lower end of the outlet 208, and the valve body 206 is lifted accordingly, so that the opening portion 216 advances inward of the toner container relative to the outlet to ensure that the toner is ready for supply (fig. 10).

[0093] After the termination of toner supply, the valve body operating member 211 retrogresses to the guide passage 207 of the discharge portion 201. At this time, now that the valve body 206 is in contact with the distal connecting portion 212 of the valve body operating member 211 through the connecting portion 213, the valve body 206 is drawn toward the outlet 208 (to the lower part of the drawing), whereby the main fitting portion 209 of the valve body 206 is fitted in the outlet 208 to close the latter. This example is also substantially the same as the previous modes of practice in the relationship of the main fitting portion and the main receiving portion, and the sub fitting portion and the sub receiving portion; and the strength of a forced fitting between each pair of the portions of each group.

[0094] Fig. 11 is a perspective view explanatory of the main part of the toner cartridge in accordance with

further mode of practice.

[0095] In the previous example, the valve body operating member 4 is provided with the toner discharge pathway, but herein, this figure of drawing shows a valve body operating member free from toner discharge pathway.

[0096] An outlet 301 is made from synthetic resin, disposed on the peripheral edge of a toner container 302, and formed with a cylindrical base portion 303 having a flange portion 304 formed at the lower end portion thereof. Said base portion 303 is joined by hot welding to the peripheral edge of the toner container 302. In the drawing, a guide passage 305 extends through the base portion 303 for communication with the inside and outside of the toner container 302. Arm portions 306, 306 are formed opposite to each other with the guide passage 305 interposed therebetween, extending from the upper part of the base portion 303 upward to the center point respectively until the distal ends of the arm portions 306, 306 are joined to a valve body 307. The valve body 307 has a substantially spherical shape, and the outer periphery of the valve body 307 represents a main fitting portion 311.

[0097] As aforementioned, the guide passage 305 is provided extending in a vertical direction in the middle of the base portion 303, having an outlet 308 formed over the upper end of the guide passage 305 in such a manner that the main fitting portion 311 of the valve body 307 may be received airtight by the outlet 308. The outlet 308 has an inner periphery so inclined that its inner diameter gradually increases upward.

[0098] Both the arm portions 306, 306 bend resiliently in response to the vertical movement of the valve body 307 and has a sufficient strength to support the latter.

[0099] A rod-shaped valve actuating member 309 is provided extending from the bottom of the valve body 307 downward to pass through the guide passage 305.

[0100] The valve actuating member 309 has a guide plate 310 formed in the middle thereof. The guide plate 310 helps center the valve actuating member 309 so that the former may properly guide the latter inside of the guide passage 305, and the guide plate 310 may also act to seal the guide passage 305 when the valve actuating member 309 is pushed downward.

[0101] Specifically, when the outer diameter of the guide plate 310 is identical to or larger than the inner diameter of the guide passage 305, the guide plate 310 is brought into a close contact with the guide passage 305, so that when the valve actuating member 309 moves up and down, the guide plate 310 may center the valve actuating member 309 for a sure guidance. The guide plate 310 may also play the role of a covering by which the guide passage 305 is sealed during the vertical movement of the valve actuating member 309.

[0102] If the outer diameter of the guide plate 310 is larger than the inner diameter of the guide passage 305, the guide plate 310 must be made of a resilient and



elastic material, and if the outer diameter of the guide plate 310 is identical to or smaller than the inner diameter of the guide passage 305, the guide plate 310 may be made of either rigid or elastic material.

[0103] The valve body operating member at the developing device side is not shown in Fig. 11, but it will do if it is capable of putting the valve actuating member 309 in a vertical motion. By way of illustration, a valve body operating member may be enumerated which acts to grasp the valve actuating member 309 by means of a chuck to move the valve actuating member 309 in a vertical direction by moving the chuck up and down. A member engageable with the lower end of the valve actuating member 309 may be used as a valve body operating member, which member may move up and down together with the valve actuating member 309 kept in abutment therewith.

[0104] A toner discharge pathway in the device such as copiers will do if it is capable of receiving discharges from the guide passage 305. The opening of the discharge pathway (not shown) may be a cylindrical element which is formed therein with a connecting hole which can discharge toner. Another cylindrical element is a type which can be fit into the guide passage 305 of the discharge member 301, or a type which can fit on the outer periphery of the flange portion 304 provided on the lower end of the discharge member 301.

[0105] The former type is preferably provided in the distal end thereof with a valve body operating member serving to give motion to the lower end of the valve actuating member 309 and in addition, there must be disposed between a pressing member and the inner periphery of the cylindrical member a space which allows toner to pass therethrough.

[0106] Similarly, in the case of the latter type, a valve body operating member serving to actuate the valve actuating member 309 must be formed extending from the upper end of the cylindrical element into a lower connecting hole, and there must be disposed between the pressing member and the inner periphery of the cylindrical member a space which allows toner to pass therethrough.

[0107] There may be available a process of discharging toner from the guide passage 305 direct into the toner reservoir of the device without the aid of a limited guide passage such as the cylindrical element.

[0108] The discharge process for toner in accordance with this mode of practice is as follows.

[0109] The valve actuating member 309 is engaged with the valve body operating member of the device, and then pushed upward as it starts. This urges the valve actuating member 309 to move upward, thereby to separate the valve body 307 connected airtight with the outlet 308 from the latter to cause discharge of toner. In the termination of discharge, a reverse operation takes place so as to fit the main fitting portion 311 of the valve body 307 in the outlet 308, thus resulting in stop of toner discharge. At that time, even in the middle of the dis-

charge operation, any extra discharge of toner may be avoided by the guide plate 310.

[0110] In this example, the valve actuating member 309 is formed integral with the valve body 307, but the both members may be formed separate from each other. In that case, an arrangement is available such that the valve actuating member 309 may be connected with the valve body 307 by a fitting operation. This fitting structure may be the same as that composed of the connecting portion and the valve body operating member in the mode of practice as shown in fig. 2.

[0111] It will be understood from the above explanation that in this mode of practice, the valve actuating member 309 constitutes a part of the valve body 307 and the connecting portion relative to the valve body operating member of the device may be provided in a proper position such as the lower end of the valve actuating member. The valve body operating member of the device may be made similar to the valve actuating member 309 in configuration, and said valve body operating member may be connected with the valve body 307 by the same fitting structure as that composed of the connecting portion and the valve body operating member in the embodiment as shown in fig. 2.

[0112] Fig. 12 illustrates further mode of practice, in which the entire toner container 401 is made of hard thermoplastics. Materials, such as other hard synthetic resin or metal, which do not deform under the atmospheric pressure may selectively be used. A discharge member 2 may be of a similar type to those used in the previous embodiments, and may be mounted on the toner container 401 in a suitable place. The toner container 401 may be made rectangular, cubic, or columnar. In this example, the toner discharge member 2 is positioned on an end face 411, but it maybe mounted on other place such as a square portion 412 or side face 413.

[0113] The method of use is the same as those in the previous modes of practice. Specifically, the toner container 401 is mounted on the device such as copiers in such a manner that the discharge member 2 will be positioned in the lower end of the container (not shown). The valve body operating member is arranged such that it may put the toner container in an opened position by its elevation, as in the previous example. In this connection, the toner falls by gravity from the opening portion of the valve body operating member, past the discharge pathway and into the toner reservoir such as hoppers. However, the discharge of toner may also be achieved by applying pressure to the inner side of the toner container 401. In that case, the discharge member 2 may be disposed on the upper side of, or laterally of the toner container 401. In order to effect a high pressure in the toner container, an air inlet (not shown) is provided in a suitable section of the toner container 401, thereby to increase the pressure inside the container to carry out the discharge of toner. Even in the case of the discharge by gravity-drop, though no increase of the inside pres-

sure is necessary, the air inlet (not shown) may be used to avert reduction of the inside pressure. Alternatively, a conveying screw or agitator may be mounted inside of the lower container 401 so as to send the toner to the discharge member 2 mechanically.

[0114] The present invention may be embodied in the foregoing modes of practice. In particular, it may be advantageously embodied in the following structures. In the toner cartridge comprising a toner container containing powder or liquid toner for use in the developing device, and a discharge member for supplying toner from the toner container to the developing device, the toner container is provided with a shrinkable portion which may shrink according to the amount of toner consumed within the toner container, and the toner discharge member is composed of a toner outlet, and a valve body adapted to open said outlet when a valve body operating member of the developing device is at work and to close said outlet when the valve body operating member of the developing device is at rest; and the valve body is formed with a main fitting portion of closing the outlet by fitting in the outlet. In this connection, as the outlet is closed by the valve body when the discharge of toner from the toner container comes to end, there will occur no leakage of toner. And besides, because the valve body and the outlet are fittingly (preferably forcibly) connected with each other, such a connection is not easily dissolved even by vibration to ensure that extra discharge or leakage of toner will be prevented. Furthermore, since the toner container may shrink according to the discharge of toners within the toner container on the basis that the toner container is formed with a shrinkable portion of shrinking in response to the reduced amount of toners within the toner container, the toner discharge can be carried out without any risk of air invasion of the container. As a result, the quality of toner contained in the container can be preserved well intact. Additionally, by providing a toner discharge pathway in the valve body operating member, or connecting a cylindrical outlet at the device side direct with the guide passage 306, the interior of the toner container is connected direct with the toner reservoir via a sealed pathway, thereby to preclude any invasive risk of the open air. This enables supply of toner to the device in a more stable mode. In the above-described embodiments, different kinds of methods for filling the toner container with toner may be utilized. Employment of a reverse procedure to the discharge may readily obtain more desirable filling conditions. With the valve body operating member with a toner discharge pathway, this toner discharge pathway may be used as a pathway for filling purpose in a toner-filling device. In other words, the valve body operating member may be utilized as a nozzle for filling purpose in the toner-filling device. In the embodiment as shown by fig.9, the toner discharge pathway of the cylindrical member may be used as a toner-filling pathway (not shown). Namely, such a filling pathway may be consti-

tuted by a guide passage 306 in the form of a cylinder. Specifically, the opening of the filling pathway may constitute a cylindrical member having a connecting hole which can fill the container with toner. In addition, this cylindrical member may be of a type which is fittable into the guide passage 306 of the discharge member 301, or which can fit on the outer periphery of the flange portion 304 located on the lower end of the discharge member 301. In particular, in the use of the toner container provided with the shrinkable portion, when the shrinkable portion is in a shrink position, the toner container may be filled with toner by supplying the toner from the discharge member. Thus, since the toner container can be filled with toner with air rarely got mixed therewithin, the container can be almost completely filled with toner so that the toner can be preserved without deterioration for long periods. And as the filling operation takes place with substantially none of air remaining in the container as a result of the complete shrink of the shrinkable portion of the toner container, the filling operation can be performed with a high speed without necessity of eliminating air from the container or introducing air into the container.

[0115] Various modifications and alterations of the present invention may be made outside the modes of practice set forth herein. For example, the arm portions in the modes of practice of this invention may be always biased downward (in a direction in which the valve body will close the outlet). The guide plate 310 may be provided in any of the valve body operating members in accordance with the other modes of practice. The toner may be allowed to drop by gravity for discharge, or a pressure may be applied from outside to the shrinkable portion of the toner container for a positive acceleration of discharge of toner.

[0116] A means may be represented as means of accelerating toner discharge positively for applying external pressure to the shrinkable portion of the toner container, using an apparatus of mechanically applying force, such as a piston. In the alternative, toners can be absorbed by means of a pump provided in the developing device. At any rate, except for the gravity-drop, means to positively accelerate the discharge of toners from the toner container by mechanical force or fluid pressure may be added for the toner discharge.

[0117] The above-described filling operation will be explained in further detail. If a toner discharge pathway is provided in the valve body operating member, this toner discharge pathway may be used as a toner filling pathway of the toner filling device. Specifically, the valve body operating member in the foregoing embodiments may be used as a filling nozzle of the toner filling device. Namely, the valve body operating member as illustrated in the embodiments is provided in the leading end of a powder supply line (not shown), such as a pipe or tube, provided in the toner filling device (not shown) to serve as filling nozzle. The toner filling device (not shown) is actuated to fill the toner container in, using a pressure

applying means such as pumps provided in the toner filling device (not shown) or by gravity.

[0118] Referring to another form of filling operation, fig.13 shows a second discharge member 602 having the same structure as that of the discharge member 2 in the previous embodiments and provided in a toner container 601. This toner container 601 may be the toner container 1 formed with the same shrinkable portion as that of the previous embodiments or the toner container 401 not having a shrinkable portion but a high rigidity with which the toner container can resist change of form by the atmospheric pressure. In said toner container, the discharge portion 2 of the toner container 601 is utilized as a toner filling pathway, and the valve body operating member 4 is used as filling nozzle of the toner filling device to fill the toner container 601 with toners. In that case, a valve body operating member 603 which is the same in shape as the valve body operating member 4 of the previous embodiments is connected with the second discharge member 602. The air within the toner container 601 is discharged from the second discharge member 602 through the valve body operating member 603. This may keep the pressure within the toner container 601 constant. In this case, it is preferable that air be discharged with a filter arranged in the passageway, using the second discharge member 602 having means for preventing discharge of toners, or the valve body operating member 603. Furthermore, the discharge of the air from the toner container 601 may be achieved in a natural way, or in an positive way by an absorbing means such as pumps (not shown). That is, the valve body operating member 603 is employed as absorbing nozzle connected with the absorbing means such as pumps to absorb the air within the toner container 601 from the second discharge member 602 and past the valve body operating member 603.

[0119] A pressure regulating valve or check valve may be substituted for the second discharge member 602 and valve body operating member 603. The second discharge member 602 is, however, advantageous in that a reliable closed position can be obtained by said special valve structure after the connection with the valve body operating member 603 has been dissolved.

[0120] After this toner filling process (i.e. after the stop of toner supply), the air can be discharged from the toner container 601. This may follow the discharge of air in the described filling process, or may be performed in another process. If the latter case is employed, a toner container with no second discharge member 602 (for example, toner container 1 with a single discharge member 2 as shown in fig. 1) is available for practice. In this case, after the valve body operating member 4 used for toner filling has been removed from the toner container 1, the valve body operating member 603 connected with the absorbing means is connected to the discharge member 2 for absorbing operation. In this case, the provision of a filter in the discharge member 2 may render the toner discharge difficult, and therefore, it

is preferable that the filter be arranged in the valve body operating member 603 connected with the absorbing means for the purpose of prevention of toner leakage.

[0121] Using the aforementioned forced air absorption, air can be absorbed to such an extent that a vacuum or a state next to the vacuum is produced. However, too much absorption may cause the hardening of toners, resulting in decrease in its flowability, so the absorption of a quantity of air (air pressure) suitable for the preservation and availability of toners is desirable.

[0122] The absorption of air within the toner container may be appropriately carried out by the toner container 1 formed with the shrinkable portion, but the toner container 401 having a high rigidity and a strength sufficient to resist change of form by the atmospheric pressure can also do the same thing. The second discharge member can be used to discharge the air within the toner during and after the supply of toners to the toner container to adjust the air pressure within the toner container, or to introduce air or other fluids into the toner container. Additionally, such a discharge or introduction of fluids can be carried out during the transportation of the toner container or after the toner container has been set in the developing device. In particular, toners can be discharged from the toner container through the first discharge member in operation. Consequently, the second discharge member can be used for adjustment of the air and atmosphere within the toner container as needed.

[0123] Finally, an advantageous mechanism for attachment and detachment between the valve body at discharge member's side and the valve body operating member will be described. As a first example for the attachment and detachment is recited the manual or automatic dissolution of a coupling of the valve body at discharge member's side and the valve body operating member by the discharge member provided in the toner container which is actuated by a working member such as lever or spring as provided together with the valve body operating member at the developing device's side of copier.

[0124] As shown in figs.14 and 15, the valve body operating member 4 is secured to the developing device of copier with an opening 42c communicating with the toner reservoir of the developing device. More specifically, a supporting portion 45 is formed at the end side of the opening 42c of the valve body operating member 4 and fixed to the developing device. There is provided in this developing device a slide lever 501 as a working member for connecting and disconnecting the valve body 3 at discharge member's side and the valve body operating member 4. The lever 501 has a longhole 503 formed on the upper face to extend in a direction in which the lever 501 slides. The valve body operating member 4 is sited within the long hole 503 so as to pass through the latter in a vertical direction. There is formed on the peripheral edge of the long hole 503 a flat portion

504 and a slope portion 505 gradually rising from the flat portion 504 backward (in a right-hand direction of fig.14, in other words, in a direction in which the slope portion 505 goes away from the valve body operating member 4). The flat portion 504 is spacious enough to rest thereon a flange portion 24 of the lower end of the discharge member 2 which is in contact with the flat portion 504 while the valve body 3 at discharge portion's side and the valve body operating member 4 are in fitting relationship. A fingering portion 506 is formed in the rear end of the slope portion 505 for pushing the lever 501 into sliding, under which a spring receiver 507 is provided.

**[0126]** On the other hand, there is another spring receiver 47 formed in the supporting portion 46 of the valve body operating member 4 in a section opposite to the spring receiver 507, and a spring 508 is interposed between the both spring receivers 507, 47. The spring 508 is intended for biasing the lever 501 backward at all times. The spring 508 is a compression coil spring. With the fingers put on said fingering portion 506, the lever 501 is advanced by pushing it forward (in a left-hand direction of fig.14, in other words, in a direction in which the slope portion 505 approaches the valve body operating member 4) against the biasing force of the spring 508, and then, the slope portion 505 goes under the flange portion 24 of the discharge member 2. As the lever 501 is further advanced, the slope portion 505 lifts the flange portion 24 with the result that the discharge member 2 will come out of the valve body operating member 4 (see fig.15). This may set the toner container provided with the discharge member 2 so free that the toner container can be taken out of the developing device of copiers by hand. After the discharge member 2 has been separated from the valve body operating member 4, the fingers are detached from the fingering portion 506, and then, the lever 501 goes back to the initial state under the influence of the biasing force of the spring 508.

**[0126]** When the toner container with discharge member 2 is mounted on the developing device of copiers, the discharge member 2 of the toner container is fitted onto the valve body operating member 4. In such an event, as aforementioned, the lever 501 is in the retreated position, thereby providing no obstacle whatsoever, so that the discharge member 2 may be mounted on the valve body operating member 4 in a simple way. When this operation has been completed, the flange portion 24 of the discharge member 2 abuts against the flat portion 504, as shown in fig.14.

**[0127]** In order to obtain a secure sliding of said lever 501, there are provided on both sides of the lever 501 guided pieces 509, 509 facing downward, as illustrated by figs 16 to 18. These guided pieces 509, 509 are slidably fitted in guide grooves (not shown) provided in the developing device of copiers. The lever 501 may slide back and forth under the guidance of the guide grooves (not shown).

**[0128]** The above-described example is indicative of a mechanism for actuating the discharge member 2 to move to or away from the valve body operating member 4 fixed to the developing device. More specifically, said mechanism includes the lever 501 with slope because the latter is used to force the discharge member 2 into motion as a working member for attachment and detachment between the discharge member 2 and the valve body operating member 4, and the spring 508 because it is used to move the lever 501. However, this spring 507 is not always necessary. A design may be used that the lever 501 can be moved back and forth by hand or a drive such as an electric motor or air cylinder. The lever 501 may be of a horizontal- or vertical-movable type, or a type of lever that can lift the discharge member 2 using the principle of lever. A spring may be used to act direct on the discharge member 2 to lift it.

**[0129]** In the alternative, as a working member for attachment and detachment between the discharge member 2 and the valve body operating member 4, a member may be used that can support portions such as flange portion 24 within the discharge member 2 in a manner that they may move in a vertical direction. Such a working member can be used to not only separate the discharge member 2 from the valve body operating member 4, but also allow the discharge member 2 to come near the valve body operating member 4. For example, the relationship between the discharge member 2 and the valve body operating member 4 was indicated to included three different modes, i.e. the first one wherein the valve body 3 of the discharge member 2 and the valve body operating member 4 are kept separate from each other, the second one wherein the valve body 3 of the discharge member 2 and the valve body operating member 4 are kept in a complete contact with each other, and the third one wherein the valve body 3 of the discharge member 2 and the valve body operating member 4 are not completely separate from each other, while the valve body 3 is in a closed position. In order that these three modes can be selected, the selection of the distance between the discharge member 2 and the valve body operating member 4 may permit the discharge member 2 to readily move to or away from the valve body operating member 4.

**[0130]** All what the working member for attachment and detachment between the discharge member 2 and the valve body operating member 4 has to do is to actuate at least one of the discharge member 2 and the valve body operating member 4 so that the discharge member 2 and the valve body operating member 4 will move to or away from each other. Thus, in the said example, the discharge member 2 was a movable element, but contrary to this, the discharge member 2 may be of a stationary type, while the valve body operating member 4 may be designed for a movable element. As a second example for the attachment and detachment recited an instance that in order to open and close the discharge member 2 provided in the toner container, the

discharge member 2 is attached to or detached from the valve body operating member 4 by fixing the discharge member 2 to a fixing position so as to actuate the valve body operating member 4 manually or automatically. Fig. 19 shows this specific example, wherein the discharge member 2 is rendered unmovable in a vertical direction by means of a fixing member 511 provided at the side of the developing device of copiers. In this example is shown discharge member 2 which is kept unmovable in a vertical direction by the flange portion 24 that has been forced into a hole provided in the fixing member 511. For example, a rigid toner container having no deformable part can be kept stationary by pressing the upper and lower ends thereof. The discharge member 2 or the toner container maybe kept at rest by a mechanical device such as chucks. Proper measures may be taken to practice said methods for inability to move in a vertical direction.

[0131] On the other hand, the valve body operating member 4 is provided in the developing device so that it may move in a vertical direction. In this instance, a guided portion 512 is provided below the valve body operating member 4, while there is provided on the side of the developing device a guide 513 such as a guide groove which may receive said guided portion 512 so that it can slide in a vertical direction. The attachment and detachment between the discharge member 2 and the valve body operating member 4 may be achieved by moving in a vertical direction a handle 514 extending from the valve body operating member 4 sideways. Fig. 19 shows the valve body 3 of the discharge member 2 and the valve body operating member 4 in fitting relationship with each other. The valve body operating member 4 may be removed from the valve body 3 of the discharge member 2 by the valve body operating member 4 which is slid downward by pushing down the handle 514.

[0132] In this instance was cited a valve body operating member 4 operable by hand-powered handle. However, as in the previous example, members with slope, or members which is driven by a mechanical device such as air cylinder or electric motor may be used. In either second example or first example, the attachment and detachment between the discharge member 2 and the valve body operating member 4 includes not only the transition from a position in which the valve body 3 of the discharge member 2 and the valve body operating member 4 are being coupled one to another to a position in which the both members are separate from each other but also the transition from the former position to an intermediate semi-coupled position (the valve body 3 and the valve body operating member 4 are kept unseparated from each other but the valve body 3 is in a closed position). Furthermore, the working member preferably may help to realize or complete at least one of these transitions. Thus, for example, the working member may be designed to handle only the transition from a coupled position to an uncoupled position, and not the transition from an uncoupled position to a coupled position.

tion, and not the transition from an uncoupled position to a coupled position.

[0133] As previously noted, with an arrangement such that at least one of the discharge member 2 and the valve body operating member 4 is made movable, the attachment and detachment between the discharge member 2 and the valve body operating member 4 can be achieved by manually or automatically actuating the working member for moving the discharge member 2 and the valve body operating member 4 to or away from each other. This may save troubles necessary for said attachment and detachment, and render said operations easy.

#### Industrial Applicability

[0134] The present invention is usable in a toner cartridge for supplying powder or liquid toner (including printing ink) for use in copying machines, printers, or pressing machines and its opening and closing mechanism for toner pass-through.

[0135] Furthermore, the present invention is not limited to the toner container as set forth but is applicable to supply containers for many other kinds of liquids, powders, or particles and its opening and closing mechanism for pass-through.

[0136] The present invention is also usable for coffee, soaps, juices, syrups, paintings, detergent, cosmetics, chemical products, motor oil, adhesives, medicine, every sort of foods, drinks, inedible liquids, powders, or particles. It will be appreciated by those skilled in the art that further changes in design, and combinations are available based on the above descriptions.

#### Claims

1. A toner cartridge comprising a toner container containing powder or liquid toners for use in developing device and a connecting member for supplying toners from said toner container to the developing device, characterized in that the connecting member includes a pass-through, said connecting member opening the pass-through provided thereon when the valve body operating member of said developing device is at work, and a valve body for closing the pass-through when the valve body operating member of the developing device is at rest, and the toners are discharged from the opened pass-through.
2. The toner cartridge as defined in claim 1, characterized in that the toner container includes a shrinkable portion of shrinking according to the amount of toners consumed within the toner container.
3. The toner cartridge as defined in claim 2, characterized in that the toner container may be filled with toners by pouring the toners from the connecting

member in the shrinking state of the shrinkable portion of the toner cartridge, that the valve body has a main fitting portion of closing the pass-through by fitting in the pass-through, and a connecting portion of connecting with the valve body operating member of the developing device, and that when the valve body operating member of the developing device proceeds relatively to the nondischarging position, said connecting portion moves, while staying in contact with the valve body operating member, together with the valve body operating member for subsequent fitting connection between the main fitting portion and the pass-through.

4. The toner cartridge as defined in any of claims 1 to 3, characterized in that the toner container includes a second connecting member other than said connecting member, and the pressure within the toner container may be adjusted by the second connecting member which selectively maintains a ventilate communication with the outside.
5. The toner cartridge as defined in any of claims 1 to 4, characterized in that after the toner container has been filled with toners injected from the connecting member, the discharge of the air within the toner container may be achieved by an air discharge means for discharging the air within the toner container without allowing any eventual leakage of the toners.
6. An opening and closing mechanism for pass-through of toner cartridge characterized in that a connecting member for supplying powder or liquid toners for use in developing device from the toner cartridge to the developing device comprises a body provided with a pass-through, a valve body for opening and closing the pass-through by moving to or away from the pass-through, a fixing means for rendering the valve body stationary with the pass-through kept closed, and a valve body operating member connected with the valve body for moving the valve body between opened and closed positions.
7. An opening and closing mechanism for the pass-through of the toner cartridge characterized in that the connecting member of the toner cartridge for supplying from the toner cartridge powder or liquid toners for use in the developing device comprises a body with pass-through, a valve body for opening and closing the pass-through by moving to or away from the pass-through, a fixing means for rendering the valve body stationary with the pass-through kept closed, and a valve actuating member formed integral with the valve body for moving the valve body between opened and closed positions, that said valve actuating member is provided stretching

over the areas in and about the pass-through, and the valve body operating member provided in the outside of the pass-through urges the valve actuating member to move the valve body between the opened and closed positions.

8. An opening and closing mechanism for the pass-through of the toner container as defined in claim 6 or 7 characterized in that the valve body operating member is provided in the developing device, and that only when the developing device needs toner supply, the valve body operating member resumes placing the valve body in an opened position, and when the toner supply is over, the valve body operating member resumes placing the valve body in a closed position.
9. An opening and closing mechanism for the pass-through of the toner container as defined in any of claims 6 to 8, characterized in that a working member is provided in the developing device for moving the connecting member and the valve body operating member to or away from each other by moving at least one of the connecting member and the valve body operating member, and that the working member is manually or automatically operated.

FIG. 1

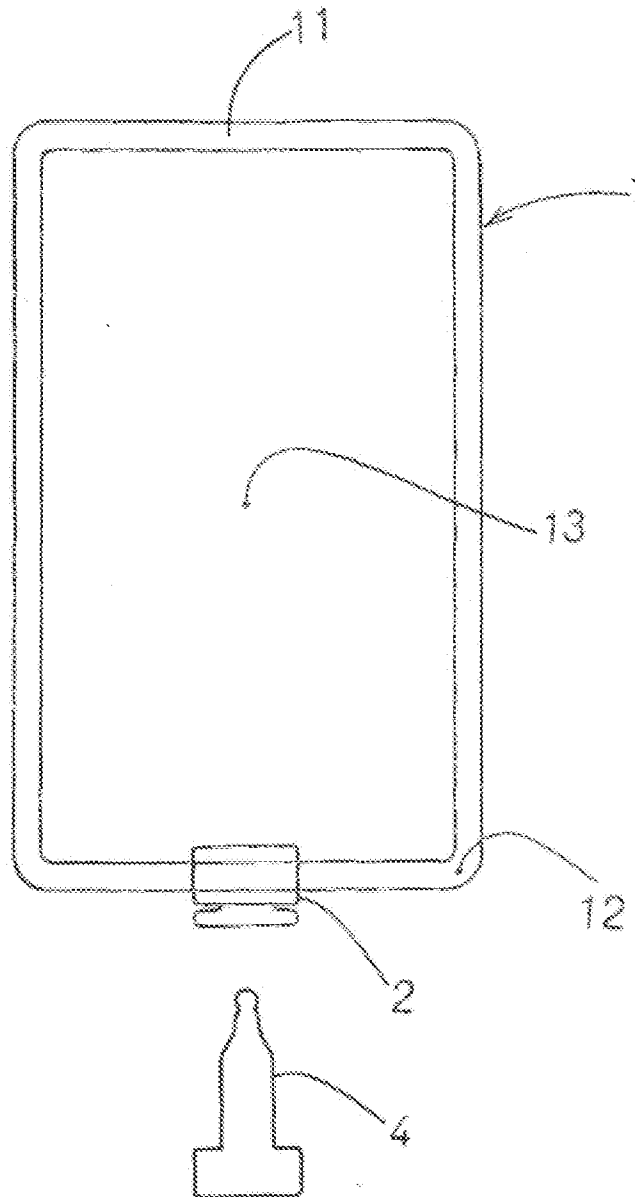


FIG. 2

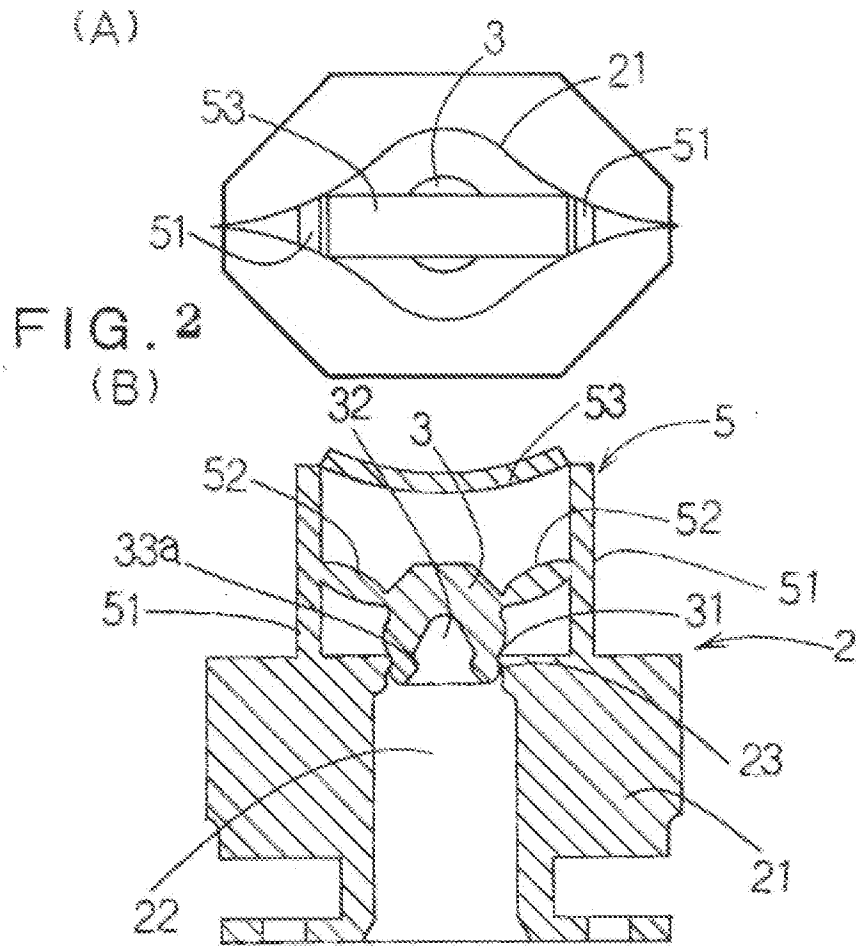


FIG. 2

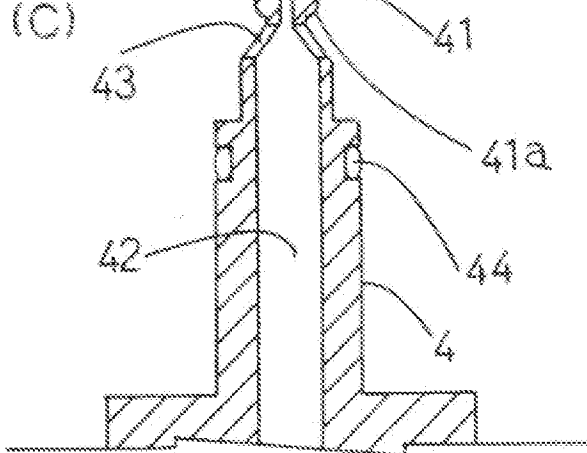




FIG. 3

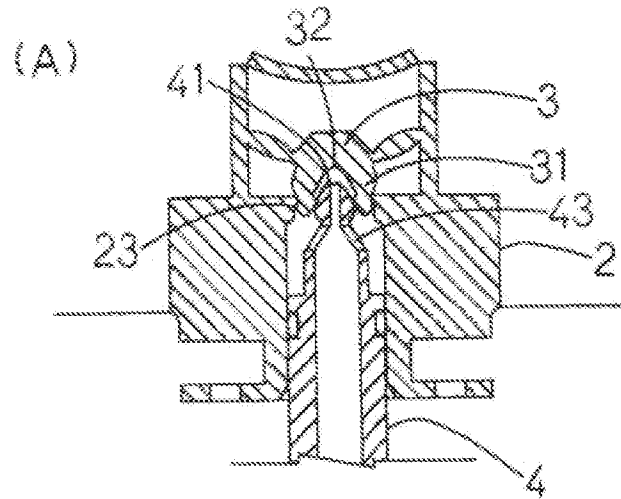


FIG. 3

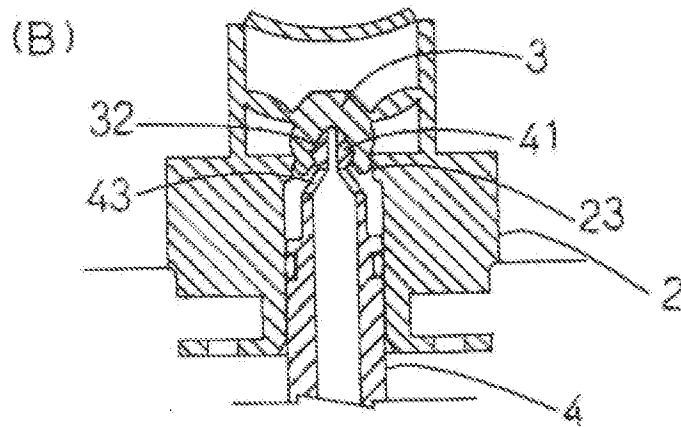


FIG. 3

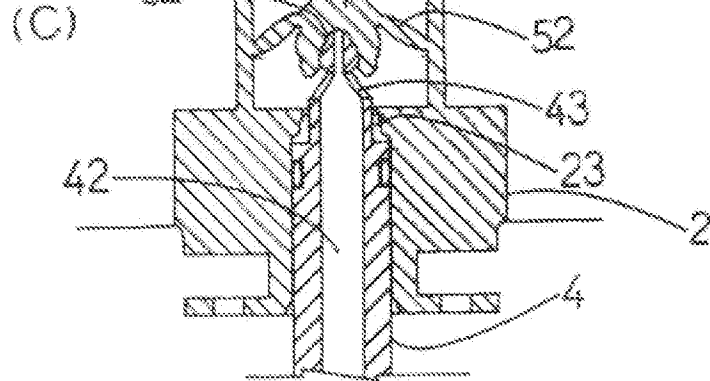


FIG. 4

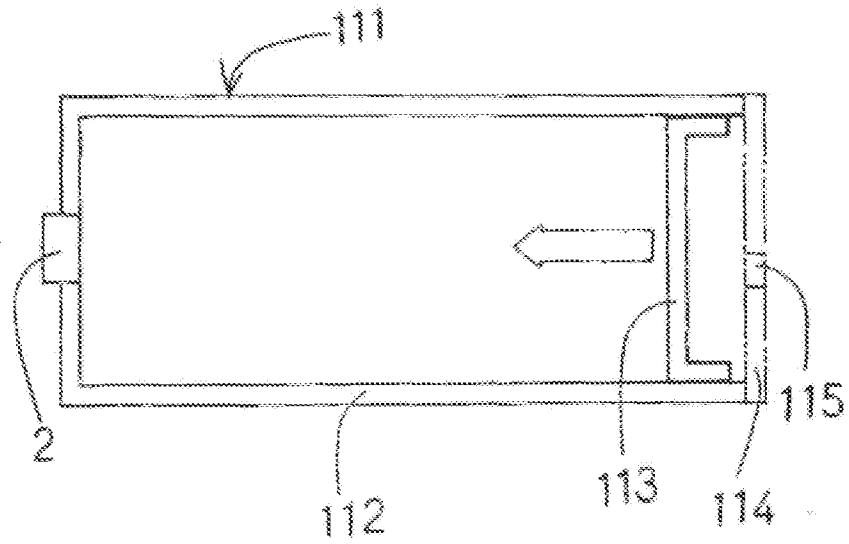
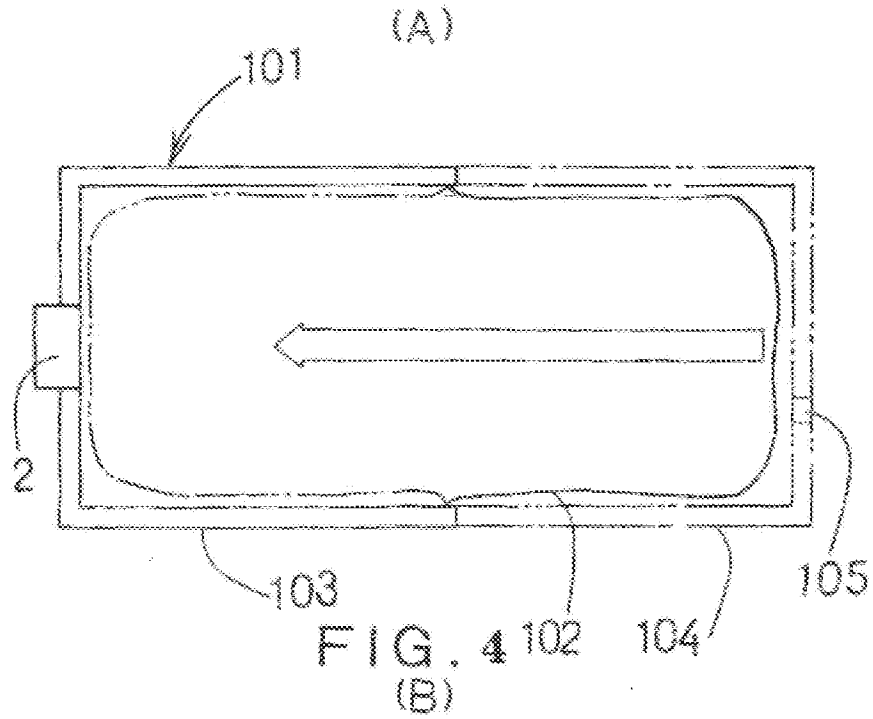


FIG. 5

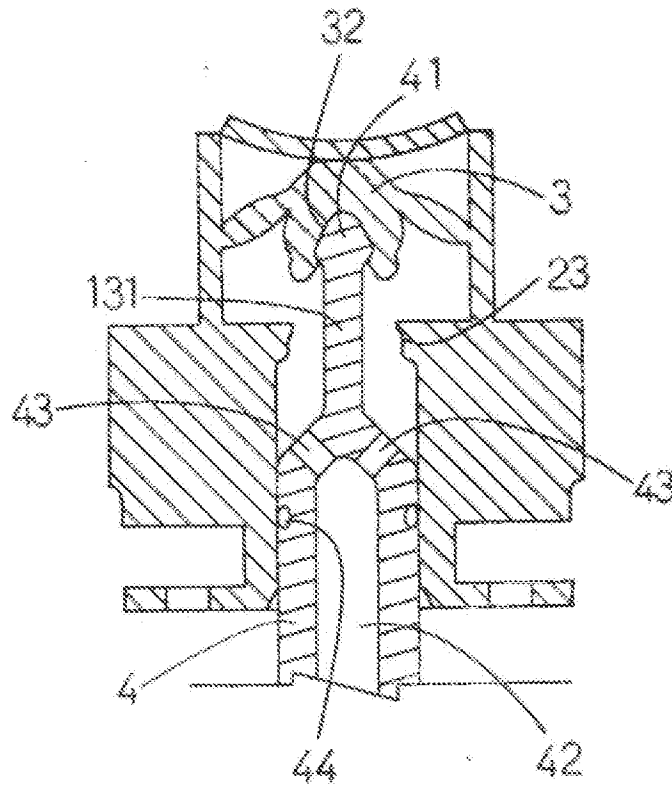


FIG. 6

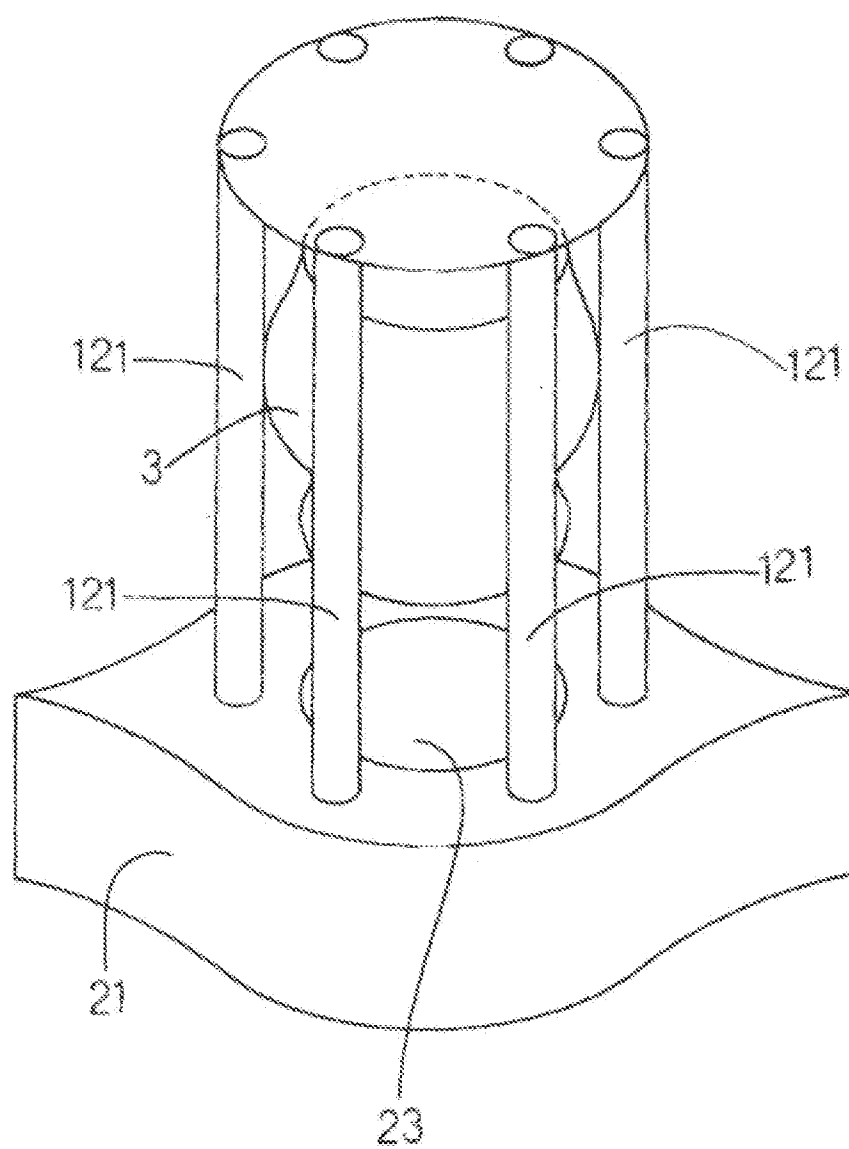


FIG. 7

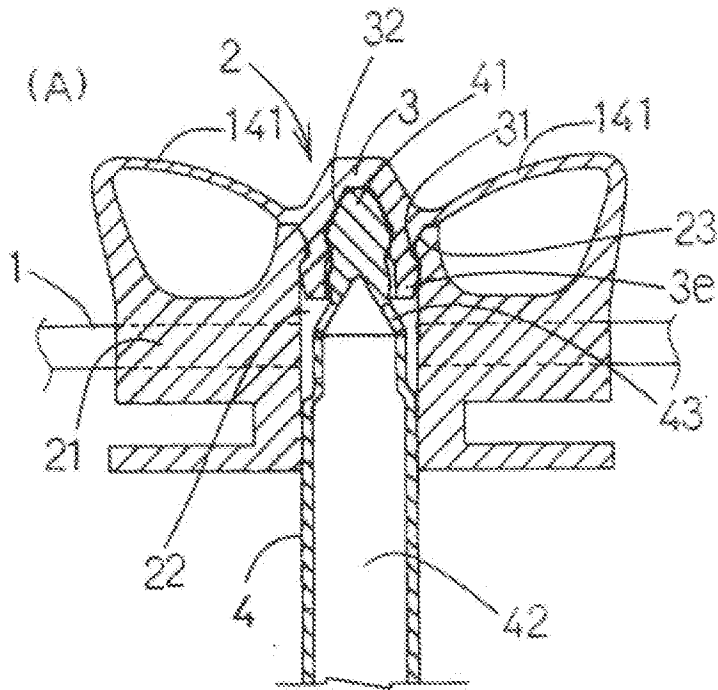
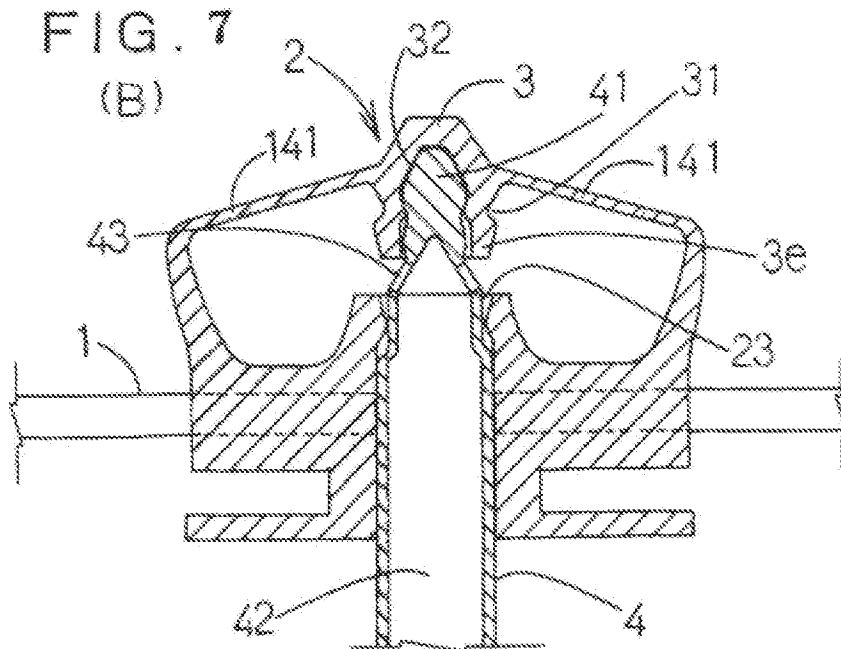


FIG. 7



(A) FIG. 8

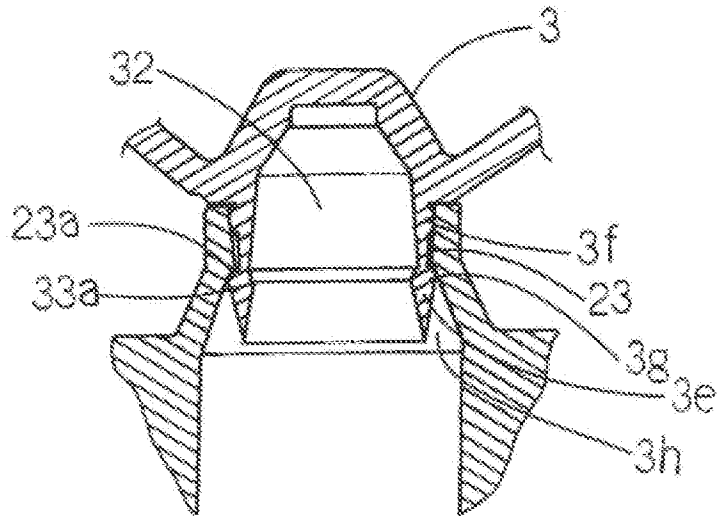


FIG. 8  
(B)

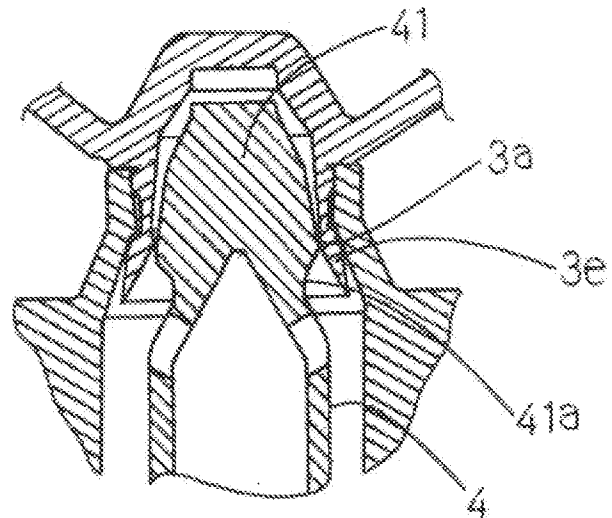


FIG. 9

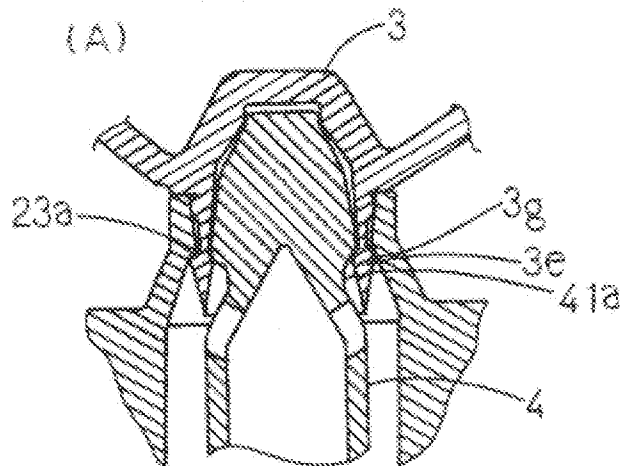


FIG. 9 (B)

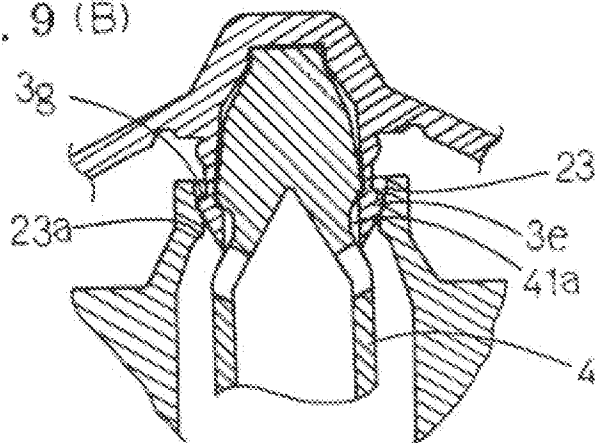


FIG. 9 (C)

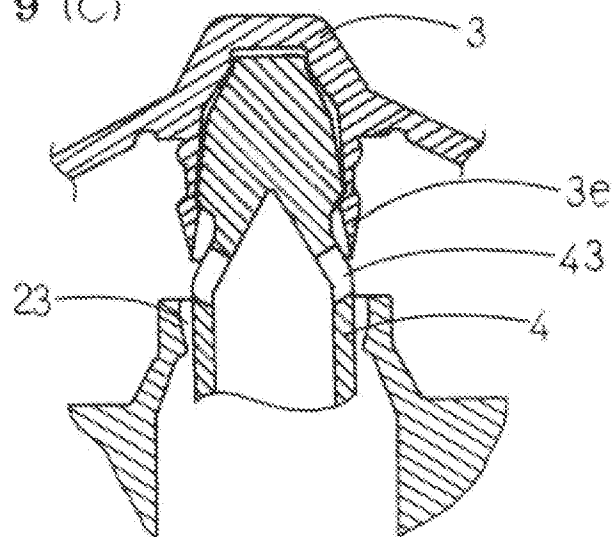


FIG. 10

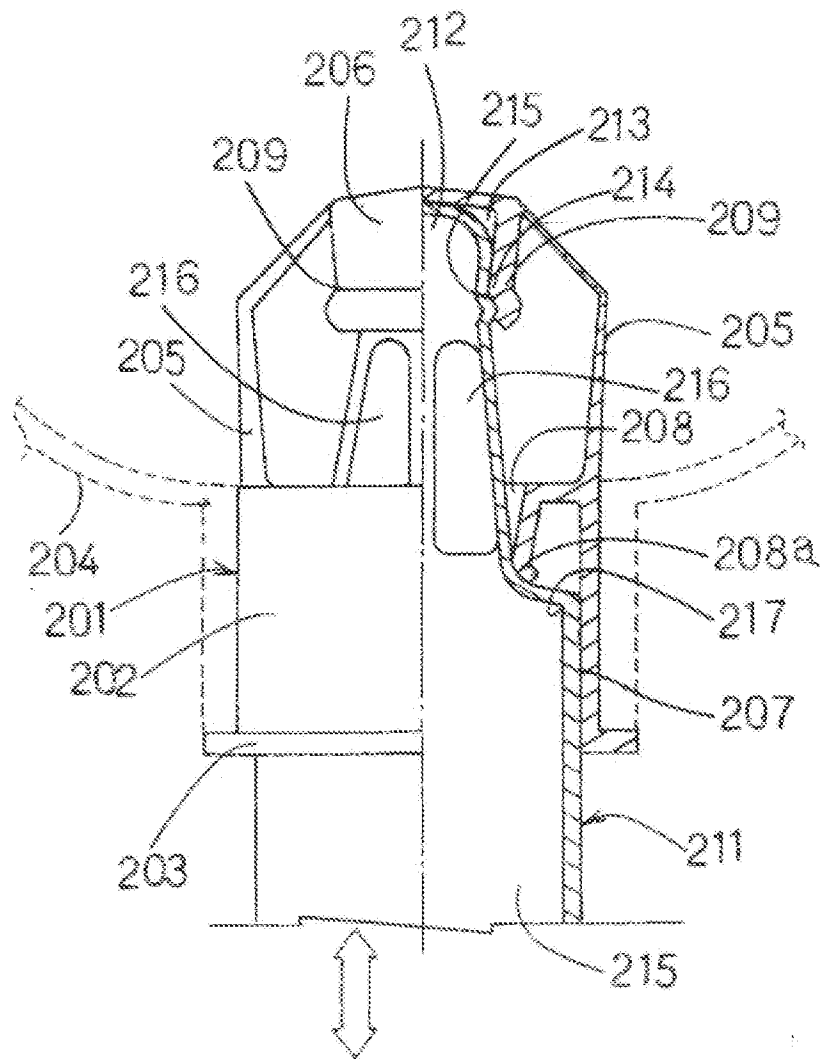




FIG. 11

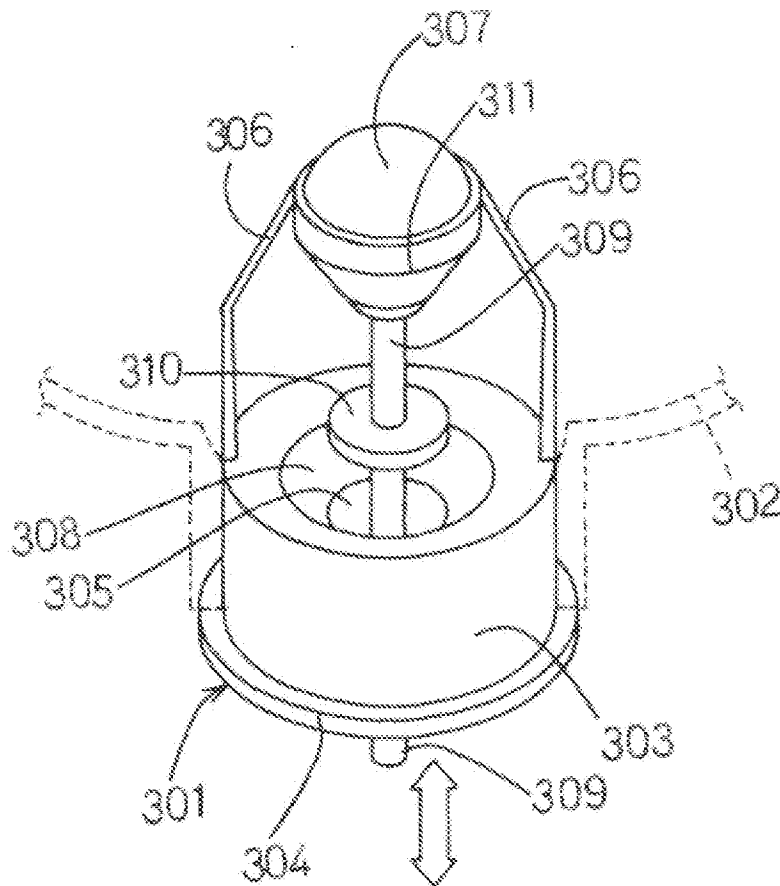


FIG. 12

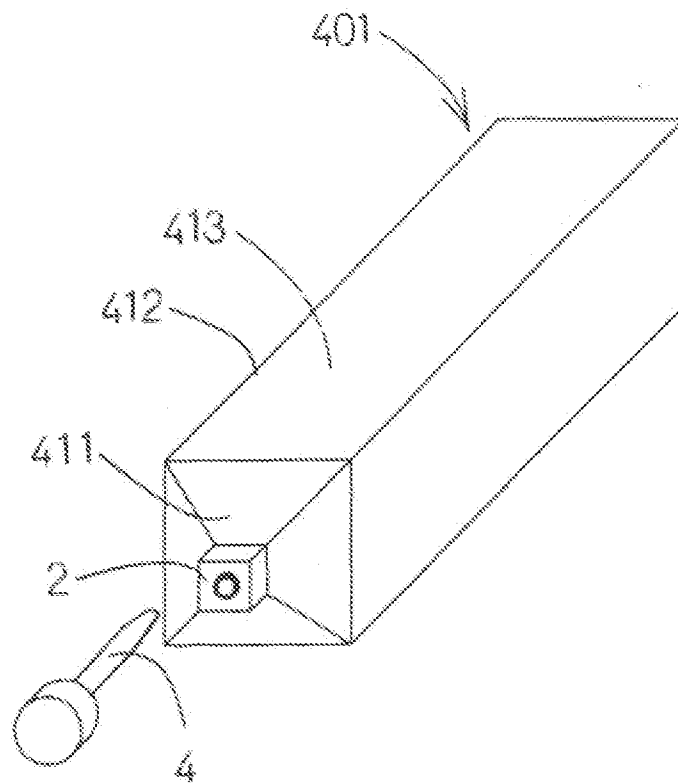


FIG. 13

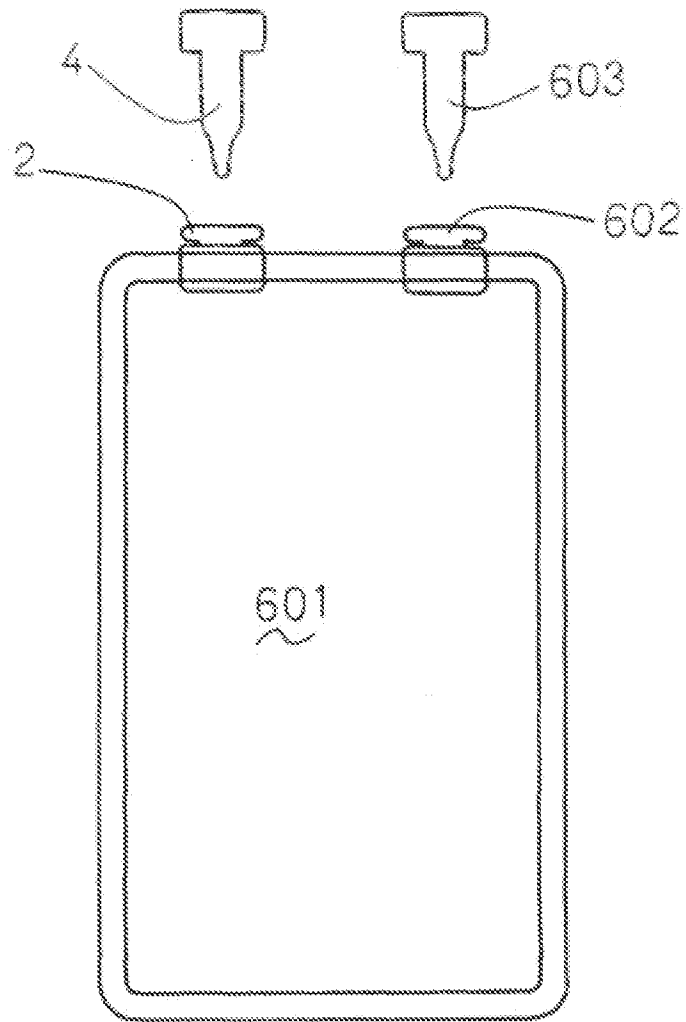


FIG. 14

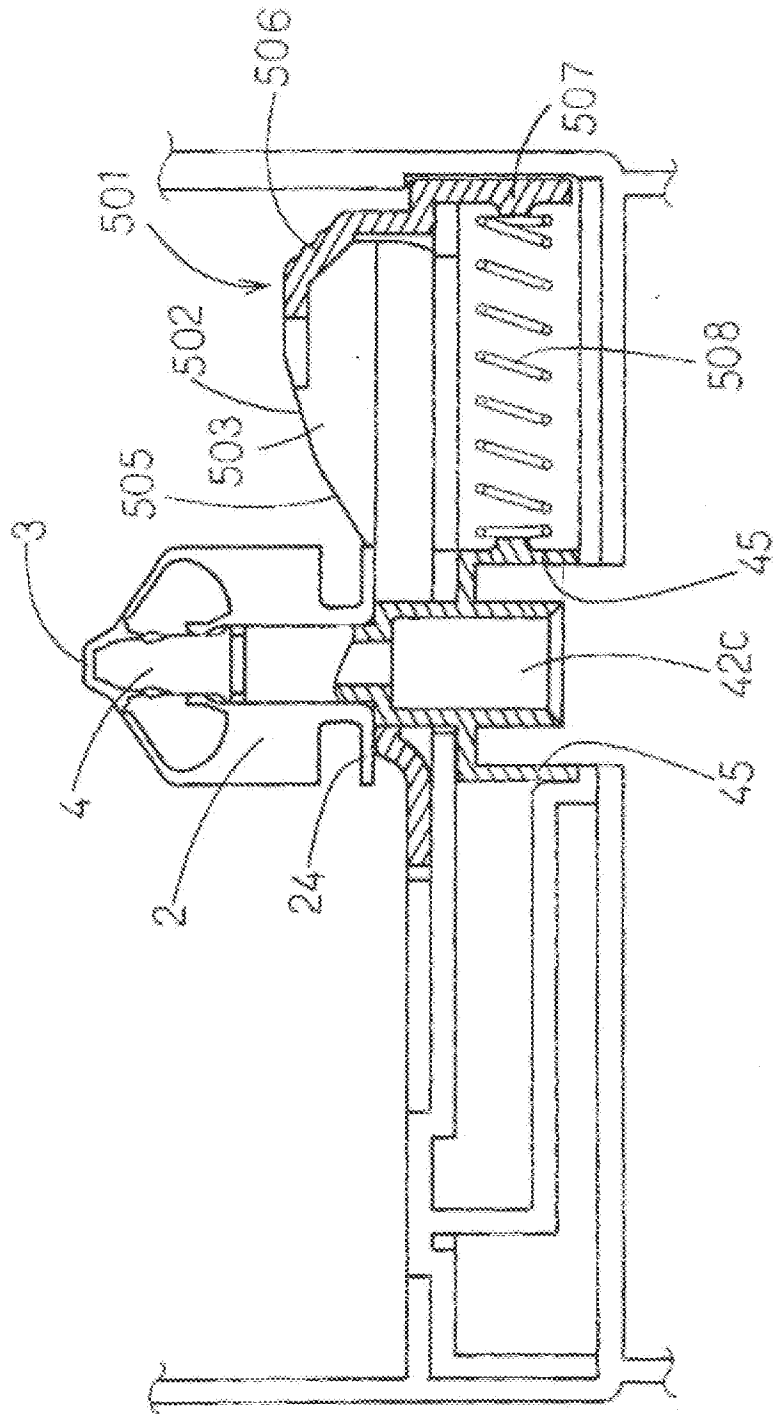


FIG. 15

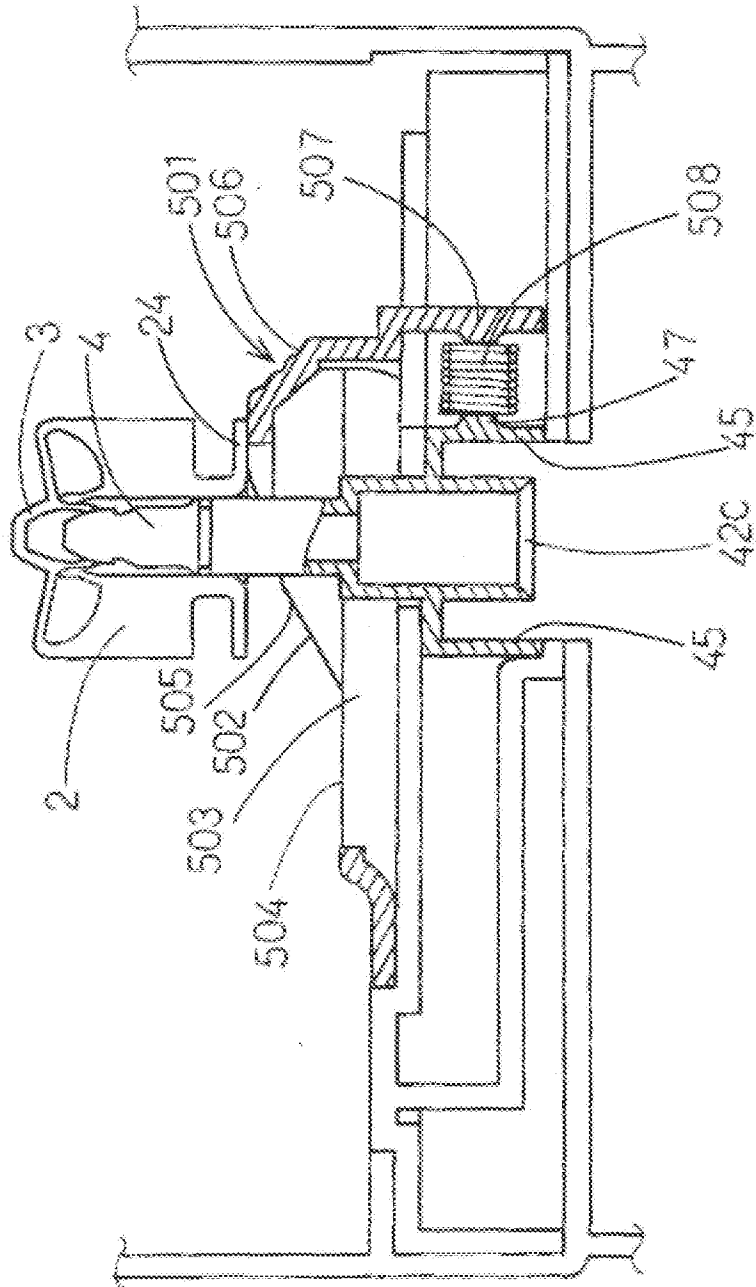


FIG. 16

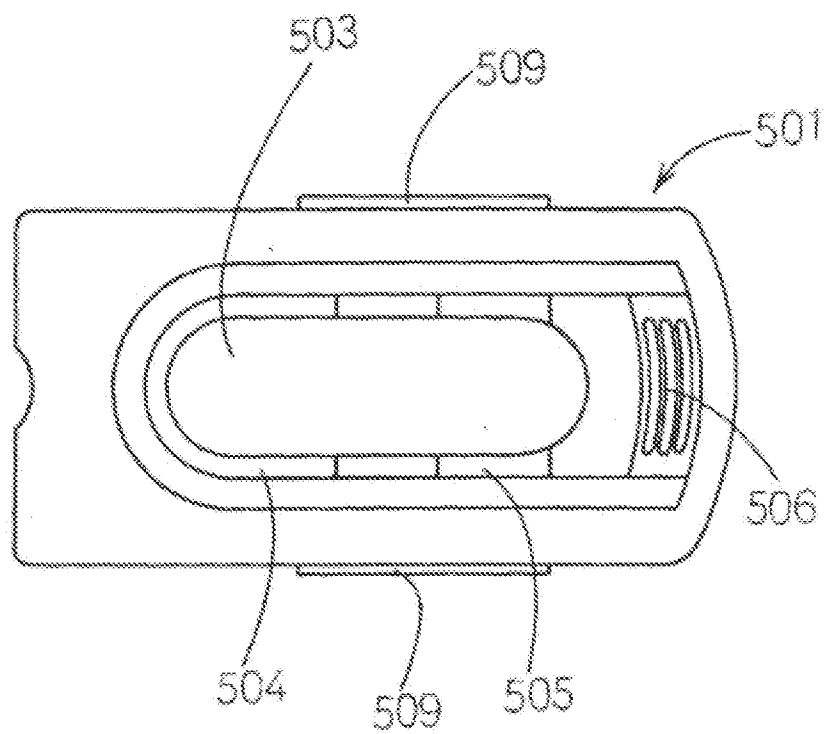


FIG. 17

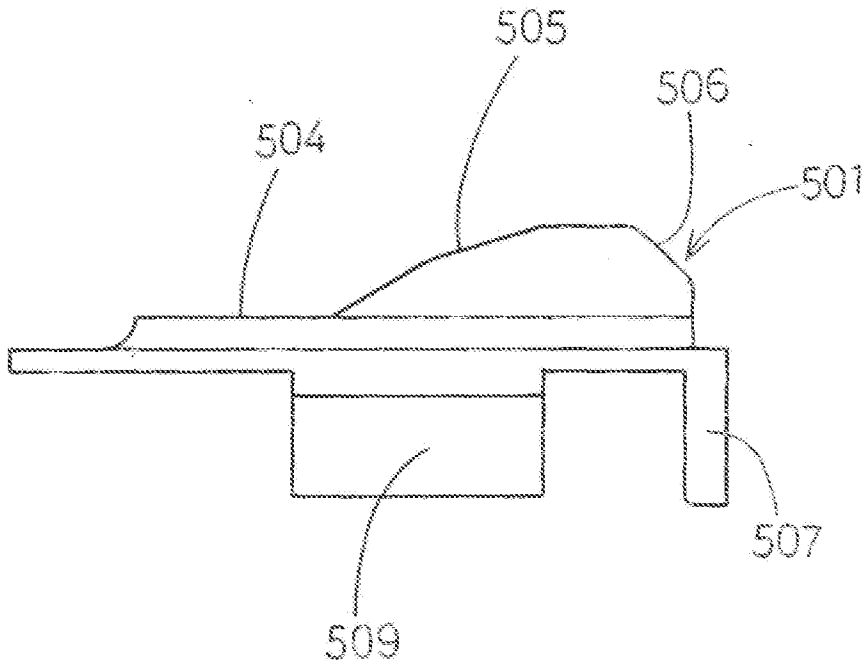


FIG. 18

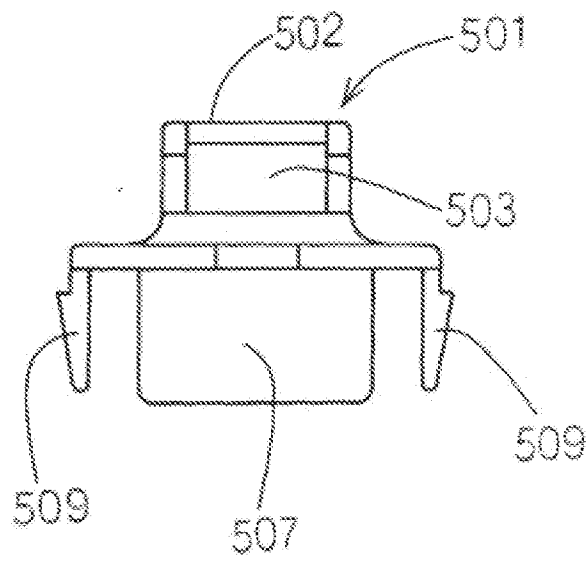
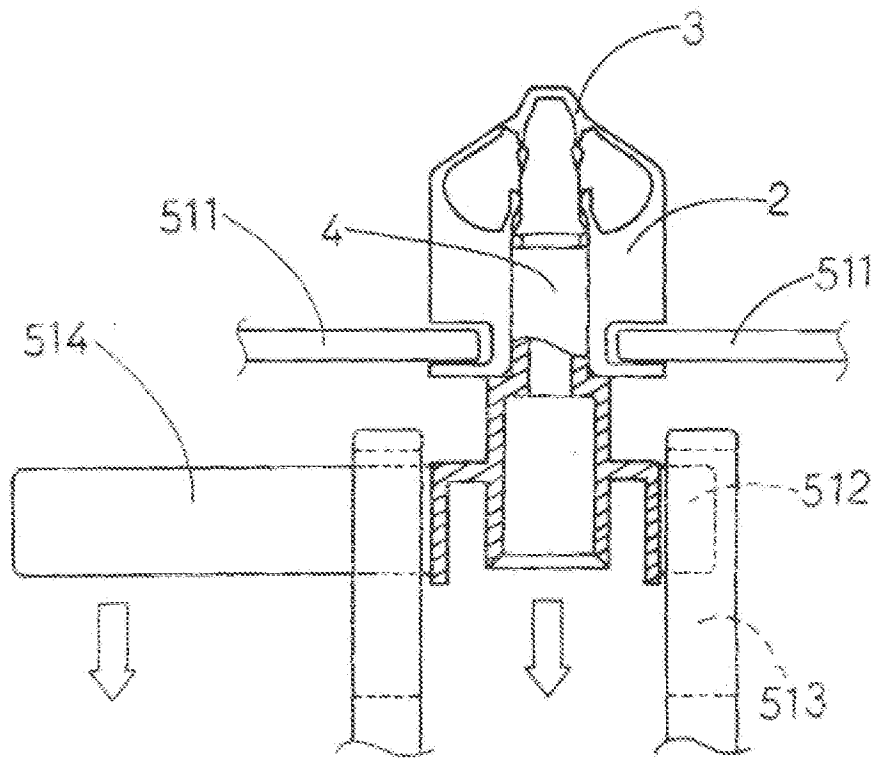




FIG. 19



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP98/03676

A. CLASSIFICATION OF SUBJECT MATTER Int.Cl. <sup>7</sup> G03G15/08, G03G15/10		
According to International Patent Classification (IPC) or to both national classification and IPC.		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) Int.Cl. <sup>7</sup> G03G15/06-15/11, E4132/005-2/215		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1923-1996 Toroku Jitsuyo Shinan Koho 1994-1998 Kokai Jitsuyo Shinan Koho 1971-1996 Jitsuyo Shinan Toroku Koho 1996-1998		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category <sup>a</sup>	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP, 1-130587, A (Fukuda Metal Coil & Power Co., Ltd.), 12 May, 1989 (12. 05. 89), Full text ; Figs. 1, 2	1, 6 3-5, 7-9
Y	Full text ; Figs. 1, 2 (Family: none)	
X	JP, 1-255877, A (Ricoh Co., Ltd.), 12 October, 1989 (12. 10. 89), Full text ; Figs. 1 to 8 (Family: none)	1-2
X	JP, 8-174816, A (Hewlett-Packard Co.), 9 July, 1996 (09. 07. 96), Full text ; Figs. 1 to 13	1-3
Y	Full text ; Figs. 1 to 13 (Family: none)	6-9
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 7230/1991 (Laid-open No. 96762/1992) (Dainippon Printing Co., Ltd.), 21 August, 1992 (21. 08. 92), Full text ; Figs. 1 to 3 (Family: none)	2-3
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" documents defining the general state of the art which is not considered to be of particular relevance "E" earlier documents not published on or after the international filing date "L" documents which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" documents referring to an oral disclosure, use, exhibition or other means "P" documents published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" documents of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "Z" document member of the same patent family	
Date of the actual completion of the international search 27 October, 1998 (27. 10. 98)	Date of mailing of the international search report 4 November, 1998 (04. 11. 98)	
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer	
Facsimile No.	Telephone No.	

Form PCT/ISA/210 (second sheet) (July 1997)

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP92/03678

C (Continuation): DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 45115/1988 (Laid-open No. 152354/1989) (Shoichi Yakura), 20 October, 1989 (20. 10. 89), Page 6, line 1 to page 9, line 1 ; page 11 ; Fig. 1 (Family: none)	4-5
Y	CD-ROM of the specification and drawings annexed to the request of Japanese Utility Model Application No. 36744/1992 (Laid-open No. 90515/1993) (Showa Products K.K.), 10 December, 1993 (10. 12. 93), Full text ; Figs. 1 to 6 (Family: none)	4-5
Y	JP, 4-25715, Y2 (Ricoh Co., Ltd., Tohoku Ricoh Co., Ltd.), 19 June, 1992 (19. 06. 92), Full text ; Figs. 1 to 3 (Family: none)	7-9

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/617,050	)	
	:	Examiner: Susan S. Y. Lee
First Named Inventor:	)	
YUSUKE YAMADA	:	Group Art Unit: 2852
	)	
Filed: September 14, 2012	:	Confirmation No.: 1149
	)	
For: SEALING MEMBER, TONER	:	
ACCOMMODATING	:	
CONTAINER AND IMAGE	)	
FORMING APPARATUS	:	October 22, 2014

**Mail Stop Issue Fee**  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

FOURTH SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Madam:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56 and in accordance with the practice under 37 C.F.R. §§ 1.97 and 1.98, the Examiner’s attention is directed to the documents listed on the enclosed PTO/SB/08a. Copies of the listed foreign documents are also enclosed.

Applicants certify under 37 C.F.R. §1.97(e)(1) that each item of information contained in the subject information disclosure statement (IDS) was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this statement. Specifically, these documents were first cited in (1) a Brazilian Office Action (with English translation) dated September 9, 2014, in corresponding Brazilian Patent

Application No. P10216075-7; (2) a Brazilian Office Action (with English translation) dated September 5, 2014, in corresponding Brazilian Patent Application No. P10200483-6; (3) a Brazilian Office Action (with English translation) dated September 9, 2014, in corresponding Brazilian Patent Application No. P10216078-1; (4) a Brazilian Office Action (with English translation) dated September 9, 2014, in corresponding Brazilian Patent Application No. P10216077-3; (5) a Brazilian Office Action (with English translation) dated September 9, 2014, in corresponding Brazilian Patent Application No. P10216076-5; and (6) a Brazilian Office Action (with English translation) dated September 9, 2014, in corresponding Brazilian Patent Application No. P10216074-9. Copies of the Office Actions that issued on that related applications are enclosed.

U.S. Patent No. 6,137,972 was cited in the IDS dated January 23, 2013, and therefore is not included herewith.

The fee of \$180.00 pursuant to 37 C.F.R. §1.97(c)(2) and §1.17(p) is being paid electronically.

#### CONCLUSION

It is respectfully requested that the above information be considered by the Examiner and that an initialed copy of the enclosed Form PTO/SB/08a be returned indicating that such information has been considered.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

/Scott D. Malpede/

---

Scott D. Malpede  
Attorney for Applicants  
Registration No. 32,533

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, NY 10104-3800  
Facsimile: (212) 218-2200

SDM/rmm

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13617050
<b>Filing Date:</b>	14-Sep-2012
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Filer:</b>	Lawrence A. Stahl/Rizalina Mendiola
<b>Attorney Docket Number:</b>	00684.003330.18

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	1806	1	180	180
<b>Total in USD (\$)</b>				<b>180</b>



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	20481060
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Lawrence A. Stahl/Denni Godfrey
<b>Filer Authorized By:</b>	Lawrence A. Stahl
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	22-OCT-2014
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	10:21:14
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$180
RAM confirmation Number	7451
Deposit Account	503939
Authorized User	GODFREY, DENNI L.

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

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Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	PTOSB08a00684003330_18USA600.PDF	612556 5a67ffc7a99c2801966ca2dc18408871ae15046d	no	4

**Warnings:**

**Information:**

A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.

2	Non Patent Literature	BROfficeAction_for_BR_P10216075_7_0068400330_18.pdf	387299 f1b485086d36655874021179329430e2a9ffa1e7	no	8
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**Warnings:**

**Information:**

3	Non Patent Literature	BROfficeAction_for_BR_P10200483_6_0068400330_18.pdf	423877 7ad2f21b5e9b4cc92ac03c4bc10b98abead3711	no	8
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**Warnings:**

**Information:**

4	Non Patent Literature	BROfficeAction_for_BR_P10216078_1_0068400330_18.pdf	455524 b5ac55bb926049e873fc661e38092875356a6f95	no	9
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**Warnings:**

**Information:**

5	Non Patent Literature	BROfficeAction_for_BR_P10216077_3_0068400330_18.pdf	427053 2284c5983dd77c73da65dd41ec615108945d439b	no	8
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**Warnings:**

**Information:**

6	Non Patent Literature	BROfficeAction_for_BR_P10216076_5_0068400330_18.pdf	466328 5f2af782dd116fa09aaf400e5669ba3278b4a9b6	no	10
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**Warnings:**

**Information:**

7	Non Patent Literature	BROfficeAction_for_BR_P10216074_9_0068400330_18.pdf	446368 486cfbee1a23386fc8da998e3a15e9e1e8c94540	no	9
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**Warnings:**

Information:					
8	Foreign Reference	EP0853260_00684003330_18.pdf	1213616 07e827ba41aeb74c77502df1e918189a9b346e14	no	25
Warnings:					
Information:					
9	Foreign Reference	EP1006415_00684003300_18.pdf	2083594 0e85e5e7cfdc4034c30ef6d0c10378878df6de6	no	38
Warnings:					
Information:					
10	Transmittal Letter	FourthSupplDS00684003330_18USA600.pdf	87273 f33fa1f4f053e303b68d836e35e3ac34386ffc3	no	3
Warnings:					
Information:					
11	Fee Worksheet (SB06)	fee-info.pdf	30662 2affc015174c101f56943dd69d49222947379793	no	2
Warnings:					
Information:					
<b>Total Files Size (in bytes):</b>			6634150		

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



NOTICE OF ALLOWANCE AND FEE(S) DUE

5514 7590 08/01/2014
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

Table with 2 columns: EXAMINER, ART UNIT, PAPER NUMBER

DATE MAILED: 08/01/2014

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.

TITLE OF INVENTION: SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS

Table with 7 columns: APPLN. TYPE, ENTITY STATUS, ISSUE FEE DUE, PUBLICATION FEE DUE, PREV. PAID ISSUE FEE, TOTAL FEE(S) DUE, DATE DUE

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.
If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.
If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".
For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

**PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 or Fax (571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

5514 7590 08/01/2014  
**FITZPATRICK CELLA HARPER & SCINTO**  
 1290 Avenue of the Americas  
 NEW YORK, NY 10104-3800

**Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/617,050	09/14/2012	Yusuke Yamada	00684.003330.18	1149

TITLE OF INVENTION: SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	\$960	\$0	\$0	\$960	11/03/2014

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEE, SUSAN SHUK YIN	2852	399-106000

<p>1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).</p> <p><input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.</p> <p><input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. <b>Use of a Customer Number is required.</b></p>	<p>2. For printing on the patent front page, list</p> <p>(1) The names of up to 3 registered patent attorneys or agents OR, alternatively, _____ 1</p> <p>(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. _____ 2</p> <p>_____ 3</p>
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**3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)**

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE \_\_\_\_\_ (B) RESIDENCE: (CITY and STATE OR COUNTRY) \_\_\_\_\_

Please check the appropriate assignee category or categories (will not be printed on the patent) :  Individual  Corporation or other private group entity  Government

<p>4a. The following fee(s) are submitted:</p> <p><input type="checkbox"/> Issue Fee</p> <p><input type="checkbox"/> Publication Fee (No small entity discount permitted)</p> <p><input type="checkbox"/> Advance Order - # of Copies _____</p>	<p>4b. Payment of Fee(s): (<b>Please first reapply any previously paid issue fee shown above</b>)</p> <p><input type="checkbox"/> A check is enclosed.</p> <p><input type="checkbox"/> Payment by credit card. Form PTO-2038 is attached.</p> <p><input type="checkbox"/> The Director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).</p>
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5. **Change in Entity Status** (from status indicated above)

Applicant certifying micro entity status. See 37 CFR 1.29

Applicant asserting small entity status. See 37 CFR 1.27

Applicant changing to regular undiscounted fee status.

**NOTE:** Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

**NOTE:** If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

**NOTE:** Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

**NOTE:** This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_

Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
Values: 13/617,050, 09/14/2012, Yusuke Yamada, 00684.003330.18, 1149

5514 7590 08/01/2014
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

Table with 1 column: EXAMINER
Value: LEE, SUSAN SHUK YIN

Table with 2 columns: ART UNIT, PAPER NUMBER
Value: 2852

DATE MAILED: 08/01/2014

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

## OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

### Privacy Act Statement

**The Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

<b>Notice of Allowability</b>	<b>Application No.</b> 13/617,050	<b>Applicant(s)</b> YAMADA ET AL.	
	<b>Examiner</b> SUSAN LEE	<b>Art Unit</b> 2852	<b>AIA (First Inventor to File) Status</b> No

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to amendment and terminal disclaimer filed 6/26/14.  
 A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on \_\_\_\_\_.
2.  An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_\_; the restriction requirement and election have been incorporated into this action.
3.  The allowed claim(s) is/are 22-74. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see [http://www.uspto.gov/patents/init\\_events/pph/index.jsp](http://www.uspto.gov/patents/init_events/pph/index.jsp) or send an inquiry to [PPHfeedback@uspto.gov](mailto:PPHfeedback@uspto.gov).
4.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

**Certified copies:**

- a)  All    b)  Some    \*c)  None of the:
1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
 including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Examiner's Amendment/Comment                             |
| 2. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO/SB/08),<br>Paper No./Mail Date <u>1/23/13, 1/23/13, 2/3/14, 6/27/14, 1/23/13, 4/25/14</u> | 6. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| 3. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material   | 7. <input type="checkbox"/> Other _____.   |
| 4. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____.  |  |



The present application is being examined under the pre-AIA first to invent provisions.

The terminal disclaimer filed on 6/26/14 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent No. 7,647,012 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### **REASONS FOR ALLOWANCE**

The following is an examiner's statement of reasons for allowance:

The primary reasons for allowance of claims 22-31 is the inclusion of an engaging portion in a toner supply container having a rotational force receiving portion, a locking portion, and a displacing force receiving portion. The rotational force receiving portion is capable of being abutted in a direction that is concentric with a circumference of the cylindrical portion of the container body to receive a rotational drive force for rotating the sealing member and the container body. The locking portion is capable of being abutted in a direction parallel to the rotation axis of the container body to enable the relative movement of the sealing member and the container body from the first position, in which the opening is sealed, to the second position, in which the opening is unsealed. The displacing force receiving portion is provided on the supporting portion at a position closer to the container body than the engaging portion, the displacing force receiving portion being displaceable with the supporting portion and having a radially outermost part that is more remote from the rotation axis of the

Art Unit: 2852

container body than a radially outermost part of the engaging portion. The supporting portion, the engaging portion, and the displacing force receiving portion are integrally molded. This in combination with the rest of the limitations of the claims is found in all of claims 22-31, but not disclosed nor suggested by the prior art of record.

The primary reason for allowance of claims 32-40 is the inclusion of an engaging portion in a toner supply container having a rotational force receiving portion, a locking portion, and a displacing force receiving portion. The rotational force receiving portion is capable of being abutted in a direction that is concentric with a circumference of the cylindrical portion of the container body to receive a rotational drive force for rotating the sealing member and the container body. The locking portion is capable of being abutted in a direction parallel to the rotation axis of the container body to enable the relative movement of the sealing member and the container body from the first position, in which the opening is sealed, to the second position, in which the opening is unsealed. The displacing force receiving portion is provided on each supporting portion at a position closer to the container body than the engaging portion provided at the free end of that supporting portion, the displacing force receiving portion being displaceable with the supporting portion on which it is provided and having a radially outermost part that is more remote from the rotation axis of the container body than a radially outermost part of the engaging portion provided at the free end of that supporting portion. This in combination with the rest of the limitations of the claims is found in all of claims 32-40, but not disclosed nor suggested by the prior art of record.

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The primary reason for allowance of claims 41-49 is the inclusion of an engaging portion in a toner supply container having a rotational force receiving portion, a locking portion, and a displacing force receiving portion. The rotational force receiving portion is capable of being abutted in a direction that is concentric with a circumference of the cylindrical portion of the container body to receive a rotational drive force for rotating the sealing member and the container body. The locking portion is capable of being abutted in a direction parallel to the rotation axis of the container body to enable the relative movement of the sealing member and the container body from the first position, in which the opening is sealed, to the second position, in which the opening is unsealed. The displacing force receiving portion is provided on each supporting portion at a position closer to the container body than the engaging portion provided at the free end of that supporting portion, the displacing force receiving portion being displaceable with the supporting portion on which it is provided and having a radially outermost part that is more remote from the rotation axis of the container body than a radially outermost part of the engaging portion provided at the free end of that supporting portion. The engaging portions of at least two supporting portions are provided at diametrically opposed positions. This in combination with the rest of the limitations of the claims is found in all of claims 41-49, but not disclosed nor suggested by the prior art of record.

The primary reason for allowance of claims 50-58 is the inclusion of a coupling portion in a toner supply container having a supporting portion, an engaging portion, and a projection portion. The supporting portion is provided on the sealing portion, the supporting portion being elastically displaceable in an inward direction toward the axis

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of the container body and elastically restorable in an outward direction away from the axis of the container body. The engaging portion is provided at a free end of the supporting portion and being displaceable with the supporting portion. The projecting portion is provided at a position closer to the container body than the engaging portion, the projecting portion projecting radially from an outer surface of the supporting portion such that a radially outermost part of the projecting portion is more remote from the axis of the container body than a radially outermost part of the engaging portion, and the projecting portion being displaceable with the supporting portion. The supporting portion, the engaging portion, and the projecting portion are integrally molded. This in combination with the rest of the limitations of the claims is found in all of claims 50-58, but not disclosed nor suggested by the prior art of record.

The primary reason for allowance of claims 59-66 is the inclusion of a coupling portion in a toner supply container having at least two supporting portions, an engaging portion, and a projection portion. At least two supporting portions is provided on the sealing portion at diametrically opposed positions, each supporting portion being elastically displaceable in an inward direction toward the axis of the container body and elastically restorable in an outward direction away from the axis of the container body. The engaging portion is provided at a free end of each supporting portion and being displaceable with the supporting portion, and a projecting portion is provided on each supporting portion at a position closer to the container body than the engaging portion, the projecting portion projecting radially from an outer surface of the supporting portion such that a radially outermost part of the projecting portion is more remote from the axis

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of the container body than a radially outermost part of the engaging portion, and the projecting portion being displaceable with the supporting portion. This in combination with the rest of the limitations of the claims is found in all of claims 59-66, but not disclosed nor suggested by the prior art of record.

The primary reason for allowance of claims 67-74 is the inclusion of a coupling portion in a toner supply container having at least two supporting portions, an engaging portion, and a projection portion. The plurality of supporting portions is provided on the sealing portion, each supporting portion being elastically displaceable in an inward direction toward the axis of the container body and elastically restorable in an outward direction away from the axis of the container body. The engaging portion is provided at a free end of each supporting portion and being displaceable with the supporting portion. The projecting portion is provided on each supporting portion at a position closer to the container body than the engaging portion, the projecting portion projecting radially from an outer surface of the supporting portion such that a radially outermost part of the projecting portion is more remote from the axis of the container body than a radially outermost part of the engaging portion, and the projecting portion being displaceable with the supporting portion. The engaging portions of at least two supporting portions are provided at diametrically opposed positions. This in combination with the rest of the limitations of the claims is found in all of claims 67-74, but not disclosed nor suggested by the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

Art Unit: 2852

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUSAN LEE whose telephone number is (571)272-2137. The examiner can normally be reached on Mon. - Fri., 9:30-7:00, Second Monday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Lindsay can be reached on (571) 272-1674. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SUSAN LEE/  
Primary Examiner, Art Unit 2852

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050
	Filing Date		2012-09-14
	First Named Inventor	Yusuke YAMADA	
	Art Unit	2852	
	Examiner Name		
	Attorney Docket Number	00684.003330.18	

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5218407		1993-06-08	Matsushita et al.	
	2	5455662		1995-10-03	Ichikawa et al.	
	3	5557382		1996-09-17	Tatsumi et al.	
	4	5598254		1997-01-28	Ikesue et al.	
	5	5765079		1998-06-09	Yoshiki et al.	
	6	5822663		1998-10-13	Ichikawa et al.	
	7	5909609		1999-06-01	Yahata et al.	
	8	5915155		1999-06-22	Shoji et al.	

<b>Receipt date: 01/23/2013</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		13617050	13617050 - GAU: 2852	
	Filing Date		2012-09-14		
	First Named Inventor	Yusuke YAMADA			
	Art Unit		2852		
	Examiner Name				
	Attorney Docket Number		00684.003330.18		

	9	5918090		1999-06-29	Ichikawa et al.	
	10	5953567		1999-09-14	Muramatsu et al.	
	11	5966574		1999-10-12	Ui et al.	
	12	5970290		1999-10-19	Yoshiki et al.	
	13	6097903		2000-08-01	Yahata et al.	
	14	6289195	B1	2001-09-11	Ichikawa et al.	
	15	6298208	B1	2001-10-02	Kawamura et al.	
	16	6418293	B2	2002-07-09	Ichikawa et al.	

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	1	20010008593	A1	2001-07-19	Tsuji et al.	



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	Filing Date		2012-09-14	
	First Named Inventor	Yusuke YAMADA		
	Art Unit		2852	
	Examiner Name			
	Attorney Docket Number		00684.003330.18	

2	20020044795	A1	2002-04-18	Kato	
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	1	Defendant Color Imaging, Inc.'s Invalidity Contentions Pursuant to Local Patent Rule 4.3, dated May 8, 2012, in Case No. 1:11-cv-03855-RLV in the United States District Court, Northern District of Georgia, Atlanta Division.	<input type="checkbox"/>
	2	Defendant General Plastic Industrial Co., Ltd.'s Invalidity Contentions Pursuant to Local Patent Rule 4.3, dated May 8, 2012, in Case No. 1:11-cv-03855-RLV in the United States District Court, Northern District of Georgia, Atlanta Division.	<input type="checkbox"/>
	3	Notice of Acceptance dated May 21, 2012, in Australian Application No. 2010201088.	<input type="checkbox"/>
	4	Notice of Acceptance dated May 21, 2012, in Australian Application No. 2010201089.	<input type="checkbox"/>
	5	Notice of Acceptance dated May 21, 2012, in Australian Application No. 2010201091.	<input type="checkbox"/>

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	First Named Inventor	Yusuke YAMADA	
	Art Unit	2852	
	Examiner Name		
	Attorney Docket Number	00684.003330.18	

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<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	966	(yusuke near3 yamada).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:15
L2	546	(yutaka near3 ban).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:15
L3	494	(katsuya near3 murakami).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:15
L4	329	(fumio near3 tazawa).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:15
L5	317	(hironori near3 minagawa).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:15
L6	1741	L1 or L2 or L3 or L4 or L5	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:15
L7	59625	(number or quantit\$4 or count\$4) near11 (rib\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:15
L8	262476	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:15
L9	47	L6 and L7 and L8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:15
L10	171479	(toner\$1 or develop\$4) near10 (seal\$4 or gasket or cap\$4)	US-PGPUB; USPAT	OR	ON	2014/07/27 12:18
L11	1036820	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or	US-PGPUB; USPAT	OR	ON	2014/07/27 12:18

		(engag\$3) near11 (hole\$4 or aperture or open\$4)				
L12	130878	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)	US-PGPUB; USPAT	OR	ON	2014/07/27 12:18
L13	35916	(number or quantit\$4 or count\$4) near11 (rib\$4)	US-PGPUB; USPAT	OR	ON	2014/07/27 12:18
L14	15	L10 same L11 same L12 same L13	US-PGPUB; USPAT	OR	ON	2014/07/27 12:18
L15	69648	(toner\$1 or develop\$4) near10 (seal\$4 or gasket or cap\$4)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:18
L16	131598	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:18
L17	89	L15 and L16	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:18
L18	69648	(toner\$1 or develop\$4) near10 (seal\$4 or gasket or cap\$4)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:18
L19	131598	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:18
L20	1102440	(project\$3 or projection or protrus\$3 or protrud\$3 or engagement or engag\$3) near11 (hole\$4 or aperture or open\$3 or opening)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/07/27 12:18
L21	40	L18 same L19 same L20	USOCR	OR	ON	2014/07/27 12:18

**EAST Search History (Interference)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L22	3728	((toner\$1 or develop\$4) near10 (seal\$4 or gasket or cap\$4)).clm.	US-PGPUB; UPAD	OR	ON	2014/07/27 12:26
L23	126738	((project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (hole\$4 or aperture or open\$4)).clm.	US-PGPUB; UPAD	OR	ON	2014/07/27 12:27
L24	13198	((project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)).clm.	US-PGPUB; UPAD	OR	ON	2014/07/27 12:27
L26	4034	((number or quantit\$4 or count\$4) near11 (rib\$4 or joint\$4 or bridg\$4)).clm.	US-PGPUB; UPAD	OR	ON	2014/07/27 12:28
L27	8	22 and 23 and 24 and 26	US-PGPUB; UPAD	OR	ON	2014/07/27 12:28

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050
	Filing Date		2012-09-14
	First Named Inventor	Yusuke YAMADA	
	Art Unit		2852
	Examiner Name		
	Attorney Docket Number		00684.003330.18

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Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4060105		1977-11-29	Feldeisen et al.	
	2	4342282		1982-08-03	Yamashita et al.	
	3	4981218		1991-01-01	Ban et al.	
	4	5177539		1993-01-05	Tsuji	
	5	5177540		1993-01-05	Honda et al.	
	6	5235389		1993-08-10	Kikuchi et al.	
	7	5268722		1993-12-07	Ikkatai et al.	
	8	5296900		1994-03-22	Saijo et al.	

<b>Receipt date: 01/23/2013</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		13617050	13617050 - GAU: 2852
	Filing Date		2012-09-14	
	First Named Inventor	Yusuke YAMADA		
	Art Unit		2852	
	Examiner Name			
	Attorney Docket Number		00684.003330.18	

	9	5351728		1994-10-04	Ban et al.	
	10	5513679		1996-05-07	Yamada	
	11	5515143		1996-05-07	Shiotani	
	12	5528349		1996-06-18	Satake	
	13	5579101		1996-11-26	Omata et al.	
	14	5794108		1998-08-11	Yoshizawa et al.	
	15	5828935		1998-10-27	Tatsumi et al.	
	16	5852760		1998-12-22	Harris et al.	
	17	5870652		1999-02-09	Kanamori et al.	
	18	5890040		1999-03-30	Matsuoka et al.	
	19	5907756		1999-05-25	Shirota et al.	

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	First Named Inventor	Yusuke YAMADA		
	Art Unit		2852	
	Examiner Name			
	Attorney Docket Number		00684.003330.18	

	20	5909610		1999-06-01	Yoshiki et al.	
	21	5918095		1999-06-29	Huang	
	22	6032013		2000-02-29	Nizawa	
	23	6049685		2000-04-11	Murakami et al.	
	24	6064846		2000-05-16	Wang et al.	
	25	6067432		2000-05-23	Huang	
	26	6075963		2000-06-13	Ichikawa et al.	
	27	6091912		2000-07-18	Kitajima et al.	
	28	6118951		2000-09-12	Kato et al.	
	29	6128453		2000-10-03	Ban et al.	
	30	6131008		2000-10-10	Kanamori et al.	



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	First Named Inventor	Yusuke YAMADA		
	Art Unit		2852	
	Examiner Name			
	Attorney Docket Number		00684.003330.18	

	31	6137972		2000-10-24	Playfair et al.	
	32	6151432		2000-11-21	Nakajima et al.	
	33	6151471		2000-11-21	Yahata et al.	
	34	6185401	B1	2001-02-06	Kanamori et al.	
	35	6224270	B1	2001-05-01	Nakajima et al.	
	36	6259874	B1	2001-07-10	Murakami et al.	
	37	6266505	B1	2001-07-24	Ban et al.	
	38	6289193	B1	2001-09-11	Ban et al.	
	39	6292644	B1	2001-09-18	Goto et al.	
	40	6314261	B1	2001-11-06	Omata et al.	
	41	6334037	B1	2001-12-25	Ise	

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	First Named Inventor	Yusuke YAMADA			
	Art Unit		2852		
	Examiner Name				
	Attorney Docket Number		00684.003330.18		

	42	6533468	B2	2003-03-18	Nakajima et al.	
	43	6766133	B1	2004-07-20	Ban et al.	
	44	6879789		2005-04-12	Yamada et al.	
	45	6920298		2005-07-19	Yamada et al.	
	46	6944417		2005-09-13	Yamada et al.	
	47	6950621	B2	2005-09-27	Himes	
	48	6990301		2006-01-24	Yamada et al.	
	49	6990302	B2	2006-01-24	Toba et al.	
	50	6993273	B2	2006-01-31	Yamada	
	51	7127193	B2	2006-10-24	Yamada et al.	
	52	7245852		2007-07-17	Takawa	

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	First Named Inventor	Yusuke YAMADA		
	Art Unit		2852	
	Examiner Name			
	Attorney Docket Number		00684.003330.18	

	53	7324777	B2	2008-01-29	Yamada et al.	
	54	7376369		2008-05-20	Yamada et al.	
	55	7382997		2008-06-03	Yamada et al.	
	56	7386251		2008-06-10	Yamada et al.	
	57	7430384	B2	2008-09-30	Yamada et al.	
	58	7433633		2008-10-07	Yamada et al.	
	59	7469113		2008-12-23	Yamada et al.	
	60	7474866		2009-01-06	Doi et al.	
	61	7505718		2009-03-17	Kawamura et al.	
	62	7965963	B2	2011-06-21	Yamada et al.	

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Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	20040009017	A1	2004-01-15	Yoshino et al.	
	2	20050169674	A1	2005-08-04	Yoshino et al.	

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	1	2300202	CA		1999-02-25	Showa Marutsutsu Co Ltd		<input type="checkbox"/>
	2	1237405C	CN		2006-01-18	Canon KK		<input type="checkbox"/>
	3	0 853 260	EP	A2	1998-07-15	Konishiroku Photo Ind		<input type="checkbox"/>
	4	0 897 137	EP	A1	1999-02-17	Canon KK		<input type="checkbox"/>
	5	0 897 138	EP	A1	1999-02-17	Canon KK		<input type="checkbox"/>
	6	0 905 577	EP	A2	1999-03-31	Canon KK		<input type="checkbox"/>

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	First Named Inventor	Yusuke YAMADA		
	Art Unit		2852	
	Examiner Name			
	Attorney Docket Number		00684.003330.18	

7	1 006 415	EP	A1	2000-06-07	Showa Marutsutsu Co Ltd	<input type="checkbox"/>
8	1 041 454	EP	A1	2000-10-04	Canon KK	<input type="checkbox"/>
9	2 287 100	GB	A	1995-09-06	Seiko Epson Corp	<input type="checkbox"/>
10	63-135359	JP		1988-06-07	Unitika Ltd	<input checked="" type="checkbox"/>
11	1-29745	JP		1989-09-11	Hoshi Denki Seizo Kabushiki Kaisha	<input type="checkbox"/>
12	3-256058	JP		1991-11-14	Ricoh KK	<input checked="" type="checkbox"/>
13	4-112474	JP		1992-09-30	Witoc of Jupiter Dentsu Kabushiki Kaisha	<input checked="" type="checkbox"/>
14	5-75768	JP		1993-03-26	Ricoh KK	<input checked="" type="checkbox"/>
15	8-211719	JP		1996-08-29	Ricoh Co Ltd	<input checked="" type="checkbox"/>
16	9-222786	JP		1997-08-26	Canon Inc	<input type="checkbox"/>
17	9-274366	JP		1997-10-21	Ricoh KK	<input type="checkbox"/>

<b>Receipt date: 01/23/2013</b>  <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <b>( Not for submission under 37 CFR 1.99)</b>	Application Number		13617050	13617050 - GAU: 2852
	Filing Date		2012-09-14	
	First Named Inventor	Yusuke YAMADA		
	Art Unit		2852	
	Examiner Name			
	Attorney Docket Number		00684.003330.18	

18	10-48936	JP		1998-02-20	Minolta Co Ltd	<input type="checkbox"/>
19	10-63076	JP		1998-03-06	Konishiroku Photo Ind	<input type="checkbox"/>
20	10-63084	JP		1998-03-06	Ricoh KK	<input type="checkbox"/>
21	10-68076	JP		1998-03-10	Mitsubishi Materials Corp	<input type="checkbox"/>
22	11-2744	JP		1999-01-06	Nippon Kokan KK	<input type="checkbox"/>
23	11-73000	JP		1999-03-16	Canon Inc	<input type="checkbox"/>
24	11-73001	JP		1999-03-16	Canon Inc	<input type="checkbox"/>
25	11-73002	JP		1999-03-16	Canon Inc	<input type="checkbox"/>
26	11-102109	JP		1999-04-13	Canon Inc	<input type="checkbox"/>
27	2002-42384	JP		2002-02-19	Canon Inc	<input type="checkbox"/>
28	2002-318490	JP		2002-10-31	Canon KK	<input type="checkbox"/>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050	13617050 - GAU: 2852
	Filing Date		2012-09-14	
	First Named Inventor	Yusuke YAMADA		
	Art Unit		2852	
	Examiner Name			
	Attorney Docket Number		00684.003330.18	

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<b>NON-PATENT LITERATURE DOCUMENTS</b>				<b>Remove</b>
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>5</sup>	
	1	Konica Parts Catalog, Model 7020, 1st Edition, February 2000, CMPC-7020, Konica Business Technologies, Inc., and seven (7) sheets of annotated illustrations and photographs of Konica 7020 and 8050 toner bottles along with a cover sheet.	<input type="checkbox"/>	
	2	European Search report dated 11/17/2008 in European Application No. 08163935.3 - 2209/1993003.	<input type="checkbox"/>	
	3	Austrian Patent Office Written Opinion dated November 21, 2008, forwarded in Singapore Application No. 200602933-4 on December 18, 2008.	<input type="checkbox"/>	
	4	European Search report dated 03/24/2009 in European Application No. 09151710.2 - 2209.	<input type="checkbox"/>	
	5	Search and Examination Report from the Intellectual Property Office of Singapore, dated July 23, 2009, for Singapore Patent Application No., 200604752-6, which forwards Austrian Search Report and Written Opinion, both dated June 22, 2009, prepared by the Austrian Patent and Trademark Office.	<input type="checkbox"/>	
	6	Search and Examination Report from the Intellectual Property Office of Singapore, dated April 26, 2007, for Singapore Patent Application No. 200602934-2, which forwards Danish Search and Examination Reports, both dated April 11, 2007, prepared by the Danish Patent and Trademark Office.	<input type="checkbox"/>	
	7	Invitation to Respond to Written Opinion from the Intellectual Property Office of Singapore, dated April 17, 2007, for Singapore Patent Application No. 200407942-2, which forwards Australian Search Report and Written Opinion, both dated March 15, 2007, prepared for the Intellectual Property Office of Singapore.	<input type="checkbox"/>	
	8	Australian Patent Office Examiner's First Report, for Australian Patent Application No. 2005201134, dated September 18, 2006.	<input type="checkbox"/>	
	9	Letter from the Intellectual Property Office of Singapore, dated April 18, 2006, for Singapore Patent Application No. 200201079-1, which forwards Austrian Patent Office Supplementary Search Report, dated March 9, 2006.	<input type="checkbox"/>	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050	13617050 - GAU: 2852
	Filing Date	2012-09-14	
	First Named Inventor	Yusuke YAMADA	
	Art Unit	2852	
	Examiner Name		
	Attorney Docket Number	00684.003330.18	

10	Invitation to Respond to Written Opinion from the Intellectual Property Office of Singapore, dated January 14, 2008, for Singapore Patent Application No. 200602933-4, which forwards Austrian Search Report and Written Opinion, both dated December 14, 2007, prepared by the Austrian Patent and Trademark Office.	<input type="checkbox"/>
11	Third-Party Observation filed in corresponding Japanese Laid-Open Publication No. 2002-318490, laid open Oct. 31, 2002 (Application No. 2002-42384).	<input type="checkbox"/>
12	Canadian Patent Office Search Report, dated February 20, 2004, for Canadian Application No. 2,372,419.	<input type="checkbox"/>
13	Search and Examination Report from the Intellectual Property Office of Singapore, dated January 31, 2004, for Singapore Patent Application No. 200201079-1, which forwards Austrian Patent Office Search Report and Written Opinion, both dated December 22, 2003, prepared by the Austrian Patent Office.	<input type="checkbox"/>
14	Notification of the First Office Action from the State Intellectual Property Office of the People's Republic of China, dated July 13, 2007, for Chinese Application No. 2005100702734.	<input type="checkbox"/>
15	Notification of the First Office Action from the State Intellectual Property Office of the People's Republic of China, dated July 13, 2007, for Chinese Application No. 2005100702749.	<input type="checkbox"/>
16	Notification of the First Office Action from the State Intellectual Property Office of the People's Republic of China, dated July 13, 2007, for Chinese Application No. 2005100702753.	<input type="checkbox"/>
17	Japanese Office Action, dated March 17, 2007, issued in Japanese Application No. 2006-211509 (English excerpt translation provided).	<input checked="" type="checkbox"/>
18	European Search Report, dated January 18, 2006, issued in European Application No. 02 003 651.3 – 2209.	<input type="checkbox"/>
19	European Search Report, dated September 3, 2007, issued in European Application No. 02 003 651.3 – 2209.	<input type="checkbox"/>
20	Examination Report dated December 10, 2009, prepared by the Austrian Patent Office and forwarded with a Search and Examination Report dated January 8, 2010, in counterpart Singapore Application No. 200602933-4.	<input type="checkbox"/>



<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050	13617050 - GAU: 2852
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	First Named Inventor	Yusuke YAMADA		
	Art Unit		2852	
	Examiner Name			
	Attorney Docket Number		00684.003330.18	

21	Extended European Search Report dated February 18, 2010, in counterpart European Application No. 08163934.6-2209/1993002.	<input type="checkbox"/>
22	Rejection Decision dated February 12, 2010, in counterpart Chinese Application No. 200510070274.9.	<input checked="" type="checkbox"/>
23	Communication dated December 10, 2010, forwarding a European Search Report dated December 6, 2010, in counterpart European Patent Application No. 10162683.6 - 2209/2216690.	<input type="checkbox"/>
24	Communication dated December 15, 2010, forwarding a European Search Report dated December 6, 2010, in counterpart European Patent Application No. 10182966.1 - 2209/2270607.	<input type="checkbox"/>

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Receipt date: 02/03/2014

13617050 - GAI: 2852

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

Approved for use through 07/31/2012. OMB 0651-0031  
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050
	Filing Date	2012-09-14
	First Named Inventor	Yusuke Yamada
	Art Unit	2852
	Examiner Name	Susan S. Y. Lee
	Attorney Docket Number	00684.003330.18

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Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup>	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1							<input type="checkbox"/>

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Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.		T <sup>5</sup>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050	13617050 - GAU: 2852
	Filing Date		2012-09-14	
	First Named Inventor	Yusuke Yamada		
	Art Unit	2852		
	Examiner Name	Susan S. Y. Lee		
	Attorney Docket Number	00684.003330.18		

1	Court Order dated January 9, 2014, in Case No. 1:11-cv-03855-RLV in the U.S. District Court, Northern District of Georgia, Atlanta Division.	<input type="checkbox"/>
2	Special Master's Claims Construction Report and Recommendations dated November 8, 2013, in Case No. 1:11-cv-03855-RLV in the U.S. District Court, Northern District of Georgia, Atlanta Division.	<input type="checkbox"/>


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Examiner Signature	/Susan Lee/	Date Considered	07/27/2014
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\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.

<b>Index of Claims</b> 	<b>Application/Control No.</b> 13617050	<b>Applicant(s)/Patent Under Reexamination</b> YAMADA ET AL.
	<b>Examiner</b> SUSAN LEE	<b>Art Unit</b> 2852

✓	<b>Rejected</b>
=	<b>Allowed</b>


-	<b>Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	10/08/2012	05/22/2013	02/22/2014	07/27/2014				
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<b>Index of Claims</b>  	<b>Application/Control No.</b>  13617050	<b>Applicant(s)/Patent Under Reexamination</b>  YAMADA ET AL.
	<b>Examiner</b>  SUSAN LEE	<b>Art Unit</b>  2852

✓	<b>Rejected</b>
=	<b>Allowed</b>


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  CPA
  T.D.
  R.1.47

CLAIM		DATE							
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<b><i>Index of Claims</i></b>  	<b>Application/Control No.</b> 13617050	<b>Applicant(s)/Patent Under Reexamination</b> YAMADA ET AL.
	<b>Examiner</b> SUSAN LEE	<b>Art Unit</b> 2852

✓	<b>Rejected</b>
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O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	10/08/2012	05/22/2013	02/22/2014	07/27/2014				
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	74			=	=				

00684.003330.18

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: Unassigned
Yusuke YAMADA et al.	)	
	:	Group Art Unit: 2852
Application No.: 13/617,050	)	
	:	Confirmation No.: 1149
Filed: September 14, 2012	)	
	:	January 23, 2013
For: SEALING MEMBER, TONER	)	
ACCOMMODATING CONTAINER	:	
AND IMAGE FORMING APPARATUS	)	

**Mail Stop Amendment**  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT TRANSMITTAL LETTER

Sir:

Applicants are in receipt of a non-final Office Action mailed October 12, 2012, in the above-identified application. The one-month extended date for response to the Office Action is set for February 11, 2013, and a response thereto has not yet been filed. This Information Disclosure Statement is being filed so that it will be in the official file when the Examiner next acts on the application.

In compliance with the duty of disclosure under 37 C.F.R. § 1.56 and in accordance with the practice under 37 C.F.R. §§ 1.97 and 1.98, the Examiner's attention is directed to the documents listed on the enclosed PTO/SB/2008a ("citation form"). Copies of the cited

documents are not provided herewith, inasmuch as copies may be found in the filewrapper of one or more the "parent" applications of the present application.

REMARKS

The following related patents and patent applications are in the same family as the present application, and therefore have not been cited on the enclosed citation form.

<b>Docket No.</b>	<b>Application No./ Application Date</b>	<b>Publication No./ Publication Date</b>	<b>Patent No./ Patent Issue Date</b>
00684.003330	10/076,430 02/19/2002	2002/0127029 09/12/2002	6,879,789 04/12/2005
00684.003330.1	10/429,696 05/06/2003	2004/013445 01/22/2004	6,920,298 07/19/2005
00684.003330.2	10/429,741 05/06/2003	2004/0009006 01/15/2004	6,990,301 01/24/2006
00684.003330.3	10/962,675 10/13/2004	2005/0047818 03/03/2005	7,469,113 12/23/2008
00684.003330.4	11/200,069 08/10/2005	2006/0034641 02/16/2006	7,127,193 10/24/2006
00684.003330.5	11/200,179 08/10/2005	2006/0008290 01/12/2006	7,430,384 09/30/2008
00684.003330.6	11/200,185 08/10/2005	2006/0008291 01/12/2006	7,382,997 06/03/2008
00684.003330.7	11/567,963 12/07/2006	2007/0134021 06/14/2007	7,386,251 06/10/2008
00684.003330.8	11/567,973 12/07/2006	2007/0098454 05/03/2007	7,433,633 10/07/2008
00684.003330.9	11/567,976 12/07/2006	2007/0092304 04/26/2007	7,376,369 05/20/2008
00684.003330.10	11/567,982 12/07/2006	2007/0086810 04/19/2007	7,324,777 01/29/2008
00684.003330.11	12/169,895 07/09/2008	2009/0003872 01/01/2009	7,647,012 01/12/2010

/Susan Lee/

07/27/2014



Docket No.	Application No./ Application Date	Publication No./ Publication Date	Patent No./ Patent Issue Date
00684.003330.12	12/615,012 11/09/2009	2010/0046982 02/25/2010	7,890,027 02/15/2011
00684.003330.13	12/685,186 01/11/2010	2010/0111560 05/06/2010	7,965,963 06/21/2011
00684.003330.14	12/685,204 01/11/2010	2010/0111561 05/06/2010	7,881,645 02/01/2011
00684.003330.15	12/685,199 01/11/2010	2010/0111573 05/06/2010	7,970,321 06/28/2011
00684.003330.16	12/981,785 12/30/2010	2011/0097107 04/28/2011	8,045,901 10/25/2011
00684.003330.17	13/231,388 09/13/2011	2012/0063807 03/15/2012	8,290,394 10/16/2012

/Susan Lee/

07/27/2014

This Information Disclosure Statement cites information which is of record in at least one of the family applications.

The Examiner's attention is also directed to:

- (1) Defendant Color Imaging Inc.'s Invalidity Contentions Pursuant to Local Patent Rule 4.3, and
- (2) Defendant General Plastic Industrial Co., Ltd.'s Invalidity Contentions Pursuant to Local Patent Rule 4.3

(collectively, "Invalidity Contentions").

The Invalidity Contentions were filed by each respective defendant in a lawsuit for patent infringement of U.S. Patent No. 7,647,012, from which the present application claims the benefit under 35 U.S.C. § 120. The Invalidity Contentions are listed on the citation form.

Each Invalidity Contention identifies an identical set of patent documents. Such patent documents are listed on the citation form. A copy of each Invalidity Contention was provided in

parent application, U.S. Patent Application No. 13/231,388, with the Information Disclosure Statement filed June 1, 2012 filed therein.

FEE

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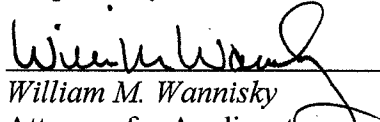
CONCLUSION

It is respectfully requested that the cited information be considered by the Examiner and that a copy of the citation form be returned indicating that such information has been considered.

It is believed that no fee is required for this paper. However, the Commissioner is hereby authorized to charge any fee which may be deemed necessary in connection with this paper to Deposit Account No. 06-1205.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

  
William M. Wannisky  
Attorney for Applicants  
Registration No. 28,373

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, NY 10104-3800  
Facsimile: (212) 218-2200  
WMW:mds

Receipt date: 04/25/2014

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

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13617050 - GAI: 2852

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050
	Filing Date		2012-09-14
	First Named Inventor	Yusuke Yamada	
	Art Unit		2852
	Examiner Name	Susan S. Y. Lee	
	Attorney Docket Number		00684.003330.18

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4878603		1989-11-07	Ikesue et al.	
	2	4941022		1990-07-10	Ohmura et al.	
	3	4979645		1990-12-25	Groves et al.	
	4	4990964		1991-02-05	Kraehn	
	5	5089854	A	1992-02-18	Kaieda et al.	
	6	5200787	A	1993-04-06	Nishiguchi	
	7	5248847	A	1993-09-28	Aoyama	
	8	5383502	A	1995-01-24	Fisk et al.	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050	13617050 - GAU: 2852
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	Art Unit		2852	
	Examiner Name	Susan S. Y. Lee		
	Attorney Docket Number		00684.003330.18	

	9	5495323	A	1996-02-27	Meetze, Jr.	
	10	5593224	A	1997-01-14	Ruckert	
	11	5598254	A	1997-01-28	Ikesue et al.	
	12	5692652	A	1997-12-02	Wise	
	13	5812915	A	1998-09-22	Farkash	
	14	5823814	A	1998-10-20	Alwine	
	15	5903806	A	1999-05-11	Matsuoka et al.	
	16	5966010	A	1999-10-12	Loy et al.	
	17	6003675	A	1999-12-21	Maruyama et al.	
	18	6027097	A	2000-02-22	Humphreys et al.	
	19	6040523	A	2000-03-21	Cunningham	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050	13617050 - GAU: 2852
	Filing Date		2012-09-14	
	First Named Inventor	Yusuke Yamada		
	Art Unit		2852	
	Examiner Name	Susan S. Y. Lee		
	Attorney Docket Number		00684.003330.18	

	20	6079593	A	2000-06-27	Konrad	
	21	6131961	A	2000-10-17	Heilmann	
	22	6152304	A	2000-11-28	Hikita et al.	
	23	6168467	B1	2001-01-02	Chiou	
	24	6199913	B1	2001-03-13	Wang	
	25	6249501	B1	2001-06-19	Nakamura et al.	
	26	6412163	B1	2002-07-02	Russell	
	27	6501990	B1	2002-12-31	Sundberg et al.	
	28	6648715	B2	2003-11-18	Wiens et al.	
	29	6659680	B2	2003-12-09	Wyer	
	30	6698966	B2	2004-03-02	Hilton et al.	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050	13617050 - GAU: 2852
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	First Named Inventor	Yusuke Yamada	
	Art Unit	2852	
	Examiner Name	Susan S. Y. Lee	
	Attorney Docket Number	00684.003330.18	

	31	6874220	B1	2005-04-05	Jones	
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	1	0796405	EP	B1	2001-02-21	ITT MFG ENTERPRISES INC		<input type="checkbox"/>

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	1	Defendant's Amended Invalidity Contentions Pursuant to Local Patent Rule 4.3, dated April 9, 2014, in Case No. 1:11-cv-03855-RLV in the U.S. District Court, Northern District of Georgia, Atlanta Division.	<input type="checkbox"/>

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<b>Search Notes</b>  	<b>Application/Control No.</b>  13617050	<b>Applicant(s)/Patent Under Reexamination</b>  YAMADA ET AL.
	<b>Examiner</b>  SUSAN LEE	<b>Art Unit</b>  2852

CPC- SEARCHED		
Symbol	Date	Examiner
g03g 15/0834, g03g 15/0837, g03g 15/0839, g03g 2221/1657, g03g 2215/0678, g03g 2215/0692, g03g 2215/0668	2/22/14	/sl/
above to date	7/27/14	/sl/

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
399	106, 262, 119, 120	10/8/12	/sl/
222	dig.1	10/8/12	/sl/
	above to date	5/21/13	/s/
399	260	5/21/13	/sl/
	above to date	2/22/14	/sl/
	above to date	7/27/14	/sl/

SEARCH NOTES		
Search Notes	Date	Examiner
East - see text search history printout	10/8/12	/sl/
Inventor search - see text search history printout	10/8/12	/sl/
checked prior art in parent applications 13/231,388, 12/981,785, 12/615,012, 12/169,895, 11/200,179, 10/429,741, 10/076,430	10/8/12	/sl/
above to date	5/22/13	/sl/
above to date	2/22/14	/sl/
above to date	7/27/14	/sl/


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<b>US Class/ CPC Symbol</b>	<b>US Subclass / CPC Group</b>	<b>Date</b>	<b>Examiner</b>
USPG Pubs & UPAD	see text search history printout	7/27/14	/sl/

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<b>Issue Classification</b> 	<b>Application/Control No.</b> 13617050	<b>Applicant(s)/Patent Under Reexamination</b> YAMADA ET AL.	
	<b>Examiner</b> SUSAN LEE	<b>Art Unit</b> 2852	

CPC						
Symbol					Type	Version
G03G		2215		0678	A	2013-01-01
G03G		2215		0668	A	2013-01-01
G03G		15		0839	I	2013-01-01
G03G		15		0834	I	2013-01-01
G03G		2221		1657	A	2013-01-01
G03G		15		0837	F	2013-01-01
G03G		2215		0692	A	2013-01-01

CPC Combination Sets				
Symbol	Type	Set	Ranking	Version

NONE		<b>Total Claims Allowed:</b>	
(Assistant Examiner)	(Date)	53	
/SUSAN LEE/ Primary Examiner.Art Unit 2852	07/27/2014	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	14



<b>Issue Classification</b> 	<b>Application/Control No.</b> 13617050	<b>Applicant(s)/Patent Under Reexamination</b> YAMADA ET AL.
	<b>Examiner</b> SUSAN LEE	<b>Art Unit</b> 2852

<input checked="" type="checkbox"/> <b>Claims renumbered in the same order as presented by applicant</b> <input type="checkbox"/> <b>CPA</b> <input type="checkbox"/> <b>T.D.</b> <input type="checkbox"/> <b>R.1.47</b>															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17		33		49		65						
	2		18		34		50		66						
	3		19		35		51		67						
	4		20		36		52		68						
	5		21		37		53		69						
	6		22		38		54		70						
	7		23		39		55		71						
	8		24		40		56		72						
	9		25		41		57		73						
	10		26		42		58		74						
	11		27		43		59								
	12		28		44		60								
	13		29		45		61								
	14		30		46		62								
	15		31		47		63								
	16		32		48		64								

NONE		<b>Total Claims Allowed:</b>	
		53	
(Assistant Examiner)	(Date)	O.G. Print Claim(s)	O.G. Print Figure
/SUSAN LEE/ Primary Examiner. Art Unit 2852	07/27/2014	1	14
(Primary Examiner)	(Date)		

Receipt date: 06/27/2014

Doc code: IDS

Doc description: Information Disclosure Statement (IDS) Filed

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13617050 - GAI: 2852

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050	
	Filing Date		2012-09-14	
	First Named Inventor	Yusuke Yamada		
	Art Unit	2852		
	Examiner Name	Susan S.Y. Lee		
	Attorney Docket Number	00684.003330.18		

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	1	4219222		1980-08-26	Brusadin	
	2	4821875		1989-04-18	Groves et al.	
	3	4902045		1990-02-20	McGugan et al.	
	4	4917237		1990-04-17	Groves et al.	
	5	4971193		1990-11-20	Groves et al.	
	6	5068496		1991-11-26	Favalora	
	7	5154212	A	1992-10-13	Weber	
	8	5609101	A	1997-03-11	Oyama et al.	

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050	13617050 - GAU: 2852
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	First Named Inventor	Yusuke Yamada	
	Art Unit	2852	
	Examiner Name	Susan S.Y. Lee	
	Attorney Docket Number	00684.003330.18	

9	5630570	A	1997-05-20	Lacroix et al.	
10	5655180	A	1997-08-05	Yasuda et al.	
11	5785545	A	1998-07-28	Holt	
12	5853814	A	1998-12-29	Murphy	
13	5857129	A	1999-01-05	Harris	
14	5966010	A	1999-10-12	Loy et al.	
15	6056577	A	2000-05-02	Blanchet	
16	6871588	B2	2005-03-29	Sasaki et al.	

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	Filing Date		2012-09-14	
	First Named Inventor	Yusuke Yamada		
	Art Unit	2852		
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	Attorney Docket Number	00684.003330.18		

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	1	1 041 455	EP	A2	2000-10-04	SHARP KK		<input type="checkbox"/>

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	1	Expert Report of D. B.E. Springett Regarding Invalidity of U.S. Patent No. 7,647,012, dated May 12, 2014, in Case No. 1:11-cv-03855-RLV in the U.S. District Court, Northern District of Georgia, Atlanta Division.	<input type="checkbox"/>

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	6	5068496		1991-11-26	Favalora	
	7	5154212	A	1992-10-13	Weber	
	8	5609101	A	1997-03-11	Oyama et al.	

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( Not for submission under 37 CFR 1.99)

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10	5655180	A	1997-08-05	Yasuda et al.	
11	5785545	A	1998-07-28	Holt	
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14	5966010	A	1999-10-12	Loy et al.	
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16	6871588	B2	2005-03-29	Sasaki et al.	

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	1	1 041 455	EP	A2	2000-10-04	SHARP KK		<input type="checkbox"/>

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	1	Expert Report of D. B.E. Springett Regarding Invalidity of U.S. Patent No. 7,647,012, dated May 12, 2014, in Case No. 1:11-cv-03855-RLV in the U.S. District Court, Northern District of Georgia, Atlanta Division.		<input type="checkbox"/>

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	First Named Inventor	Yusuke Yamada
	Art Unit	2852
	Examiner Name	Susan S.Y. Lee
	Attorney Docket Number	00684.003330.18

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Signature	/Mark A. Williamson/	Date (YYYY-MM-DD)	2014-06-27
Name/Print	Mark A. Williamson	Registration Number	33,628

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Espacenet

Bibliographic data: EP1041455 (A2) — 2000-10-04

Image forming device

No documents available for this priority number

**Inventor(s):** HAGIHARA HIDEAKI [JP]; NISHIYAMA HARUO [FR]; ISNER DAVID [FR]; NAGATA KENICHI [JP] ± (HAGIHARA, HIDEAKI, ; NISHIYAMA, HARUO, ; ISNER, DAVID, ; NAGATA, KENICHI)

**Applicant(s):** SHARP KK [JP] ± (SHARP KABUSHIKI KAISHA)

**Classification:** - international: G03G15/08; G03G15/20; G03G21/18; (IPC1-7); G03G15/08  
- cooperative: G03G15/0832

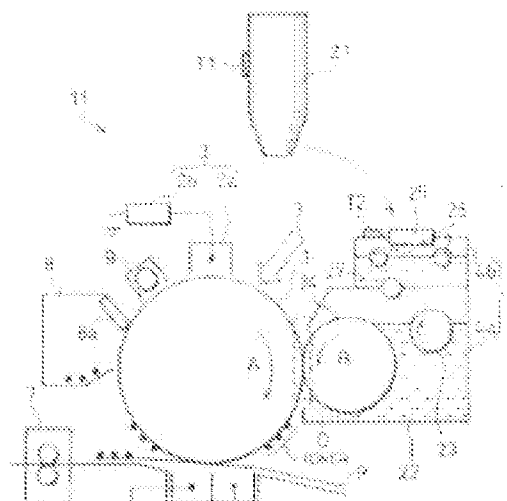
**Application number:** EP20000302648 20000330

**Priority number (s):** JP19990088571 19990330

**Also published as:** EP1041455 (A3) EP1041455 (B1) US6212338 (B1) JP2000284581 (A) JP3476704 (B2) more

Abstract of EP1041455 (A2)

FIG 1



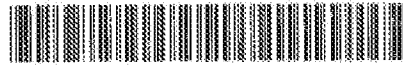


Bidirectional communication is carried out between a toner bottle end communication device disposed in a toner bottle and a main body end communication device disposed in a device main body while the toner bottle is moved from a first position where the toner bottle starts being attached to the device main body to a second position where the toner bottle is completely attached. The CPU provided in the main body end communication device decides whether or not the information on the toner bottle received from the toner bottle end communication device matches the device main body, and notifies prior to toner refilling. If the toner bottle is not suitable, the CPU specifies a lower quality image forming condition under which operation conditions for the main charging device, exposure device, and fixing device are changed so as to produce an image of relatively low quality in comparison to normal quality. The user can single out a bogus product among unsuitable toner bottles by identifying a degradation in the quality of the image produced by that condition.

Last updated: 11.12.2013 Worldwide Database 5.8.16.10/93p



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(11) EP 1 041 455 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:  
04.10.2000 Bulletin 2000/40

(51) Int. Cl.: G03G 15/08

(21) Application number: 00302648.1

(22) Date of filing: 30.03.2000

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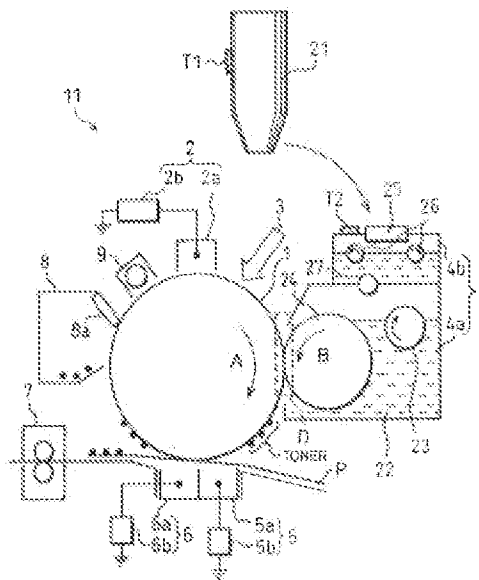
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(54) Image forming device

(57) Bidirectional communication is carried out between a toner bottle end communication device disposed in a toner bottle and a main body end communication device disposed in a device main body while the toner bottle is moved from a first position where the toner bottle starts being attached to the device main body to a second position where the toner bottle is completely attached. The CPU provided in the main body end communication device decides whether or not the information on the toner bottle received from the toner bottle end communication device matches the device main body, and notifies prior to toner refilling. If the toner bottle is not suitable, the CPU specifies a lower quality image forming condition under which operation conditions for the main charging device, exposure device, and fixing device are changed so as to produce an image of relatively low quality in comparison to normal quality. The user can single out a bogus product among unsuitable toner bottles by identifying a degradation in the quality of the image produced by that condition.

FIG. 1



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## Description

### FIELD OF THE INVENTION

**[0001]** The present invention relates to image forming devices, such as a copying machine, a facsimile, and a printer, and in particular to toner cartridges and toner bottles capable of transmitting and receiving information on themselves to and from a device main body, as well as to image forming devices incorporating such toner cartridges and toner bottles.

### BACKGROUND OF THE INVENTION

**[0002]** Conventionally, a typical image forming device using an electrophotographic scheme, such as a copying machine, a facsimile, or a printer, has a plurality of developing devices disposed opposite to an image carrier to keep developing agents mixed with predetermined types of toner respectively. By means of the developing devices, the image forming device visualizes a latent image formed on the image carrier. A supplementary toner container, such as a toner cartridge or a toner bottle, is attached externally to a toner supply section of the developing device so as to supply supplementary toner, for example, during maintenance.

**[0003]** It is suggested that an erroneous attaching prevention mechanism should be included in such a supplementary toner container to prevent a supplementary toner container that is unsuitable to the image forming device from being erroneously attached to the device main body of the image forming device. For example, Japanese Laid-Open Patent Application No. 4-1682/1992 (Tokukaihei 4-1682; published on January 7, 1992) discloses such an erroneous attaching prevention mechanism that a bar code reader or other information reading means provided to the toner supply section so as to read a bar code information shown on the toner cartridge activates a misinsertion prevention shutter based on the result of the reading.

**[0004]** Further, a popular, well-known suggestion is such an arrangement that the supplementary toner container is provided with an information storage medium, such as a non-volatile memory, so as to, when attached to a toner supply section, constitute an electric circuit with a developing device and transmit the information stored in the supplementary toner container to the developing device or the device main body by means of electric signals to form a basis on which a decision is made to prevent erroneous attaching.

**[0005]** However, to apply the erroneous attaching prevention mechanism disclosed for use with a toner cartridge in Japanese Laid-Open Patent Application No. 4-1682/1992 (Tokukaihei 4-1682) to an image forming device having a plurality of developing devices disposed opposite to an image carrier, each toner cartridge requires a bar code, and each toner supply section requires information reading means, such as a bar code

reader; this arrangement inevitably leads to increases in costs.

**[0006]** Further, the bar code shown on the toner cartridge is susceptible to contamination as a result of direct exposure to developing agent and toner, as well as the bar code reader and other optical information reading means are susceptible to contamination by developing agent and toner; the arrangement therefore suffers from bar code reading errors.

**[0007]** The aforementioned method whereby an electric circuit is formed by the developing device and the supplementary toner container provided with an information storage medium, such as a non-volatile memory, to transmit the information stored in the supplementary toner container by means of electric signals, renders connection points susceptible to contamination as a result of exposure to toner and developing agent, resulting in malfunctioning connection, abrasion, and other undesirable phenomena.

### SUMMARY OF THE INVENTION

**[0008]** A solution would be offered by such an arrangement that a unit, including a supplementary toner container, that is attachable to and detachable from an image forming device, can transmit data to and from the main body of an image forming device by means of electric waves. In the arrangement, the supplementary toner container exchanges information with the main body of the device without physical direct contact (contactlessly); therefore, the supplementary toner container is free from the foregoing problems in communication, allowing for more flexibility in design, improved durability, higher efficiency in attaching, smaller dimensions, and lower costs.

**[0009]** However, if the supplementary toner container to be attached has turned out unsuitable for the image forming device as a result of the above data transmission, it is still impossible to decide whether the container is simply manufactured by incompatible specifications or is a bogus product forged by specifications that are similar to those for the supplementary toner container. If the bogus product uses toner of inferior properties, it is likely that the image forming device, as well as the image forming process carried out by the image forming device, is affected negatively; such bogus products need to be singled out and excluded from further use.

**[0010]** In view of the foregoing problems, the present invention has an object to offer an image forming device capable of preventing erroneous attaching of a supplementary toner container to a device main body in a highly reliable manner and also capable of singling out bogus products.

**[0011]** An image forming device in accordance with the present invention includes a device main body to which a supplementary toner container for supplying supplementary toner is attached in a freely attachable and detachable manner, and so as to achieve the fore-

going object, the image forming device is characterized in that

the supplementary toner container includes container end communication means, having a memory function to store information at least on the supplementary toner container, for contactlessly communicating with main body end communication means disposed in the device main body to transmit the information, and

at least a portion, of the supplementary toner container, including the container end communication means is movable from a first position where the supplementary toner container starts being attached to the device main body to a second position where the supplementary toner container is completely attached in readiness for toner refilling, and is able to carry out the communication at least somewhere between the first position and the second position,

the image forming device including control means for deciding from a result of the communication whether or not the information on the supplementary toner container matches the device main body, and for specifying an image forming condition that varies depending on the decision whether or not the supplementary toner container is suitable.

[0012] According to the arrangement, the container end communication means disposed in the supplementary toner container can communicate with the main body end communication means disposed in the device main body to transmit the information on the supplementary toner container when the portion, of the supplementary toner container, including the container end communication means is somewhere between the first position where the supplementary toner container starts being attached and the second position where the supplementary toner container is completely attached. "Information" here refers to, for example, a manufacturer code and serial number (product lot number) of the supplementary toner container, a name and type of compatible copying machines, printers, facsimiles, and other devices and a color and developing, transfer, and fixing conditions for the toner contained in the supplementary toner container.

[0013] Further, the main body end communication means receives the information on the supplementary toner container from the container end communication means through the foregoing communication. Based on a result of the communication, the control means decides whether or not the supplementary toner container is suitable for the device main body, and specifies an image forming condition that varies depending on whether or not the supplementary toner container is suitable. Therefore, if the supplementary toner container is suitable, a normal image forming process is executable by specifying regular image forming conditions.

[0014] By contrast, if the supplementary toner container is an unsuitable product, the unsuitability can be readily discovered by specifying a low quality image forming condition under which the image quality is lowered. Consequently, the device main body can be protected from damage and quick wearing due to erroneous use of an unsuitable product over a long period of time. Further, among unsuitable products, especially a bogus product, which is likely to cause a large degradation in image quality, can be singled out.

[0015] As a result, an image forming device can be offered with capabilities to prevent erroneous attaching of a supplementary toner container to a device main body in a highly reliable manner and also to single out bogus products.

[0016] Preferably, the container end communication means is arranged so as to have another function to update the information on the supplementary toner container and bidirectionally communicate with the main body end communication means.

[0017] The space between the first position and the second position is in many cases occupied by nothing else but the supplementary toner container when it is to be attached, and serves no other purposes; transmission errors and jamming with other communication devices can be avoided and a highly reliable communication is ensured, if the bidirectional communication is carried out only in this space.

[0018] For a fuller understanding of the nature and advantages of the invention, reference should be made to the ensuing detailed description taken in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Figure 1 is a cross-sectional view showing an arrangement of an image forming device of an embodiment in accordance with the present invention.

[0020] Figure 2 is a cross-sectional view showing relative positions of a toner bottle and a toner hopper when the toner bottle is attached to the image forming device illustrated in Figure 1.

[0021] Figure 3 is a perspective view illustrating, as an example, a position where the toner bottle is attached to the image forming device illustrated in Figure 1.

[0022] Figure 4 is an explanatory drawing showing how to start attaching a toner bottle.

[0023] Figure 5 is an explanatory drawing showing how to complete the attaching of a toner bottle.

[0024] Figure 6(a) is a block diagram showing an arrangement of a communication device T1.

[0025] Figure 6(b) is a block diagram showing an arrangement of a communication device T2.

[0026] Figure 7 is a flow chart showing a first half of a process to refill the image forming device illustrated in Figure 1 with toner supplied from a toner bottle.

[0027] Figure 8 is a flow chart showing a second half of the aforementioned process to refill the image forming



device illustrated in Figure 1 with toner supplied from a toner bottle.

#### DESCRIPTION OF THE EMBODIMENTS

**[0026]** Referring to Figure 1 to Figure 9, the following will discuss an embodiment of the image forming device in accordance with the present invention.

**[0029]** Figure 1 shows an arrangement of an image forming device 11 of the present embodiment. The image forming device 11 includes a photosensitive drum 1, a main charging device 2, a light projector 3, a developing device 4, a transfer device 5, a peeling device 6, a fixing device 7, a cleaning device 8, and a discharging device 9.

**[0030]** The photosensitive drum 1 is composed of a metal or resin conductive base body, a bed layer formed on the surface of the conductive base body, and a photosensitive layer formed on the bed layer. The photosensitive layer includes a relatively thin carrier generating layer (CGL) formed on the bed layer and a relatively thin carrier transport layer (CTL) formed as the outermost layer from polycarbonate as a major component. The photosensitive drum 1 is disposed so as to be rotatable in direction A, and carries an electrostatic latent image and a toner image during an image forming process.

**[0031]** The main charging device 2 is constituted by a main charger 2a, such as a corona charger or a touch roller charger, and a high voltage supply source 2b for supplying electric power to the main charger 2a. Receiving a command to start an image forming process, the main charging device 2 uniformly charges the surface of the photosensitive drum 1 until the electric charges reach a predetermined value. Subsequently, the light projector 3 projects light onto the surface of the photosensitive drum 1, that is charged by the main charging device 2 in accordance with an image. As a result of the exposure to light, carriers are generated in the carrier generating layer of the photosensitive drum 1 and travel through the carrier transport layer. As the carriers reach the surface of the photosensitive layer, they offset those charges previously supplied by the main charging device 2, so as to achieve a predetermined electrostatic latent image potential.

**[0032]** As the photosensitive drum 1 rotates, the electrostatic latent image formed on the photosensitive drum 1 by the light projector 3 reaches a developing area D that is in direct contact with the developing device 4 which is constituted by a developing tank 4a and a toner hopper 4b. The developing tank 4a is constituted by an agitator 23 for agitating a developing agent 22 that is mixed with toner and a developing agent carrier 24 for feeding the toner. The developing agent carrier 24 rotates in direction B and is pressed against the surface of the photosensitive drum 1. A power supply source (not shown) is connected to the developing agent carrier 24 to supply a predetermined bias voltage to the devel-

oping agent carrier 24. The toner hopper 4b is constituted by a toner inlet 25 through which supplementary toner is supplied from a toner bottle 21 which will be detailed later, toner transport screws 26 for transporting the supplied supplementary toner, and a toner refilling roller 27 for refilling the developing tank 4a with the supplementary toner. The toner carried by the developing agent carrier 24 moves away therefrom and adheres to the surface of the photosensitive drum 1 in the developing area D in accordance with the pattern of the electrostatic latent image. Hence, the electrostatic latent image is visualized, i.e. developed into a toner image.

**[0033]** After development, the toner adhering to the surface of the photosensitive drum 1 moves to a predetermined transfer area. A transfer material P, such as a sheet of paper, is transported to the transfer area by paper feeding means (not shown), and comes in contact with the toner image in synchronism on the photosensitive drum 1. The transfer device 5, being constituted by a transfer charger 5a of a charger or touch roller type and a high voltage supply source 5b for supplying an electric power to the transfer charger 5a, transfers the toner image on the photosensitive drum 1 onto the transfer material P by charging the back side of the transfer material P to an electric potential of a predetermined polarity.

**[0034]** The transfer material P is electrostatically attracted to the surface of the photosensitive drum 1 for the toner image to be transferred, and thereafter peeled off by the peeling device 6. The peeling device 6, being constituted by a peeling charger 6a of a charger or touch roller type and a high voltage supply source 6b for supplying an electric power to the peeling charger 6a, discharges the transfer material P and peels it off the photosensitive drum 1, by charging the back side of the transfer material P onto which the toner image is already transferred to an electric potential of a predetermined polarity. The peeled transfer material P is transported to the fixing device 7 constituted by a pressure applying roller and a heating roller where transfer material P is pressed and heated so that the toner melts with heat and fixes on the transfer material P. After the toner has fixed, the transfer material P is ejected from the device.

**[0035]** After the transfer process, the remaining toner on the surface of the photosensitive drum 1 is collected by means of the cleaning device 8 that is provided so that the cleaning blade 8a moves on the surface of the photosensitive drum 1. Thereafter, the remaining electric charges on the surface of the photosensitive drum 1 are removed by the discharging device 9 that is constituted by a light discharge lamp or a touch discharger to electrically initialize the surface of the photosensitive drum 1 to complete a cycle of the image forming process.

**[0036]** Next, taking the toner bottle 21 as an example of a supplementary toner container, the following description will discuss attaching of a supplementary toner container. The same description holds with other types

of toner cartridges that are attached in similar manners. **[0037]** As shown in Figure 1, the toner bottle 21 is for refilling the toner hopper 4b in the developing device 4 with toner. A mount section for the toner bottle 21 is provided on the device main body and covered with a top lid 12 as shown in Figure 3, for example. As shown in Figure 4, the toner bottle 21 is mounted to a mount opening (first position) 13 where the toner outlet 21a is erected upside down (attaching started). The toner bottle 21 then is slid to a second position where the toner bottle 21 comes in contact with a stopper 15 (attaching completed), with a slide section 21b engaging with a guide groove 14 as shown in Figure 5. At the second position, the toner is supplied to the toner hopper 4b as the toner outlet 21a is opened by removing, for example, a sealing cover from the toner bottle.

**[0038]** Figure 2 is a cross-sectional view clearly showing relative positions of the toner bottle 21 and the toner hopper 4b during the attaching operation. The second position into which the toner bottle 21 slides from the first position is located right above the toner hopper 4b. The toner outlet 21a of the toner bottle 21 oppositely faces the toner inlet 25 of the toner hopper 4b at the second position. As the toner outlet 21a opens, the toner hopper 4b is filled with the toner. Further, as shown in Figure 2, the toner bottle 21 has a communication device (container end communication means) T1 on its side surface, and thereby enabled to transmit and receive information (to establish bidirectional communication) to and from a communication device (main body end communication device) T2 disposed between the first and second positions of the device main body.

**[0039]** As shown in Figure 6(a), the communication device T1 is constituted by an aerial 31, a transmission and reception circuit 32, a CPU 33, a ROM 34, and a RAM 35.

**[0040]** The RAM 35 is constituted by a ferroelectric memory (FRAM), storing information on the toner bottle 21. "Information" here includes, for example, a manufacturer code and serial number (product lot number) of the toner bottle 21, a name and type of compatible copying machines, printers, facsimiles, and other devices, and a color and developing, transfer, and fixing conditions for the toner contained in the toner bottle 21. A memory map is formed in the RAM 35 to store these pieces of information, as well as other pieces of information recorded as necessary during operation.

**[0041]** A ferroelectric memory is non-volatile, therefore superior in storing information on the toner bottle 21, and rewritable at fast rate in comparison with an EEPROM, a flash memory, and other non-volatile memories. These features of a ferroelectric memory greatly alleviates the workload of the CPU 33 that controls it. Further, the ferroelectric memory boasts a long life, because it is superior in rewriting durability, that is, rewritable more than  $10^{12}$  times.

**[0042]** The transmission and reception circuit 32 is constituted by a transmission circuit for transmitting in-

formation retrieved as necessary from the RAM 35 via the aerial 31 in a predetermined encoding scheme and a reception circuit for decoding the electronic waves received via the aerial 31 to recover information that is then written into the RAM 35. Also, the transmission and reception circuit 32 has a function to receive electromagnetic waves transmitted by the communication device T2, and supply them as an electric power to the communication device T1.

**[0043]** By the programs stored in the ROM 34, the CPU 33 controls information flow, e.g., retrieves information stored in the RAM 35, writes information to the RAM 35, and transfers information inside the communication device T1, and also controls calculation based on the information. Further, the CPU 33 switches the transmission and reception circuit 32 between the transmission circuit and the reception circuit to control its transmission and reception operations as well as standby operations. Transmission of information, if continuously done after the transmission is started, is readily controllable, since the information is carried over continuous signals. By contrast, if transmission of information is done only intermittently, since signals are transmitted only intermittently, less electric power will be required. The user can make a choice on his own on which of the transmission mode should be used.

**[0044]** As shown in Figure 6(b), the communication device T2 is constituted by an aerial 41, a transmission and reception circuit 42, a detection circuit 43, a CPU 44, a ROM 45, a RAM 46, a display section 47, and an alarm section 48.

**[0045]** The transmission and reception circuit 42 is constituted by a transmission circuit for transmitting information retrieved as necessary from the RAM 46 via the aerial 41 in a predetermined encoding scheme and a reception circuit for decoding the electronic waves received via the aerial 41 to recover information that is then written into the RAM 46. The detection circuit 43 transmits a detection signal to the CPU 44, as it detects the toner bottle 21 being attached in the first position in the image forming device 11 in an electrical, mechanical, or optical manner.

**[0046]** The display section (notification means) 47 is for displaying the progress and results of the bidirectional communication between the communication device T1 and the communication device T2 by means of characters or images on a display panel provided externally on the communication device T2. The alarm section (notification means) 48 is for warning the user by means of a human voice or an alarm sound using speakers provided externally to the communication device T2 when necessary, for example, during or after the bidirectional communication.

**[0047]** Receiving from the detection circuit 43 a detection signal representing that the toner bottle 21 has been attached to the first position, the CPU 44 controls information flow, e.g., retrieves information stored in the RAM 46, writes information to the RAM 46, and transfers

information inside the communication device T2, and also controls calculation based on the information by the programs stored in the ROM 45. Further, the CPU 44 switches the transmission and reception circuit 42 between the transmission circuit and reception circuit to control its transmission and reception operations as well as standby operations. Also, the CPU 44 sends commands to control operations of the display section 47 and the alarm section 48. In addition, based on a result of bidirectional communication between the communication device T1 and the communication device T2, the CPU 44 determines whether or not the toner bottle 21 is suitable for the device main body. The CPU 44 has a further function as control means capable of specifying different image forming conditions depending on whether or not the toner bottle 21 is suitable.

**[0046]** Further, after completion of the refilling with the supplementary toner contained in the toner bottle 21, the CPU 44 controls the transmission and reception circuit 42 to transmit history information of the toner bottle 21 to the communication device T1 of the toner bottle 21. The history information may include, for example, the date that the supplementary toner is supplied, a message representing that the toner bottle 21 is empty, and the name and type of the device to which the supplementary toner is supplied. The communication device T1, as receiving the history information, writes it to the RAM 35. Hence, the information on the toner bottle 21 is kept updated.

**[0049]** The communication device T1 and the communication device T2, arranged as above, may be located anywhere; however, here, the aeriads 31 and 41 are adjusted in terms of orientation and strength of electric waves in such a manner to enable the establishment of communication between the communication device T1 and the communication device T2 only when the toner bottle 21 is in proximity of the first position, during the move from the first position to the second position, and in proximity of the second position, so as to avoid transmission errors and jamming with other communication devices and to ensure transmission and reception of information related to the toner bottle 21.

**[0050]** The space between the first position and the second position is in many cases occupied by nothing else but the toner bottle 21 when it is to be attached, and serves no other purposes; transmission errors and jamming with other communication devices can be avoided and a highly reliable communication is ensured, if the bidirectional communication is carried out only in this space. When this is the case, the bidirectional communication established with the toner bottle 21 is smoothly carried out since the communication is established not only at specified points but covers the entire area in which the toner bottle 21 is movable. Further, if, for example, the toner bottle 21 is not properly mounted to the first position, a bidirectional communication is established before the toner bottle 21 reaches the second position; therefore, trouble, such as detection errors

caused by failed communication, are avoidable.

**[0051]** This way, the toner bottle 21 is capable of establishing bidirectional wireless communication with the main body of the image forming device; the toner bottle 21 is therefore freed from those constraints on how it should be attached to the device main body so as to form an electric circuit between the toner bottle 21 and the device main body. Besides, the toner bottle 21 can be structured more simply, and thereby occupies a smaller space. The toner bottle 21 is further improved on durability if terminals (connectors), now rendered obsolete by the above arrangement, are omitted from the toner bottle 21. In addition, the wireless communication is not affected by possible contamination of the toner bottle 21 and the device main body with toner and other materials, and is automatically established when the toner bottle 21 is attached to the device main body, freeing the user from troublesome procedures.

**[0052]** The use of unsuitable products can be prevented in advance, if further arrangement is made so that the device main body determines based on the incoming information from the toner bottle 21 whether or not the toner bottle 21 to be attached is suitable and also that the operations from the establishment of bidirectional communication through the determination are completed before the supply of the supplementary toner is started at the second position. Moreover, the device main body can transmit any piece of information stored therein to the toner bottle 21; therefore, that piece of information, if stored as history information of the toner bottle 21, can be utilized effectively in recycling after the toner bottle 21 is collected. Especially, a toner bottle 21, once used, can be prevented from being forged into a bogus product. This way, the use of the RAM 35 alone in the communication device T1 can prevent erroneous attaching as well as can provide storage for history information.

**[0053]** Next, referring to the flow charts constituting Figure 7 and Figure 8, the following description will discuss operations by the image forming device 11 being refilled with toner in the foregoing arrangement. As the detection circuit 43 in the communication device T2 detects that the toner bottle 21 has been attached in the first position, the CPU 44 controls the transmission and reception circuit 42 to send electric waves to the communication device T1 to feed electric power. As the communication device T1 is fed with electric power, the communication device T1 responds to the communication device T2 by the transmission and reception circuit 32 notifying that the communication device T1 is ready to start communication.

**[0054]** Accordingly, first, in S1, based on whether or not the communication device T2 has received the response electric waves from the communication device T1, it is determined whether or not the toner bottle 21 to be attached has reached the aforementioned communicable area (the area from the first position through the second position). If the toner bottle 21 is in the commu-

nicable area, the process proceeds to S2. In response to a press on the toner refilling start key provided on the control panel (not shown) of the device main body, the device main body becomes prepared to start the toner refilling process, and displays on a display panel in the display section 47 a message whether or not the toner hopper 4b has toner left in it.

[0055] If it turns up in S3 that there is toner left, the process proceeds to S9 in which the display section 47 displays a message informing that there still is toner remaining, terminating the attaching of the toner bottle 21. By contrast, if it turns up that the toner hopper 4b is empty, the process proceeds to S4 in which the device main body changes to a mode whereby information can be written and retrieved (RAW mode).

[0056] In the device main body, as the communication device T2 receives the incoming information from the communication device T1 in the toner bottle 21, the CPU 44 determines sequentially in S5 through S7, based on that information, whether or not the manufacturer code is suitable (whether the toner bottle 21 carries a manufacturer code that coincides or is compatible with the manufacturer code of the device main body), whether or not the toner bottle 21 has been already used, and whether or not the product type matches the device main body. The criteria in the determination are a mere example, and may be varied according to the type of information stored in the RAM 35 in the communication device T1 as necessary.

[0057] If the toner bottle 21 has cleared all the criteria stipulated in S5 through S7, the process proceeds to S8 in which the display section 47 displays a message notifying that the toner bottle 21 is properly used with the device main body. If the toner bottle 21 has failed any of the criteria, the process proceeds to S10 in which the display section 47 displays a message notifying that the toner bottle 21 is not suitable for the device main body. In the latter case, an enquiry is made in S11 whether or not the unsuitability of the toner bottle 21 should be ignored. If it is not to be ignored, the process proceeds to S12 where the RAW mode of the device main body is deactivated, and the attaching of the toner bottle 21 is suspended. If it is to be ignored, the process proceeds to subsequent steps. Alternatively, the alarm section 48 may be arranged to produce an alarming sound, for example, in place of, or in addition to, a display carried out by the display section 47.

[0058] The foregoing steps are executed before the toner bottle 21 reaches the second position, allowing the user to know suitability of the toner bottle 21 before the supplementary toner is actually supplied; therefore, the steps are important in determining what to do further with the toner bottle 21, for example, whether or not the refilling with toner is to be continued.

[0059] Subsequently, in S13, the toner bottle 21 slides to the second position. The present embodiment has the most prominent feature in that the image forming process that follows S13 varies depending on the suitability

of the toner bottle 21. If the attaching is suspended as above when a message is displayed that the toner bottle 21 is unsuitable, toner is supplied only from toner bottles 21 that are suitable, whereby the user is assured to obtain optimal results from the device main body and the toner bottles 21. By contrast, if the user still needs to take a chance and single out the possibly bogus product contained in the unsuitable toner bottle, the user may ignore the displayed message on the unsuitability of the toner bottle and proceed to the image forming process as follows.

[0060] First, if it turns out in S14 that the toner bottle 21 is suitable, since the toner can be used to carry out the image forming process without any problems, the process proceeds to S15 in which the CPU 44 in the communication device T2 retrieves toner information from the incoming information transmitted from the communication device T1. The CPU 44 specifies image forming conditions (normal image forming conditions) that are suitable for the toner information in S16, and resets a counter for counting the number of copied sheets in S17. By contrast, if it turns out in S14 that the toner bottle 21 is unsuitable, the process proceeds to S24, in which the CPU 44 in the communication device T2 specifies image forming conditions that match the unsuitable product, by selecting one of image forming conditions under which image quality is lowered in comparison to normal quality, stored in a memory (not shown) of the device main body, for example, according to a manner predetermined by the user.

[0061] These low quality image forming conditions may be, for example, such that the photosensitive drum 1 is charged up to a higher value than normal when it is given negative charges or the light projector 3 is adjusted to project a smaller amount of light than normal, so as to increase the consumption of toner and thereby lower the brightness of the formed image as a whole. Another example is such that the fixing temperature of the fixing device 7 is set lower than normal so as to make it difficult for the toner to be fixed properly onto the transfer material P. The condition, regardless of which one is selected, is retrieved from the memory in the device main body in response to a selection signal from the CPU 44, and supplied to a control device (not shown) in the device main body.

[0062] If the former image forming condition is selected, the control device causes the output voltage from the high voltage supply source 2b in the main charging device 2 to increase by a predetermined amount, and further causes the voltage fed to a light emitting element, such as a laser diode, used in the light projector 3 to decrease by a predetermined amount. If the latter image forming condition is selected, the control device causes the voltage supplied to a heat source, such as a halogen lamp, used for the heating roller in the fixing device 7 to decrease by a predetermined amount. Alternatively, the former and latter image forming conditions may be applied concurrently.

**[0063]** As image forming conditions are determined either for a suitable product or for an unsuitable product as above, the process proceeds to S18 in which supplementary toner is supplied from the toner bottle 21 to the toner hopper 4b from which the CPU 44 then receives a signal representative of completion of the refilling of the toner hopper 4b with toner. Subsequently, in S19, the CPU 44 controls the transmission and reception circuit 42 in the communication device T2 to send information notifying that the toner bottle 21 is "already used" to the communication device T1 of the toner bottle 21 which subsequently writes the information as history information into the RAM 35 of the communication device T1.

**[0064]** Thereafter, in S20, the toner bottle 21 returns from the second position to the first position and removed from the device main body. Meanwhile, in the device main body, in S21, the supplementary toner supplied to the toner hopper 4b is agitated to achieve uniform density; in S22, image quality, such as contrast, is adjusted; and finally, in S23, the R/W mode is deactivated. This concludes the toner refilling operations and has the image forming device prepared for an image forming process.

**[0065]** Thereafter, if the toner bottle 21 is a suitable product, a normal image forming process is executed. If the toner bottle 21 is an unsuitable product, an image forming process is executed under selected conditions that are for use with toner of a lower quality as mentioned above.

**[0066]** According to one of the lower quality image forming conditions under which the toner is consumed in an increased quantity, the formed image has a lower level of brightness as a whole and inferior image quality than normal; this arrangement offers the user a second chance to recognize that the toner bottle 21 is an unsuitable product, if the user missed, prior to the supplementing, the display of the result of the decision whether the toner bottle is "suitable" or "unsuitable". Consequently, the device main body can be protected from damage and quick wearing due to erroneous use of an unsuitable product over a long period of time. Besides, if a bogus product including toner of poor properties is contained in an unsuitable product, since the quality of images formed using this toner is inferior by far to the quality of images formed using other unsuitable products, the bogus product can be readily singled out.

**[0067]** According to one of the lower quality image forming conditions under which the toner is difficult to be fixed properly onto the transfer material P, the toner peels off as the formed image is touched with a finger for example; therefore, the user is able to recognize that the toner bottle 21 is unsuitable. Consequently, the device main body can be protected from damage and quick wearing due to erroneous use of an unsuitable product over a long period of time. Besides, if a bogus product including toner of poor properties is contained in an unsuitable product, since the quality of images formed us-

ing this toner is inferior by far to the quality of images formed using other unsuitable products, the bogus product can be readily singled out.

**[0068]** A first image forming device in accordance with the present invention includes a device main body to which a supplementary toner container for supplying supplementary toner is attached in a freely attachable and detachable manner, wherein

the supplementary toner container includes container end communication means, having a memory function to store, and another function to update, information at least on the supplementary toner container, for contactlessly communicating with main body end communication means disposed in the device main body to bidirectionally transmit the information,

the image forming device is characterized in that at least a portion, of the supplementary toner container, including the container end communication means is movable from a first position where the supplementary toner container starts being attached to the device main body to a second position where the supplementary toner container is completely attached in readiness for toner refilling, and is able to carry out the bidirectional communication at least somewhere between the first position and the second position, and

the image forming device includes control means for deciding from a result of the bidirectional communication whether or not the information on the supplementary toner container matches the device main body, and for specifying an image forming condition that varies depending on the decision whether or not the supplementary toner container is suitable.

**[0069]** According to the arrangement, the container end communication means in the supplementary toner container can bidirectionally communicate with the main body end communication means disposed in the device main body to transmit the information on the supplementary toner container when the portion, of the supplementary toner container, including the container end communication means is somewhere between the first position where the supplementary toner container starts being attached and the second position where the supplementary toner container is completely attached. "Information" here refers to, for example, a manufacturer code and serial number (product lot number) of the supplementary toner container, a name and type of compatible copying machines, printers, facsimiles, and other devices, and a color and developing, transfer, and fixing conditions for the toner contained in the supplementary toner container.

**[0070]** The space between the first position and the second position is in many cases occupied by nothing else but the supplementary toner container when it is to

be attached, and serves no other purposes; transmission errors and jamming with other communication devices can be avoided and a highly reliable communication is ensured, if the bidirectional communication is carried out only in this space.

[0071] Further, the main body and communication means receives the information on the supplementary toner container from the container end communication means through the foregoing communication. Based on a result of the communication, the control means decides whether or not the supplementary toner container is suitable for the device main body, and specifies an image forming condition that varies depending on whether or not the supplementary toner container is suitable. Therefore, if the supplementary toner container is suitable, a normal image forming process is executable by specifying regular image forming conditions.

[0072] By contrast, if the supplementary toner container is an unsuitable product, the product can be readily discovered by specifying a lower quality image forming condition under which the image quality is lowered. Consequently, the device main body can be protected from damage and quick wearing due to erroneous use of an unsuitable product over a long period of time. Further, among unsuitable products, especially a bogus product, which is likely to cause a large degradation in image quality, can be singled out.

[0073] As a result, an image forming device can be offered with capabilities to prevent erroneous attaching of a supplementary toner container to a device main body in a highly reliable manner and also to single out bogus products.

[0074] A second image forming device in accordance with the present invention includes all the features of the arrangement of the first image forming device, and is characterized in that

the container end communication means is able to carry out the bidirectional communication anywhere between the first position and the second position. According to the above invention, the bidirectional communication is smoothly carried out since the communication is established not only at specified points but covers the entire area in which the supplementary toner container is movable. Further, if, for example, the supplementary toner container is not properly mounted to the first position, a bidirectional communication is established before the supplementary toner container reaches the second position, therefore, trouble, such as detection errors caused by failed communication, is avoidable.

[0075] A third image forming device in accordance with the present invention includes all the features of the arrangement of the first or second image forming device, and is characterized in that

before the supplementary toner is supplied to the device main body from the supplementary toner con-

tainer which is at the second position, the bidirectional communication is carried out so that the control means decides whether or not the information on the supplementary toner container matches the device main body.

[0076] According to the above invention, it is the second position where the supplementary toner container is completely attached. An operation is subsequently executed to supply the supplementary toner to the device main body; however, prior to that supplying, the main body and communication means retrieves the information on the supplementary toner container from the container end communication means through bidirectional communication so that the control means decides whether or not the information is suitable.

[0077] Consequently, the user is immediately informed of a decision on the suitability of the information; thereby, prior to supplying the supplementary toner, the user can decide what to do with the supplementary toner container that has turned out to be an unsuitable product. The user, for example, may suspend the attaching of the supplementary toner container.

[0078] A fourth image forming device in accordance with the present invention includes all the features of the arrangement of one of the first to third image forming devices, and is characterized in that

the main body end communication means writes into the container end communication means a history on a predetermined operation carried out by the supplementary toner container in order to supply the supplementary toner.

[0079] According to the above invention, the main body end communication means transmits to the container end communication means the history on a predetermined operation carried out by the supplementary toner container so that the supplementary toner container supplies the supplementary toner and writes the history into the container end communication means. "History" here may refer to, for example, the date that the supplementary toner is supplied to the device main body, a message representing that the supplementary toner container is empty, and the name and type of the device to which the supplementary toner is supplied. Consequently, history can be utilized effectively as information in recycling after the supplementary toner container that has been used to supply the supplementary toner is collected. Especially, a supplementary toner container, once used, can be prevented from being forged into a bogus product.

[0080] A fifth image forming device in accordance with the present invention includes all the features of the arrangement of one of the first to fourth image forming devices, and is characterized in that

if the control means decides that the supplementary toner container is unsuitable, the control means is able to specify an image forming condition under which toner is consumed in an amount that is either increased or decreased from a reference value by a predetermined amount.

**[0081]** According to the above invention, if the control means decides from a result of the bidirectional communication that the supplementary toner container is unsuitable, the control means is able to specify an image forming condition under which toner is consumed during an image forming process in an amount that is either increased or decreased from a reference value by a predetermined amount. For example, the image carrier is charged up to a higher value than normal when it is given negative charges or the image carrier is exposed to light in a smaller amount than normal, so as to increase the consumption of toner over a reference amount. This lowers the brightness of the formed image as a whole and enables the user to recognize that the supplementary toner container is an unsuitable product. Consequently, the device main body can be protected from damage and quick wearing due to erroneous use of an unsuitable product over a long period of time. Further, among unsuitable products, a bogus product containing toner of such poor properties that cause a large degradation in image quality can be singled out.

**[0082]** A sixth image forming device in accordance with the present invention includes all the features of the arrangement of one of the first to fifth image forming devices, and is characterized in that

it further includes fixing means for fixing the toner formed image through heat, wherein if the control means decides that the supplementary toner container is unsuitable, the control means is able to specify an image forming condition under which a fixing temperature of the fixing means is decreased from a reference value by a predetermined amount.

**[0093]** According to the above invention, the image forming device is provided with fixing means for fixing the image, and if the control means decides from a result of the bidirectional communication that the supplementary toner container is unsuitable, the control means is able to specify an image forming condition under which a fixing temperature of the fixing means is decreased from a reference value by a predetermined amount. The arrangement makes it difficult for the toner to be fixed properly onto the transfer material when compared to a normal level. The toner peels off as the formed image is touched with a finger for example; therefore, the user is able to recognize that the supplementary toner container is unsuitable. Consequently, the device main body can be protected from damage and quick wearing due to erroneous use of an unsuitable product over a long period of time. Further, among unsuitable products, a bogus product containing toner of such poor properties that cause a large degradation in the fixing onto the transfer material can be singled out.

**[0084]** A seventh image forming device in accordance with the present invention includes all the features of the arrangement of one of the first to sixth image forming

devices, and is characterized in that

it further includes a notification means for, if the control means decides that the supplementary toner container is unsuitable, notifying the user of the decision through either a display or a sound, or both. According to the above invention, if the control means decides that the attached supplementary toner container is unsuitable, the notification means notifies the user of the decision through either a display or a sound, or both. Consequently, for example, the user is better notified of the decision through visual recognition of characters or images provided that the device main body has a display panel or through audio recognition of a voice or a sound provided that the device main body has a speaker.

**[0085]** The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art intended to be included within the scope of the following claims.

#### Claims

1. An image forming device, comprising a device main body to which a supplementary toner container (21) for supplying supplementary toner is attached in a freely attachable and detachable manner, wherein

the supplementary toner container (21), includes container end communication means (T1), having a memory function to store information at least on the supplementary toner container (21), for contactlessly communicating with main body end communication means (T2) disposed in the device main body to transmit the information, and

at least a portion, of the supplementary toner container (21), including the container end communication means (T1) is movable from a first position where the supplementary toner container (21) starts being attached to the device main body to a second position where the supplementary toner container (21) is completely attached in readiness for toner refilling, and is able to carry out the communication at least somewhere between the first position and the second position,

said image forming device comprising control means (44) for deciding from a result of the communication whether or not the information on the supplementary toner container (21) matches the device main body, and for specifying an image forming condition that varies de-

- pending on the decision whether or not the supplementary toner container (21) is suitable.
2. The image forming device as set forth in claim 1, wherein
    - the container end communication means (T1) has another function to update the information on the supplementary toner container (21) and bidirectionally communicates with the main body end communication means (T2).
  3. The image forming device as set forth in either one of claims 1 and 2, wherein
    - the container end communication means (T1) carries out the communication anywhere between the first position and the second position.
  4. The image forming device as set forth in either one of claims 1 to 3, wherein
    - before the supplementary toner is supplied to the device main body from the supplementary toner container (21) which is at the second position, the communication is carried out so that the control means (44) decides whether or not the information on the supplementary toner container (21) matches the device main body.
  5. The image forming device as set forth in claim 2, wherein
    - the main body end communication means (T2) writes into the container end communication means (T1) a history on a predetermined operation carried out by the supplementary toner container (21) in order to supply the supplementary toner.
  6. The image forming device as set forth in either one of claims 1 to 5, wherein
    - if the control means (44) decides that the supplementary toner container (21) is unsuitable, the control means (44) is able to specify an image forming condition under which toner is consumed in an amount that is either increased or decreased from a reference value by a predetermined amount.
  7. The image forming device as set forth in either one of claims 1 to 6, wherein
    - if the control means (44) decides that the supplementary toner container (21) is unsuitable, the control means (44) is able to specify an image forming condition under which image quality is lowered in comparison to normal quality.
  8. The image forming device as set forth in claim 7, wherein
    - if the control means (44) decides that the supplementary toner container (21) is unsuitable, the control means (44) is able to specify an image forming condition under which brightness of an image
  - formed as a whole is different from normal brightness.
  9. The image forming device as set forth in either one of claims 7 and 8, further comprising a photosensitive member (1) on which an electrostatic latent image is formed correspondingly to an image, wherein
    - if the control means (44) decides that the supplementary toner container (21) is unsuitable, the control means (44) is able to specify an image forming condition under which the photosensitive member (1) is charged to an electric potential that is either increased or decreased from a reference value by a predetermined amount.
  10. The image forming device as set forth in either one of claims 7 to 9, wherein
    - if the control means (44) decides that the supplementary toner container (21) is unsuitable, the control means (44) is able to specify an image forming condition under which the toner is fixed less properly onto a transfer material (F).
  11. The image forming device as set forth in either one of claims 1 to 10, further comprising fixing means (7) for fixing the toner formed image through heat, wherein
    - if the control means (44) decides that the supplementary toner container (21) is unsuitable, the control means (44) is able to specify an image forming condition under which a fixing temperature of the fixing means (7) is decreased from a reference value by a predetermined amount.
  12. The image forming device as set forth in claim 1, further comprising notification means (47, 48) for, if the control means (44) decides that the supplementary toner container (21) is unsuitable, notifying the decision.
  13. The image forming device as set forth in claim 12, wherein
    - the notification means (47, 48) notifies the user of the decision through either a display or a sound, or both.
  14. The image forming device as set forth in claim 1, wherein
    - the supplementary toner container (21) has a ferroelectric memory for storing the information at least on the supplementary toner container (21).
  15. An image forming apparatus having a toner container and adapted for replenishment of the toner by transfer from a supplementary toner container removably attachable to the main body of the apparatus, the apparatus being equipped with a communication means for contactless communication with



a container communication means of a said supplementary toner container attached to the main body in preparation for toner replenishment so as to obtain identification information about said supplementary toner container, and control means for receiving and processing the obtained identification information so as to determine whether the supplementary container is suited to the apparatus. 5

16. An image forming apparatus according to claim 15 10  
wherein said control means is arranged to permit toner replenishment to be performed using a supplementary toner container judged to be unsuitable, and to adjust image forming conditions when such toner replenishment using an unsuitable supplementary 15  
toner container is performed. 20

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FIG. 1

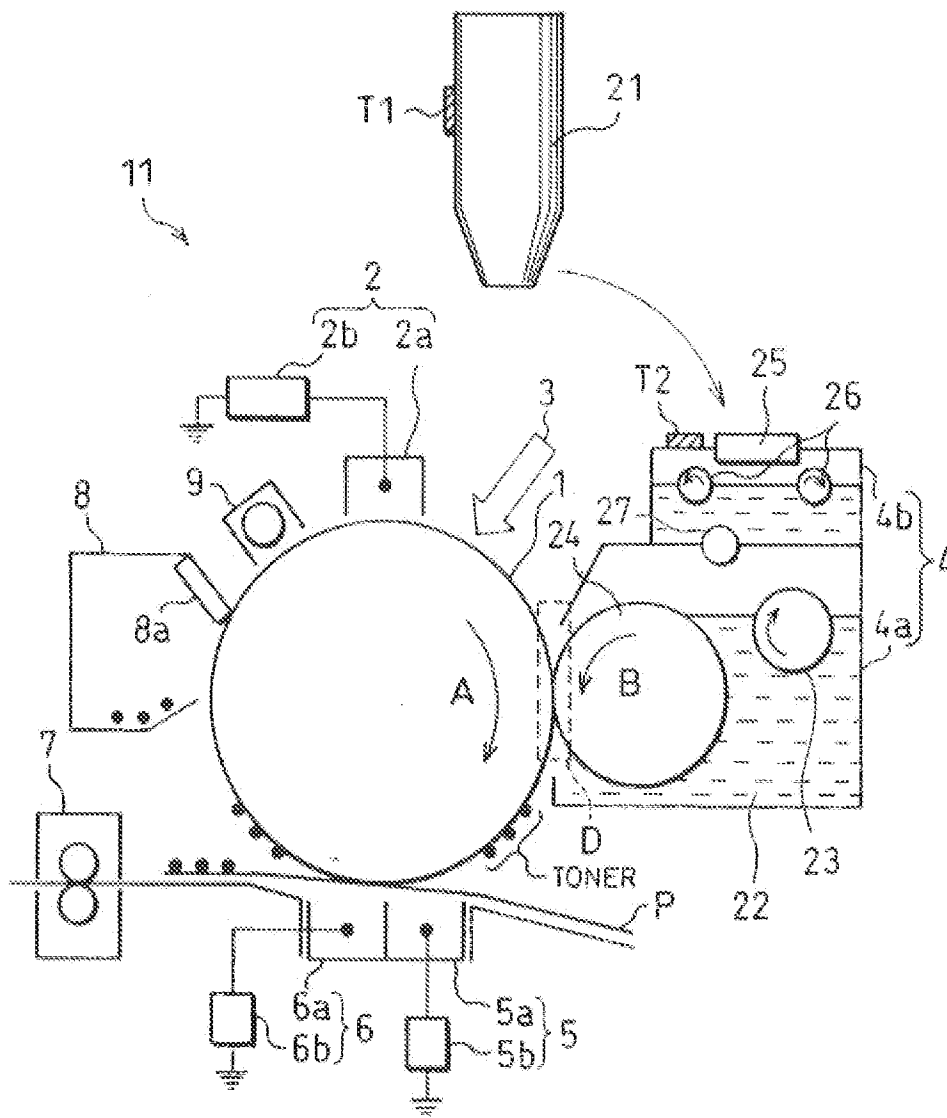


FIG. 2

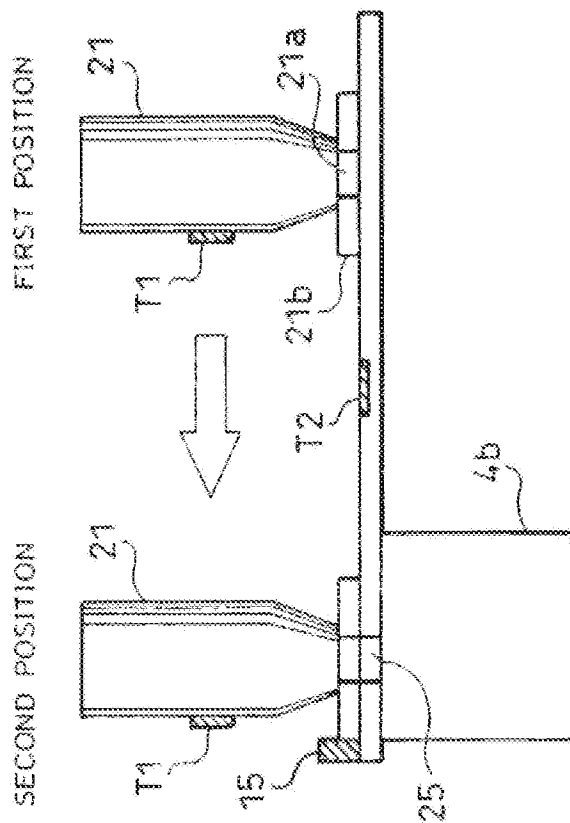


FIG. 3

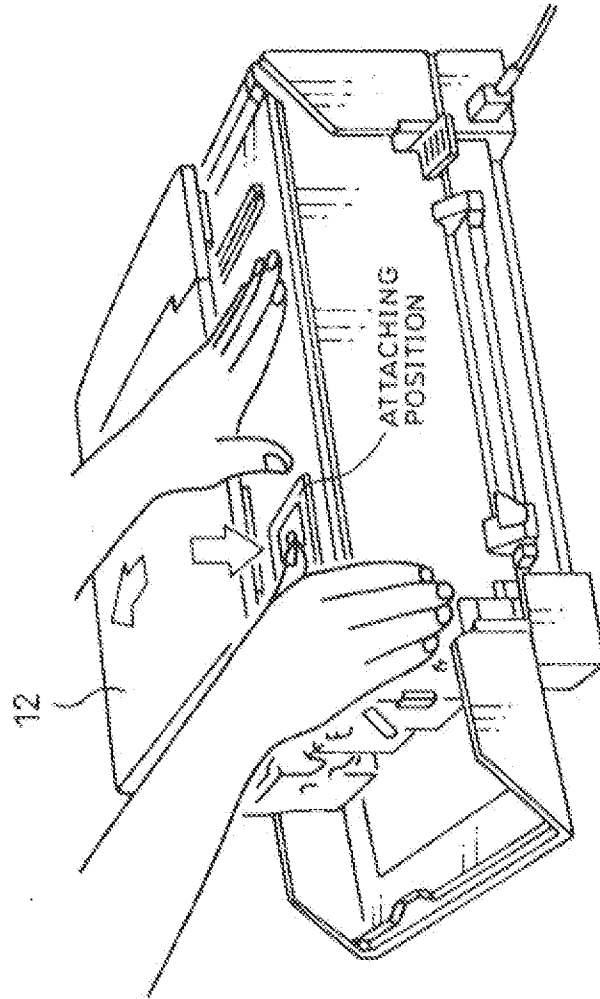


FIG. 4

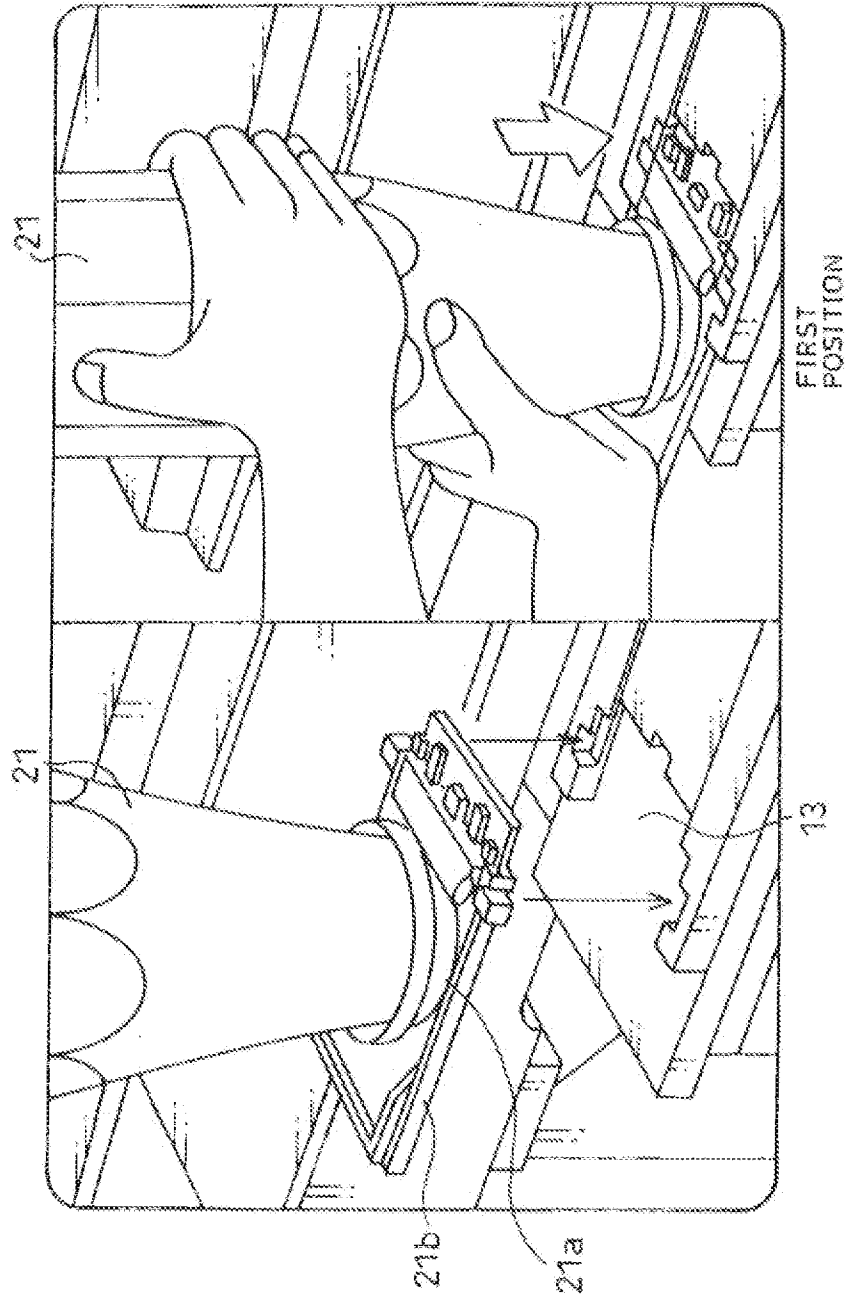


FIG. 5

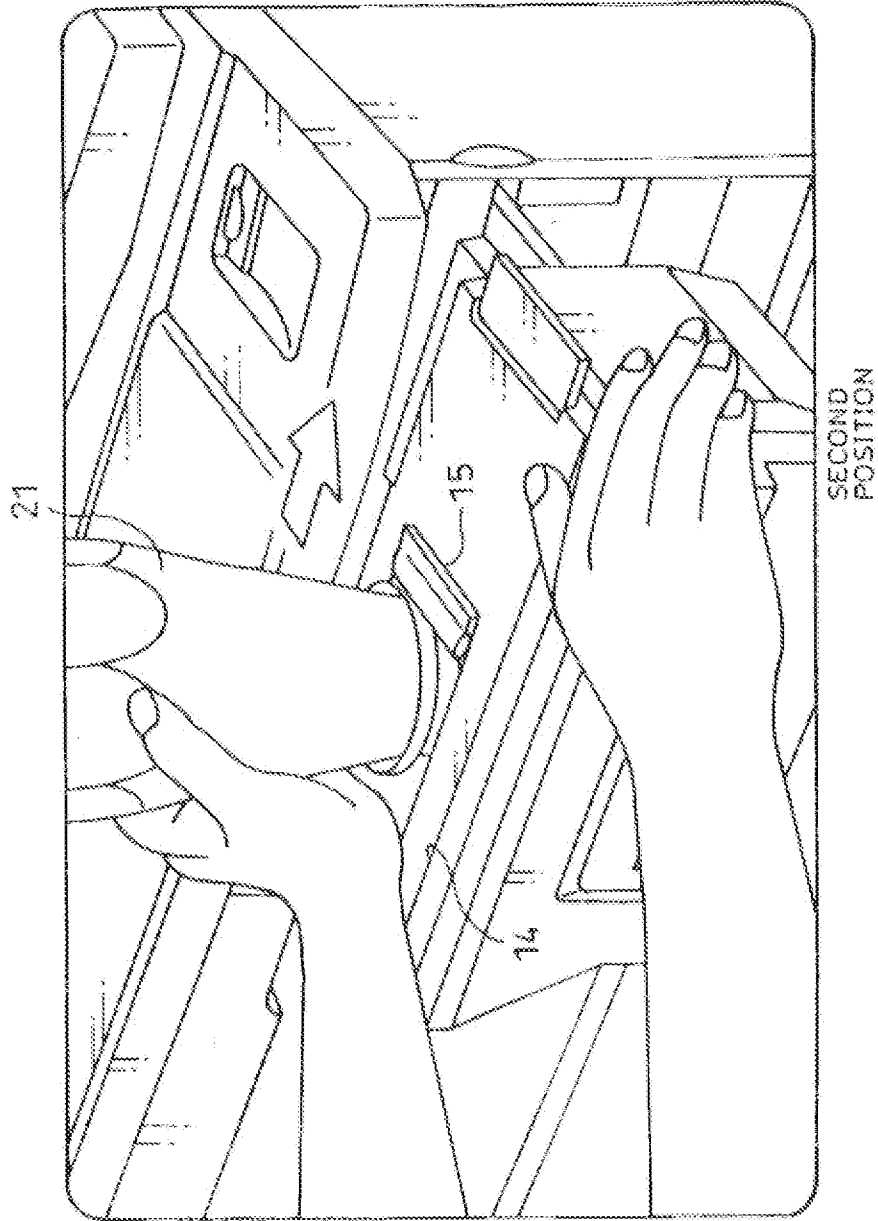


FIG. 6 (a)

BLOCK DIAGRAM FOR CONTROLS OF TONER BOTTLE

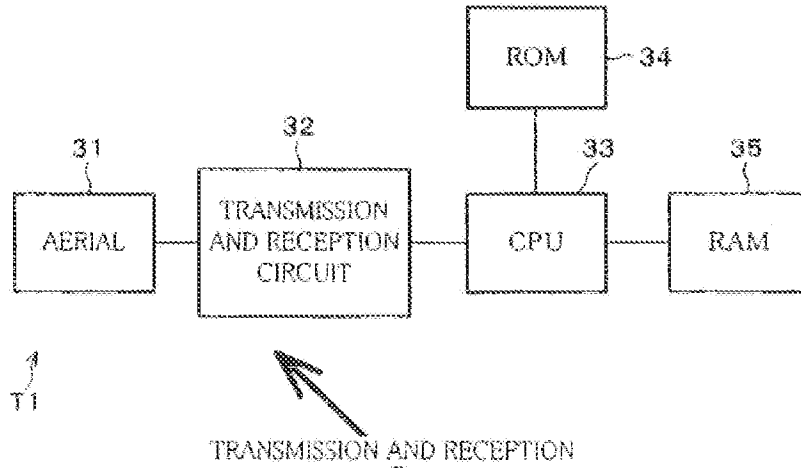
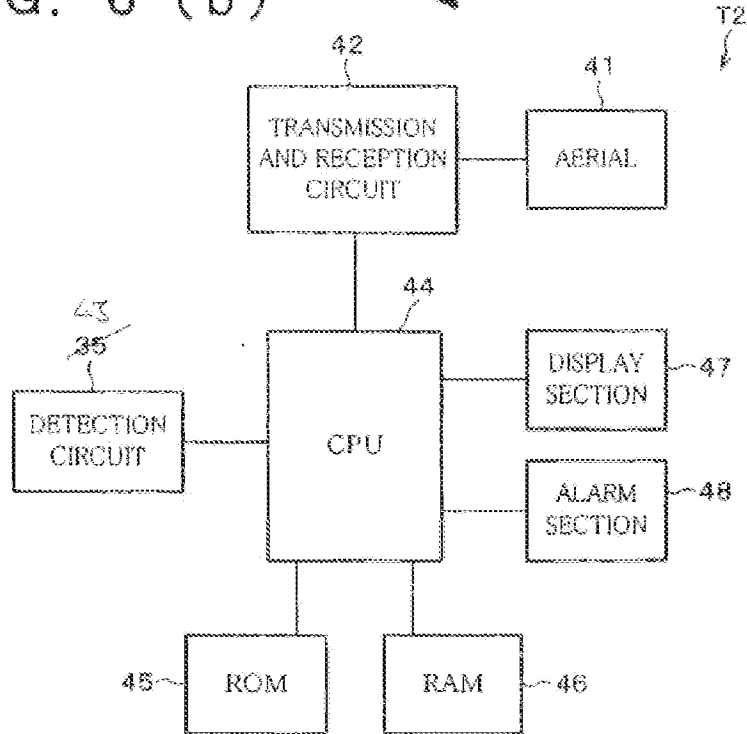


FIG. 6 (b)



BLOCK DIAGRAM FOR CONTROLS OF DEVICE MAIN BODY

FIG. 7

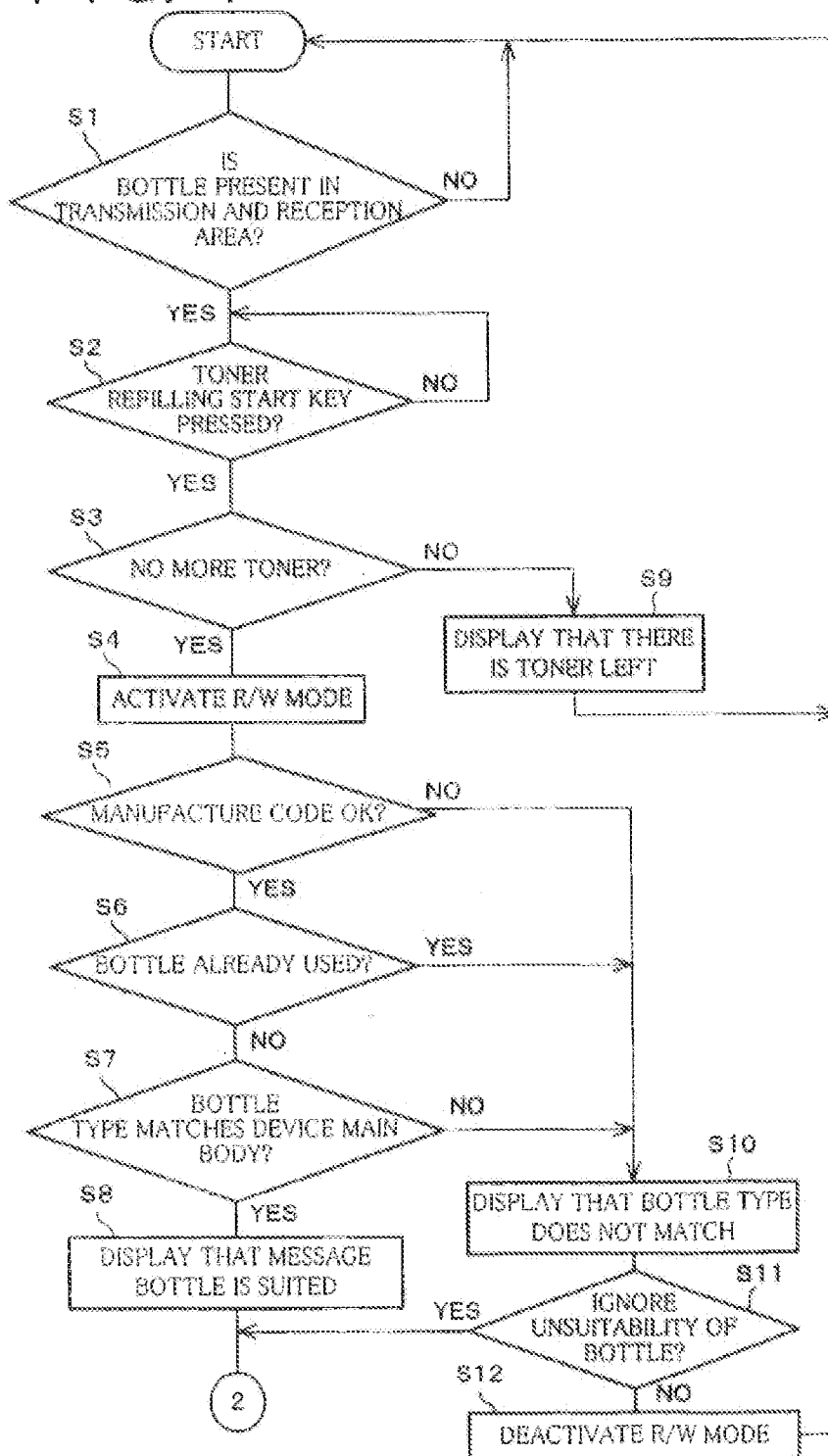
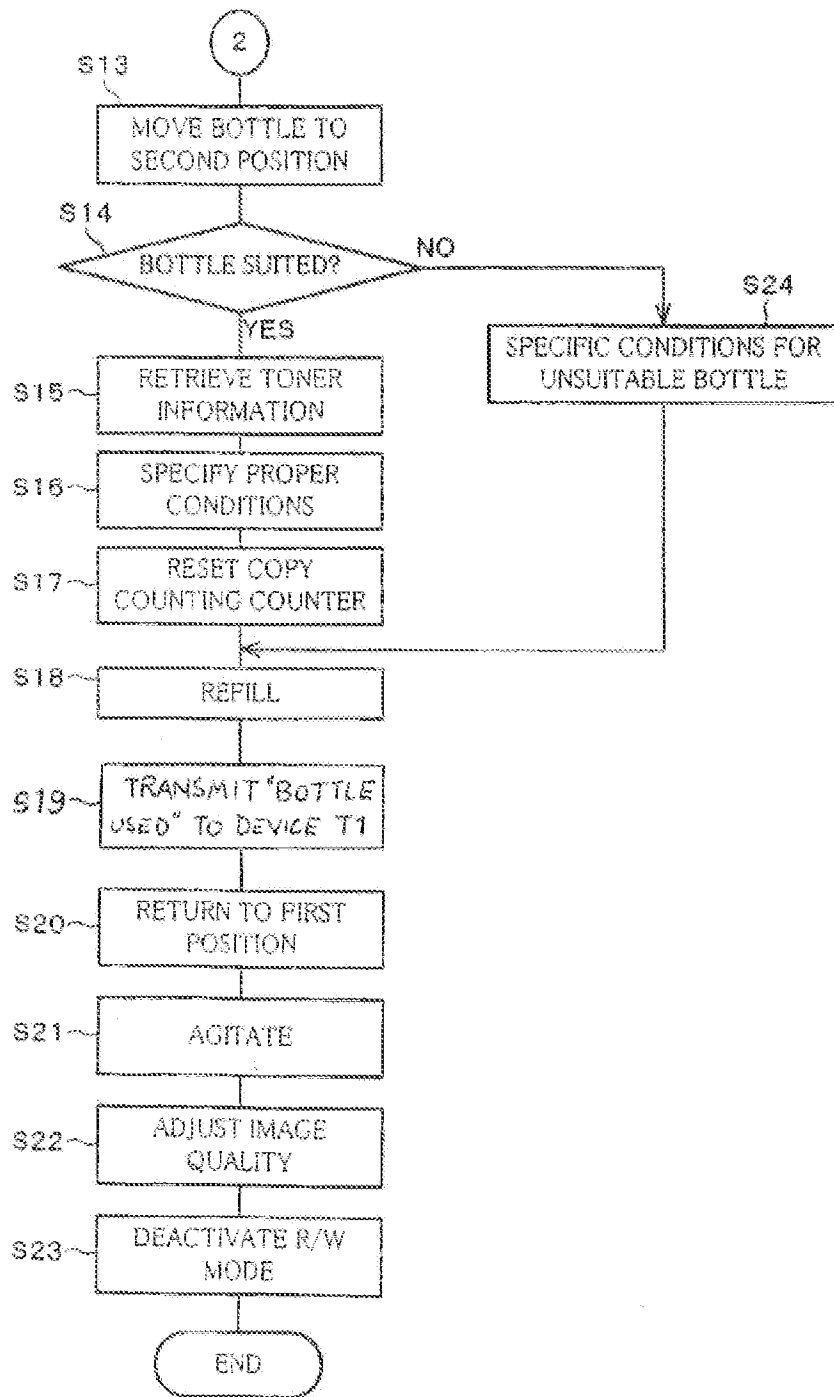




FIG. 8



## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13617050
<b>Filing Date:</b>	14-Sep-2012
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Filer:</b>	Lawrence A. Stahl/Rizalina Mendiola
<b>Attorney Docket Number:</b>	00684.003330.18

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	1806	1	180	180
<b>Total in USD (\$)</b>				<b>180</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	19440060
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Lawrence A. Stahl/Cu Tran
<b>Filer Authorized By:</b>	Lawrence A. Stahl
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	27-JUN-2014
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	16:37:43
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$180
RAM confirmation Number	3958
Deposit Account	
Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Transmittal Letter	ThirdSuppIDS00684003330_18 USA600.pdf	85865 f7cc69232290eb15dd93bb0879037db9aac bb8b3	no	2
<b>Warnings:</b>					
<b>Information:</b>					
2	Information Disclosure Statement (IDS) Form (SB08)	PTOSB08a00684003330_18USA 600.PDF	612957 553c1694c605e71a3eba43089c4785d78d3 31a4a	no	5
<b>Warnings:</b>					
<b>Information:</b>					
3	Foreign Reference	EP1041455_00684003330_18. pdf	1349932 ab1ce7bb386dd539751654730f516474023 bc4bc	no	22
<b>Warnings:</b>					
<b>Information:</b>					
4	Non Patent Literature	ExpertReportofBE_SpringettRe gardingInvalidity00684003330 _18.pdf	8047952 9ee036e3bd5f24c48849ec40d9c39f3c2707 7cf9	no	207
<b>Warnings:</b>					
<b>Information:</b>					
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<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			10127367		

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/617,050	)	
	:	Examiner: Susan S. Y. Lee
First Named Inventor:	)	
YUSUKE YAMADA	:	Group Art Unit: 2852
	)	
Filed: September 14, 2012	:	Confirmation No.: 1149
	)	
For: SEALING MEMBER, TONER	:	
ACCOMMODATING	:	
CONTAINER AND IMAGE	)	
FORMING APPARATUS	:	June 27, 2014

**Mail Stop Amendment**  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

THIRD SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Madam:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56 and in accordance with the practice under 37 C.F.R. §§ 1.97 and 1.98, the Examiner’s attention is directed to the documents listed on the enclosed PTO/SB/08a.

The fee of \$180.00 pursuant to 37 C.F.R. §1.97(c)(2) and §1.17(p) is being paid electronically.

CONCLUSION

It is respectfully requested that the above information be considered by the Examiner and that an initialed copy of the enclosed Form PTO/SB/08a be returned indicating that such information has been considered.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

/Mark A. Williamson/

---

Mark A. Williamson  
Attorney for Applicants  
Registration No. 33,628

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New York, NY 10104-3800  
Facsimile: (212) 218-2200

SDM/MAW/rmm

Electronic Petition Request	<b>TERMINAL DISCLAIMER TO OBIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT</b>
Application Number	13617050
Filing Date	14-Sep-2012
First Named Inventor	Yusuke Yamada
Attorney Docket Number	00684.003330.18
Title of Invention	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS

- Filing of terminal disclaimer does not obviate requirement for response under 37 CFR 1.111 to outstanding Office Action
- This electronic Terminal Disclaimer is not being used for a Joint Research Agreement.

Owner	Percent Interest
Canon Kabushiki Kaisha	100%

The owner(s) with percent interest listed above in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of prior patent number(s)

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as the term of said prior patent is presently shortened by any terminal disclaimer. The owner hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the prior patent are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the owner does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later:

- expires for failure to pay a maintenance fee;
- is held unenforceable;
- is found invalid by a court of competent jurisdiction;
- is statutorily disclaimed in whole or terminally disclaimed under 37 CFR 1.321;
- has all claims canceled by a reexamination certificate;
- is reissued; or
- is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Terminal disclaimer fee under 37 CFR 1.20(d) is included with Electronic Terminal Disclaimer request.



I certify, in accordance with 37 CFR 1.4(d)(4), that the terminal disclaimer fee under 37 CFR 1.20(d) required for this terminal disclaimer has already been paid in the above-identified application.

Applicant claims the following fee status:

- Small Entity
- Micro Entity
- Regular Undiscounted

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

THIS PORTION MUST BE COMPLETED BY THE SIGNATORY OR SIGNATORIES

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

- An attorney or agent registered to practice before the Patent and Trademark Office who is of record in this application  
  
Registration Number 33628
- A sole inventor
- A joint inventor; I certify that I am authorized to sign this submission on behalf of all of the inventors as evidenced by the power of attorney in the application
- A joint inventor; all of whom are signing this request

Signature	/Mark A. Williamson/
Name	Mark A. Williamson

\*Statement under 37 CFR 3.73(b) is required if terminal disclaimer is signed by the assignee (owner).  
Form PTO/SB/96 may be used for making this certification. See MPEP § 324.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13617050
<b>Filing Date:</b>	14-Sep-2012
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Filer:</b>	Lawrence A. Stahl/Cu Tran
<b>Attorney Docket Number:</b>	00684.003330.18

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
Statutory or Terminal Disclaimer	1814	1	160	160

**Pages:**

**Claims:**

**Miscellaneous-Filing:**

**Petition:**

**Patent-Appeals-and-Interference:**

**Post-Allowance-and-Post-Issuance:**

**Extension-of-Time:**

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>160</b>

Doc Code: DISQ.E.FILE

Document Description: Electronic Terminal Disclaimer – Approved

Application No.: 13617050

Filing Date: 14-Sep-2012

Applicant/Patent under Reexamination: Yamada et al.

Electronic Terminal Disclaimer filed on June 26, 2014

APPROVED

**This patent is subject to a terminal disclaimer**

DISAPPROVED

Approved/Disapproved by: Electronic Terminal Disclaimer automatically approved by EFS-Web

U.S. Patent and Trademark Office

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	19422158
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Lawrence A. Stahl/Cu Tran
<b>Filer Authorized By:</b>	Lawrence A. Stahl
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	26-JUN-2014
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	16:56:34
<b>Application Type:</b>	Utility under 35 USC 111(a)

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Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Electronic Terminal Disclaimer-Filed	eTerminal-Disclaimer.pdf	33534	no	2
			ee8785cf059bf22596caa0eeb5a103c4405304ab		
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	30408	no	2
			3d880a5a124ae395d8eb1aa872455c830b900c52		
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>				63942	

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/617,050	)	
	:	Examiner: Susan S.Y. Lee
First Named Inventor:	)	
YUSUKE YAMADA	:	Group Art Unit: 2852
	)	
Filed: September 14, 2012	:	Confirmation No.: 1149
	)	
For: SEALING MEMBER, TONER	:	
ACCOMMODATING	)	
CONTAINER AND IMAGE	:	
FORMING APPARATUS	)	June 26, 2014

**Mail Stop Amendment**  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

AMENDMENT AND PETITION FOR EXTENSION OF TIME  
 AND SUBMISSION OF ELECTRONIC TERMINAL DISCLAIMER

Madam:

Amendment

In response to the Office Action dated February 26, 2014, the Examiner is respectfully requested to amend the above-identified application as follows.

Petition for Extension of Time

Applicants petition the Commissioner for Patents to extend the time for response to the Office Action dated February 26, 2014, for one (1) month from May 26, 2014, to June 26, 2014.

The \$200.00 fee for the extension under 37 C.F.R. § 1.17 is being paid electronically. Any deficiency in or overpayment of this fee should be charged or credited to Deposit Account No. 50-3939.

IN THE ABSTRACT:

Please delete prior abstract and insert the following.

--A toner supply container includes a rotatable container body and a sealing member provided at its axial end portion. The sealing member is movable in an axial direction and includes a sealing portion to seal and unseal an opening of the container body when in first and second relative positions, respectively, and a coupling portion positioned to receive a rotational drive force for rotating the sealing member and the container body. The coupling portion includes an elastically displaceable supporting portion, an engaging portion, and a displacing force receiving portion, which are integrally molded. The engaging portion includes a rotational force receiving portion for receiving a rotational drive force for rotating the sealing member and the container body, and a locking portion. The displacing force receiving portion is provided on the supporting portion at a position closer to the container body than the engaging portion.--



IN THE CLAIMS:

Please amend Claims 58, 59, 66 and 74 as follows.

1. – 21. (Cancelled)

22. (Previously Presented) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body, the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force for rotating the sealing member and the container body about the rotation axis of the container body, the coupling portion including:

ii-ii-i) a supporting portion provided on the sealing portion, the supporting portion being elastically displaceable in an inward direction toward the rotation axis of the container body and elastically restorable in an outward direction away from the rotation axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of the supporting portion and being displaceable with the supporting portion, the engaging portion including:

ii-ii-ii-i) a rotational force receiving portion capable of being abutted in a direction that is concentric with a circumference of the cylindrical portion of the container body to receive a rotational drive force for rotating the sealing member and the container body; and

ii-ii-ii-ii) a locking portion capable of being abutted in a direction parallel to the rotation axis of the container body to enable the relative movement of the sealing member and the container body from the first position, in which the opening is sealed, to the second position, in which the opening is unsealed; and

ii-ii-iii) a displacing force receiving portion provided on the supporting portion at a position closer to the container body than the engaging portion, the displacing force receiving portion being displaceable with the supporting portion and having a radially outermost part that is more remote from the rotation axis of the container body than a radially outermost part of the engaging portion,

wherein the supporting portion, the engaging portion, and the displacing force receiving portion are integrally molded.

23. (Previously Presented) The toner supply container of claim 22, wherein the coupling portion includes a plurality of supporting portions, each of which has an engaging portion and a displacing force receiving portion, and wherein the supporting portions are arranged discretely in a rotational direction of the coupling portion.

24. (Previously Presented) The toner supply container of claim 22, wherein the engaging portion and the displacing force receiving portion are disposed along a line parallel to the rotation axis of the container body.

25. (Previously Presented) The toner supply container of claim 22, wherein the engaging portion extends radially outwardly from the supporting portion.

26. (Previously Presented) The toner supply container of claim 22, wherein the supporting portion has a uniform width over its entire length.

27. (Previously Presented) The toner supply container of claim 22, wherein the engaging portion and the supporting portion have a same width.

28. (Previously Presented) The toner supply container of claim 22, wherein the supporting portion is wider than the displacing force receiving portion.

29. (Previously Presented) The toner supply container of claim 22, wherein the locking portion comprises a surface perpendicular to a line parallel to the rotation axis of the container body.

30. (Previously Presented) The toner supply container of claim 29, wherein the rotational force receiving portion comprises a surface perpendicular to the locking portion surface.

31. (Previously Presented) The toner supply container of claim 22, wherein the sealing portion and the coupling portion are integrally molded.

32. (Previously Presented) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body, the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force for rotating the sealing member and the container body about the rotation axis of the container body, the coupling portion including:

ii-ii-i) at least two supporting portions provided on the sealing portion at diametrically opposed positions, each supporting portion being elastically displaceable in an inward direction toward the rotation axis of the container body and elastically restorable in an outward direction away from the rotation axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of each supporting portion and being displaceable with the supporting portion on which it is provided, each engaging portion including:

ii-ii-ii-i) a rotational force receiving portion capable of being abutted in a direction that is concentric with a circumference of the cylindrical portion of the container body to receive a rotational drive force for rotating the sealing member and the container body; and

ii-ii-ii-ii) a locking portion capable of being abutted in a direction parallel to the rotation axis of the container body to enable the relative movement of the sealing member and the container body from the first position, in which the opening is sealed, to the second position, in which the opening is unsealed; and

ii-ii-iii) a displacing force receiving portion provided on each supporting portion at a position closer to the container body than the engaging portion provided at the free end of that supporting portion, the displacing force receiving portion being displaceable with the supporting portion on which it is provided and having a radially outermost part that is more remote from the rotation axis of the container body than a radially outermost part of the engaging portion provided at the free end of that supporting portion.

33. (Previously Presented) The toner supply container of claim 32, wherein the engaging portion and the displacing force receiving portion of each supporting portion are disposed along a line parallel to the rotation axis of the container body.

34. (Previously Presented) The toner supply container of claim 32, wherein each engaging portion extends radially outwardly from its respective supporting portion.

35. (Previously Presented) The toner supply container of claim 32, wherein each supporting portion has a uniform width over its entire length.

36. (Previously Presented) The toner supply container of claim 32, wherein each engaging portion has a same width as the supporting portion on which it is provided.

37. (Previously Presented) The toner supply container of claim 32, wherein each supporting portion is wider than the displacing force receiving portion provided on that supporting portion.

38. (Previously Presented) The toner supply container of claim 32, wherein each locking portion comprises a surface perpendicular to a line parallel to the rotation axis of the container body.

39. (Previously Presented) The toner supply container of claim 38, wherein each rotational force receiving portion comprises a surface perpendicular to the locking portion surface.

40. (Previously Presented) The toner supply container of claim 32, wherein the sealing portion and the coupling portion are integrally molded.

41. (Previously Presented) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body, the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force for rotating the sealing member and the container body about the rotation axis of the container body, the coupling portion including:

ii-ii-i) a plurality of supporting portions provided on the sealing portion, each supporting portion being elastically displaceable in an inward direction toward the rotation axis of the container body and elastically restorable in an outward direction away from the rotation axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of each supporting portion and being displaceable with the supporting portion on which it is provided, each engaging portion including:

ii-ii-ii-i) a rotational force receiving portion capable of being abutted in a direction that is concentric with a circumference of the cylindrical portion of the container body to receive a rotational drive force for rotating the sealing member and the container body; and

ii-ii-ii-ii) a locking portion capable of being abutted in a direction parallel to the rotation axis of the container body to enable the relative movement of the sealing member and the container body from the first position, in which the opening is sealed, to the second position, in which the opening is unsealed; and

ii-ii-iii) a displacing force receiving portion provided on each supporting portion at a position closer to the container body than the engaging portion provided at the free end of that supporting portion, the displacing force receiving portion being displaceable with the supporting portion on which it is provided and having a radially outermost part that is more remote from the rotation axis of the container body than a radially outermost part of the engaging portion provided at the free end of that supporting portion,

wherein the engaging portions of at least two supporting portions are provided at diametrically opposed positions.

42. (Previously Presented) The toner supply container of claim 41, wherein the engaging portion and the displacing force receiving portion of each supporting portion are disposed along a line parallel to the rotation axis of the container body.

43. (Previously Presented) The toner supply container of claim 41, wherein each engaging portion extends radially outwardly from its respective supporting portion.



44. (Previously Presented) The toner supply container of claim 41, wherein each supporting portion has a uniform width over its entire length.

45. (Previously Presented) The toner supply container of claim 41, wherein each engaging portion has a same width as the supporting portion on which it is provided.

46. (Previously Presented) The toner supply container of claim 41, wherein each supporting portion is wider than the displacing force receiving portion provided on that supporting portion.

47. (Previously Presented) The toner supply container of claim 41, wherein each locking portion comprises a surface perpendicular to a line parallel to the rotation axis of the container body.

48. (Previously Presented) The toner supply container of claim 47, wherein each rotational force receiving portion comprises a surface perpendicular to the locking portion surface.

49. (Previously Presented) The toner supply container of claim 41, wherein the sealing portion and the coupling portion are integrally molded.

50. (Previously Presented) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body,

the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force, the coupling portion including;

ii-ii-i) a supporting portion provided on the sealing portion, the supporting portion being elastically displaceable in an inward direction toward the axis of the container body and elastically restorable in an outward direction away from the axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of the supporting portion and being displaceable with the supporting portion; and

ii-ii-iii) a projecting portion provided at a position closer to the container body than the engaging portion, the projecting portion projecting radially from an outer surface of the supporting portion such that a radially outermost part of the projecting portion is more remote

from the axis of the container body than a radially outermost part of the engaging portion, and the projecting portion being displaceable with the supporting portion,

wherein the supporting portion, the engaging portion, and the projecting portion are integrally molded.

51. (Previously Presented) The toner supply container of claim 50, further comprising a feeding portion configured and positioned to feed the toner in the container body to discharge the toner out of the container body.

52. (Previously Presented) The toner supply container of claim 51, wherein the feeding portion is integrally rotatable with the container body, and wherein the sealing member includes a transmitting portion configured and positioned to transmit the rotational force to the container body.

53. (Previously Presented) The toner supply container of claim 51, wherein the feeding portion includes a toner guiding portion extending helically on an inner surface of the container body.

54. (Previously Presented) The toner supply container of claim 51, wherein the feeding portion includes a plate-like member extending substantially in a direction parallel with a rotation axis of the container body, and a plurality of projections inclined relative to the rotation axis on the plate-like member to guide the toner.

55. (Previously Presented) The toner supply container of claim 54, wherein the plate-like member extends along substantially a full length of the container body.

56. (Previously Presented) The toner supply container of claim 50, wherein the supporting portion is made of a plastic material so as to be elastically restorable substantially radially outwardly.

57. (Previously Presented) The toner supply container of claim 50, wherein the coupling portion includes a plurality of supporting portions, each of which has an engaging portion and a displacing force receiving portion, and wherein the supporting portions are arranged discretely in a rotational direction of the coupling portion.

58. (Currently Amended) The toner supply container of claim 50, wherein the engaging portion and the ~~displacing force receiving~~ projecting portion are disposed along a line parallel to the rotation axis of the container body.

59. (Currently Amended) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body,

the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force, the coupling portion including;

ii-ii-i) at least two supporting portions provided on the sealing portion at diametrically opposed positions, each supporting portion being elastically displaceable in an inward direction toward the axis of the container body and elastically restorable in an outward direction away from the axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of each supporting portion and being displaceable with the supporting portion, and

ii-ii-iii) a projecting portion provided on each supporting portion at a position closer to the container body than the engaging portion, the projecting portion projecting radially from an outer surface of the supporting portion such that a radially outermost part of the projecting portion is more remote from the axis of the container body than a radially outermost part of the engaging portion, and the projecting portion being displaceable with the supporting portion[[:]].

60. (Previously Presented) The toner supply container of claim 59, further comprising a feeding portion configured and positioned to feed the toner in the container body to discharge the toner out of the container body.

61. (Previously Presented) The toner supply container of claim 60, wherein the feeding portion is integrally rotatable with the container body, and wherein the sealing member includes a transmitting portion configured and positioned to transmit the rotational force to the container body.

62. (Previously Presented) The toner supply container of claim 60, wherein the feeding portion includes a toner guiding portion extending helically on an inner surface of the container body.

63. (Previously Presented) The toner supply container of claim 60, wherein the feeding portion includes a plate-like member extending substantially in a direction parallel with a rotation axis of the container body, and a plurality of projections inclined relative to the rotation axis on the plate-like member to guide the toner.

64. (Previously Presented) The toner supply container of claim 63, wherein the plate-like member extends along substantially a full length of the container body.

65. (Previously Presented) The toner supply container of claim 59, wherein each supporting portion is made of a plastic material so as to be elastically restorable substantially radially outwardly.

66. (Currently Amended) The toner supply container of claim 59, wherein the engaging portion and the ~~displacing force receiving~~ projecting portion associated with each supporting portion are disposed along a line parallel to the rotation axis of the container body.

67. (Previously Presented) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body,

the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force, the coupling portion including;

ii-ii-i) a plurality of supporting portions provided on the sealing portion, each supporting portion being elastically displaceable in an inward direction toward the axis of the container body and elastically restorable in an outward direction away from the axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of each supporting portion and being displaceable with the supporting portion, and

ii-ii-iii) a projecting portion provided on each supporting portion at a position closer to the container body than the engaging portion, the projecting portion projecting radially

from an outer surface of the supporting portion such that a radially outermost part of the projecting portion is more remote from the axis of the container body than a radially outermost part of the engaging portion, and the projecting portion being displaceable with the supporting portion,

wherein the engaging portions of at least two supporting portions are provided at diametrically opposed positions.

68. (Previously Presented) The toner supply container of claim 67, further comprising a feeding portion configured and positioned to feed the toner in the container body to discharge the toner out of the container body.

69. (Previously Presented) The toner supply container of claim 68, wherein the feeding portion is integrally rotatable with the container body, and wherein the sealing member includes a transmitting portion configured and positioned to transmit the rotational force to the container body.

70. (Previously Presented) The toner supply container of claim 68, wherein the feeding portion includes a toner guiding portion extending helically on an inner surface of the container body.

71. (Previously Presented) The toner supply container of claim 68, wherein the feeding portion includes a plate-like member extending substantially in a direction parallel with a rotation axis of the container body, and a plurality of projections inclined relative to the rotation axis on the plate-like member to guide the toner.



72. (Previously Presented) The toner supply container of claim 71, wherein the plate-like member extends along substantially a full length of the container body.

73. (Previously Presented) The toner supply container of claim 67, wherein each supporting portion is made of a plastic material so as to be elastically restorable substantially radially outwardly.

74. (Currently Amended) The toner supply container of claim 67, wherein the engaging portion and the ~~displacing force-receiving~~ projecting portion associated with each supporting portion are disposed along a line parallel to the rotation axis of the container body.

## REMARKS

In view of the foregoing amendments, the concurrently-filed Electronic Terminal Disclaimer and the following remarks, favorable reconsideration and allowance of the application are respectfully sought. Claims 22-74 are currently pending in the application, with Claims 22, 32, 41, 50, 59 and 67 being independent. Claims 58, 59, 66 and 74 have been amended herein. No new matter has been added.

Applicants note with appreciation the indication that Claims 41-49 and 67-74 are allowed. None of these claims has been amended herein, with the exception of Claim 74, which was amended in response to the claim objection discussed below. These claims are believed to remain in condition for allowance.

Applicants further appreciate the indication that Claims 24-30, 32-39, 51-55, 58, 60-64 and 66 recite allowable subject matter. These claims were objected to for being dependent upon a rejected base claim. These claims will not be rewritten in independent better form at this time because the claims on which they depend are believed to be allowable for the reasons discussed below.

The abstract was objected to for not being directed to the currently claimed invention. The abstract has been revised herein based on features recited in independent Claim 22. Reconsideration and withdrawal of the objection to the abstract are respectfully requested.

Claims 58-66 and 74 were objected to for minor informalities. Claims 58, 59, 66 and 74 have been amended herein to resolve the noted informalities. Reconsideration and withdrawal of the claim objection are also requested.

Claims 22, 23, 31, 32, 40, 50, 56, 57, 59 and 65 were rejected under non-statutory double patenting as allegedly being unpatentable over Claims 24, 25, 30 and 31 of U.S. Patent No.

7,647,012. Without conceding the propriety of this rejection, Applicants are submitting herewith a Terminal Disclaimer and the requisite fee. This submission should obviate the double-patenting rejection. Favorable reconsideration and withdrawal of the double-patenting rejection are respectfully requested.

Applicants submit that all outstanding matters in the above application have been addressed and that this application is in condition for allowance. Favorable reconsideration and early passage of the application are respectfully sought.

The Commissioner is hereby authorized to charge any fee which may be deemed necessary in connection with this paper to Deposit Account No. 50-3939.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

/Mark A. Williamson/

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Mark A. Williamson  
Attorney for Applicants  
Registration No. 33,628

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New York, NY 10104-3800  
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SDM/MAW/rmm

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13617050
<b>Filing Date:</b>	14-Sep-2012
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Filer:</b>	Lawrence A. Stahl/Rizalina Mendiola
<b>Attorney Docket Number:</b>	00684.003330.18

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				
Extension - 1 month with \$0 paid	1251	1	200	200

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>200</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	19424956
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Lawrence A. Stahl/Cu Tran
<b>Filer Authorized By:</b>	Lawrence A. Stahl
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	26-JUN-2014
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	16:59:59
<b>Application Type:</b>	Utility under 35 USC 111(a)

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1		AmendmentandEOTandSubofE _TD00684003330_18USB320_U SB901_USB105.pdf	115565  b4b5db6334529de34c25d3455aca05fb8d0 73867	yes	21
<b>Multipart Description/PDF files in .zip description</b>					
		<b>Document Description</b>	<b>Start</b>	<b>End</b>	
		Amendment/Req. Reconsideration-After Non-Final Reject	1	1	
		Abstract	2	2	
		Claims	3	19	
		Applicant Arguments/Remarks Made in an Amendment	20	21	
<b>Warnings:</b>					
<b>Information:</b>					
2	Fee Worksheet (SB06)	fee-info.pdf	30625  39a1ef3804a094e7b8418165dcaae439b14 9c00b	no	2
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<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			146190		
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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>13/617,050</b>	Filing Date <b>09/14/2012</b>	<input type="checkbox"/> To be Mailed
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ENTITY:  LARGE  SMALL  MICRO

**APPLICATION AS FILED – PART I**

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 = *	*	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 = *	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				
<small>* If the difference in column 1 is less than zero, enter "0" in column 2.</small>			TOTAL	

**APPLICATION AS AMENDED – PART II**

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>	<b>06/26/2014</b>	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total <small>(37 CFR 1.16(i))</small>	* 53	Minus	** 53	= 0	X \$80 = 0
	Independent <small>(37 CFR 1.16(h))</small>	* 6	Minus	***6	= 0	X \$420 = 0
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						
					TOTAL ADD'L FEE	<b>0</b>

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR			
	Total <small>(37 CFR 1.16(i))</small>	*	Minus	**	=	X \$ =
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	X \$ =
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>						
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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050
	Filing Date	2012-09-14
	First Named Inventor	Yusuke Yamada
	Art Unit	2852
	Examiner Name	Susan S. Y. Lee
	Attorney Docket Number	00684.003330.18

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	4878603		1989-11-07	Ikesue et al.	
	2	4941022		1990-07-10	Ohmura et al.	
	3	4979645		1990-12-25	Groves et al.	
	4	4990964		1991-02-05	Kraehn	
	5	5089854	A	1992-02-18	Kaieda et al.	
	6	5200787	A	1993-04-06	Nishiguchi	
	7	5248847	A	1993-09-28	Aoyama	
	8	5383502	A	1995-01-24	Fisk et al.	

**INFORMATION DISCLOSURE  
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9	5495323	A	1996-02-27	Meetze, Jr.	
10	5593224	A	1997-01-14	Ruckert	
11	5598254	A	1997-01-28	Ikesue et al.	
12	5692652	A	1997-12-02	Wise	
13	5812915	A	1998-09-22	Farkash	
14	5823814	A	1998-10-20	Alwine	
15	5903806	A	1999-05-11	Matsuoka et al.	
16	5966010	A	1999-10-12	Loy et al.	
17	6003675	A	1999-12-21	Maruyama et al.	
18	6027097	A	2000-02-22	Humphreys et al.	
19	6040523	A	2000-03-21	Cunningham	

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Attorney Docket Number		00684.003330.18

	20	6079593	A	2000-06-27	Konrad	
	21	6131961	A	2000-10-17	Heilmann	
	22	6152304	A	2000-11-28	Hikita et al.	
	23	6168467	B1	2001-01-02	Chiou	
	24	6199913	B1	2001-03-13	Wang	
	25	6249501	B1	2001-06-19	Nakamura et al.	
	26	6412163	B1	2002-07-02	Russell	
	27	6501990	B1	2002-12-31	Sundberg et al.	
	28	6648715	B2	2003-11-18	Wiens et al.	
	29	6659680	B2	2003-12-09	Wyer	
	30	6698966	B2	2004-03-02	Hilton et al.	

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	Art Unit	2852
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	31	6874220	B1	2005-04-05	Jones	
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	1	0796405	EP	B1	2001-02-21	ITT MFG ENTERPRISES INC		<input type="checkbox"/>

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	1	Defendant's Amended Invalidity Contentions Pursuant to Local Patent Rule 4.3, dated April 9, 2014, in Case No. 1:11-cv-03855-RLV in the U.S. District Court, Northern District of Georgia, Atlanta Division.	<input type="checkbox"/>

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- See attached certification statement.
- The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.
- A certification statement is not submitted herewith.

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Signature	/Scott D. Malpede/	Date (YYYY-MM-DD)	2014-04-25
Name/Print	Scott D. Malpede	Registration Number	32,533

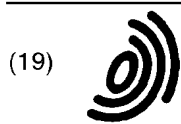
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(11) **EP 0 796 405 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

- (45) Date of publication and mention of the grant of the patent:  
**21.02.2001 Bulletin 2001/08**
- (21) Application number: **95940756.0**
- (22) Date of filing: **17.11.1995**
- (51) Int Cl.7: **F16L 37/084**
- (86) International application number:  
**PCT/US95/15074**
- (87) International publication number:  
**WO 96/18842 (20.06.1996 Gazette 1996/28)**

(54) **SQUEEZE-TO-RELEASE QUICK CONNECTOR WITH SNAP-IN RETAINER**  
**EINE DURCH QUETSCHEN LÖSBARE SCHNELLKUPPLUNG MIT SCHNAPPVERSCHLUSS**  
**RACCORD RAPIDE A LIBERATION PAR PRESSION A RETENUE PAR ENCLIQUETAGE**

- |   |  |
|---|--|
| (84) Designated Contracting States:<br><b>DE ES FR GB</b>   | (72) Inventor: <b>JACKOWSKI, Keith T.</b><br><b>Romeo, MI 48065 (US)</b>   |
| (30) Priority: <b>14.12.1994 US 355679</b>  | (74) Representative:<br><b>Dreiss, Fuhlendorf, Steimle &amp; Becker</b><br><b>Postfach 10 37 62</b><br><b>70032 Stuttgart (DE)</b> |
| (43) Date of publication of application:<br><b>24.09.1997 Bulletin 1997/39</b>                        | (56) References cited:<br><b>EP-A- 0 459 812</b> <b>WO-A-93/20379</b><br><b>US-A- 4 793 639</b>                                    |
| (73) Proprietor: <b>ITT MANUFACTURING ENTERPRISES, INC.</b><br><b>Wilmington, Delaware 19801 (US)</b> |  |

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**EP 0 796 405 B1**



**Description**BACKGROUND OF THE INVENTIONField of the Invention:

[0001] The present invention relates to snap-fit or quick connectors, and more particularly to such connectors which are employed in fluid conduit systems to facilitate assembly and disassembly, according to the preamble of claim 1.

Description of the Art:

[0002] Snap-fit or quick connectors have been found to be useful in a wide range of applications. In particular, they are frequently employed for joining fluid carrying conduits in automotive and industrial applications. Such connectors have found general acceptance as they are typically capable of being closed in a single uniaxial movement which facilitates automated assembly, and entail simple designs which are relatively inexpensive to produce.

[0003] A further advantage of quick connect fittings is that they provide an effective seal for handling volatile or hazardous fluids, such as gasoline, while permitting ease of disassembly and reassembly during repair of a host system. Although tools are often required to effect release of quick connect fittings, designs such as those described in U.S. Pat. Nos. 3,990,727, 4,844,512 and 4,991,882 provide for manual release of the fitting without the necessity of separate tools. Although representing an advancement in the art, such "squeeze-to-release" designs often have certain shortcomings.

[0004] In applications where hazardous material is to flow through a fitting, prevention of inadvertent release is of primary concern. Accordingly, relatively high axial pull-apart strength specifications are mandated. In order to comply with such specifications, manufacture's of prior art designs typically employed material with a relatively high characteristic flex modulus (such as glass filled Nylon 12) to prevent warping or deformation of abutting locking surfaces within the connector under axial loading conditions. Unfortunately, materials with increased flex modulus are inherently stiffer and can require substantially higher release forces. A related problem is found in that the stiffer material tolerates only relatively short radial displacement of the female connector abutment surface to effect release. This provides relatively little "purchase" (or degree of radial overlap) of the mating abutment surfaces in the engaged condition, thereby exacerbating potential pull apart problems.

[0005] Lastly, known prior art designs were prone to fatigue leading to failure after a relatively small number of engagement-disengagement cycles.

[0006] The squeeze-to-release quick connector shown in U.S. Patent No. 5,213,376, assigned to the assignee of the present invention, was designed to over-

come these shortcomings. This connector has a pair of parallel arranged beam members, each affixed at one end to a retaining ring and at the other end to a mount located on the outside surface of the body portion of a female connector member. Two or more spaced detents extend inwardly from the retaining ring to capture an abutment surface of a male connector member to effect positive axial engagement between the female and male members. The beam members preferably extend axially a distance approximately equal to the characteristic inner diameter of the body portion of the female member.

[0007] While the connector shown in U.S. Patent No. 5,213,376 provides positive axial engagement and quick and easy squeeze release of the two connector members, it would be desirable to further improve this connector to provide greater flexure for an easier squeeze release with less force; while still retaining positive axial engagement between the two connector members and a high pulloff strength when the connector members are in their connected state.

[0008] To meet these objectives, a squeeze-to-release quick connector was developed for the assignee of the subject invention as shown in Fig. 1. This quick connector 10 includes a female connector part 12 having an elongated body with an internal stepped bore extending inward from one end which communicates with a generally cylindrical bore extending to an open second end. A top hat or bushing 14 is fixedly mounted in an undercut 16 formed in the stepped bore. An O-ring seal 18 is also mounted in the stepped bore axially in line with one end of the top hat 14. An annular retaining ring 20 is integrally formed with the female connector 12 and is axially spaced rightwardly, as viewed in Fig. 1, from the open first end of the female connector 12. The retaining ring 20 is joined to the remainder of the female connector 12 by two circumferentially opposed, generally parallel, axially elongated beam members 22 and 24.

[0009] The retaining ring 20 has a central opening 26 having a characteristic diameter to provide clearance for the insertion of a male connector part 28 through the retaining ring 20 and into the stepped bore of the female connector part 12. Two circumferentially spaced detents 30 extend radially inward from the retaining ring 20. Each detent 30 is angularly aligned with one of the beam members 22 and 24 and forms a radially tapering ramp surface on a side facing away from the central opening in the retaining ring 20 and a radially transverse abutment surface 32 on a side facing the open first end of the female connector part 12. A finger 34 extends axially from the abutment surface 32 on each detent 30 toward the open first end of the open female connector part 12.

[0010] The retaining ring 20 has a profile formed of upper and lower crescent portions joined at the ends thereof through web members to form a generally oval shaped profile.

[0011] The portions of the retaining ring 20 adjacent

to beam members 22 and 24 are relatively stiff while the web members are relatively compliant. This enables the connector assembly 10 to be released to enable uniaxial separation of the female connector part 12 and the male connector part 28 by grasping and squeezing together grip surfaces formed on the web members. This squeezing action causes the web members to move from their normal position in which each detent 30 engages an enlarged annular flange 36 on the male connector part 28 to a release position in which the detents 30 are momentarily radially displaced outwardly to enable release of the male connector part 28 from the female connector part 12.

**[0012]** While this squeeze-to-release quick connector design has been found to exhibit high pull off forces, and relatively low insertion forces, it would still be desirable to improve on this design to provide a squeeze-to-release quick connector which has higher pull off forces and lower insertion forces. It would also be desirable to provide a squeeze-to-release quick connector which is usable with a standard male connector part or end form having a standard diameter. It would also be desirable to provide a squeeze-to-release connector which is easy to squeeze to the release position and, even through repeated usage, does not exhibit a deterioration in connector pull out forces.

**[0013]** In WO-A-93 20 379 a quick connector is shown having a one-piece retainer. When detaching the male part the connector has to be disassembled which may cause problems with the sealing when assembling again. The EP-A-0 459 812 discloses an all plastics quick-connect coupling for hoses. When opening this coupling the sealing are removed also. The problem is to keep the sealing in the connector even when the male part is removed.

**[0014]** This object and other are achieved by a squeeze-to-release quick connector according to the features of claim 1. Preferred embodiments are mentioned in claims 2 to 19.

**[0015]** The present invention is a squeeze-to-release quick connector which provides significant advantages over previously devised squeeze-to-release quick connectors, particularly with respect to higher pullout forces and reduced insertion forces.

**[0016]** The quick connector of the present invention is adapted to form a fluid sealed coupling between a female connector component and a male connector component typically in the form of a cylindrical member having an outwardly extending angular flange with an abutment surface. The female connector part is in the form of a housing having a through bore extending from a first end to an opposed second end. Receiver means are formed on the housing for receiving a retainer in a detachable snap-together connection.

**[0017]** The retainer is in the form of an annular body having a through bore which is insertible into communication with the through bore in the housing. At least one latch arm is formed on the body of the retainer and is

detachably engagable with the receiver means on the housing. Pressure receiving portions are formed on the body of the retainer and pivotally extend from the body of the retainer opposite from the at least one latch arm. A finger extends radially inward from each pressure receiving portion to engage the abutment surface on the flange male connector part to decouplingly mount the male connector part in the housing of the female connector part.

**[0018]** In a preferred embodiment, the pressure receiving portions are preferably in the form of first and second enlarged pads which are each pivotally connected to the body of the retainer by a thin tab extending axially from the body of the retainer. First and second coupling members in the form of arcuate shaped strips or ring members are connected between one edge of each of the first and second pads to retain the first and second pads in a spaced relationship. Preferably the first and second pads are spaced 180° apart on the body of the retainer. At least one and preferably a pair of notches are formed on the juncture of the body of the retainer and each tab to provide for easy flexing of the respective first and second pads with respect to the body.

**[0019]** Further, extensions are formed on the body of the retainer and extend axially from one end of the body toward the arcuate-shaped ring members. The extensions are circumferentially spaced between the tabs connected to the first and second pads.

**[0020]** The receiver means preferably includes a lip extending radially outward from an exterior surface of the body. The lip, in a preferred embodiment, is formed as a part of a hollow receptacle mounted on or integrally formed with the housing. An aperture is formed in one end wall of the receptacle adjacent each lip.

**[0021]** Deflectable latch fingers are formed on the end of the at least one latch arm of the retainer for engaging the lip on the receiver means after the latch arm is inserted through aperture in the receiver means to decouplingly attach the retainer to the housing of the female connector part. Preferably, two spaced latch arms are provided on the retainer and engage two receivers or receptacles on the housing.

**[0022]** The squeeze-to-release quick connector of the present invention provides a significant advancement in the squeeze-to-release quick connector art, particularly by providing higher pullout forces and lower insertion forces than that provided by previously devised squeeze-to-release quick connectors. The retainer employed in the quick connector in the present invention is capable of usage with a standard diameter SAE male component or fitting having a standard outer diameter abutment flange. This eliminates the need for a specially designed male component having a larger radial flange as required in certain previously devised squeeze-to-release quick connectors. The quick connector of the present invention is also capable of repeated flexures without any deterioration in the pullout forces. The pro-

vision of easy flexing of the fingers mounted on the retainer of the present quick connector significantly reduces the insertion forces required to insert a male component or fitting into the bore in the housing female component. At the same time, the angular arrangement of the deflectable fingers on the retainer causes the fingers to forcibly engage the abutment surface on the male component to provide substantially higher pullout forces than that provided by previously devised squeeze-to-release quick connectors.

#### BRIEF DESCRIPTION OF THE DRAWING

**[0023]** The various features, advantages and other uses of the present will become more apparent by referring to the following detailed description and drawing in which:

Fig. 1 is a longitudinal cross-sectional view of a prior art squeeze-to-release quick connector;

Fig. 2 is perspective view of squeeze-to-release quick connector constructed in accordance with the teachings of the present invention;

Fig. 3 is right hand end view of the female connector part of the quick connector shown in Fig. 2;

Fig. 4 is a longitudinal cross sectional view of the quick connector shown in Fig. 3;

Fig. 5 is a partial cross sectional view, generally similar to Fig. 4, but illustrating portions of the retainer of the quick connector in a release position.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0024]** Referring now to the drawing, and to Fig. 2, 3, 4 and 5 in particular, there is depicted a squeeze-to-release quick connector 50 of the present invention. The quick connector 50 includes a female connector part 52, a retainer 54 and, as shown in Fig. 5 a male connector part or fitting 56. The quick connector 50 described in detail herein below is adapted for incorporation in a system of tubular conduits for conducting fluid flow. However, it is contemplated, that in the broadest sense, the present inventive quick connector could be readily adapted for other applications in view of the present specification.

**[0025]** The female connector part 52 is in the form of an elongated, hollow housing having a first end 58 and an opposed second end 60. A stepped bore 62 is formed within the female connector part 52 and extends axially from the open first end 58. A generally cylindrical second bore portion 64 is also formed within the female connector part 52 and extends axially from one end of the stepped bore 62 to the open second 60. A plurality of annular barbs 66 are formed on the exterior of a second end portion of the female connector part 52 for receiving a flexible conduit, not shown, thereover.

**[0026]** At least one and preferably a pair of receiver means denoted generally by reference numbers 70 and

72 are formed on the female connector part 52, as an integral one piece unitary part of the body of the female connector part 52. The receiver means 70 and 72 are diametrically opposed adjacent the open first end 58 of the female connector part 52 and provide a means for detachable receiving and mounting the retainer 54 on the female connector part 52 in the desired orientation.

**[0027]** As each receiver means 70 and 72 is identically constructed, the following description with reference to receiver means 70 will be understood to apply equally to the other receiver means 72. By way of example, the receiver means 70 is in the form of a hollow receptacle, hereafter also denoted by reference number 70, which is attached to or preferably integrally formed with the female connector part 52. The receptacle 70 is formed with a first end wall 74, an opposed second end wall 76, a top wall 78 and opposed side walls 80 and 82. An aperture 84 is formed in the first end wall 74 leaving a raised lip 86 in the end wall 74, the lip 86 extending radially outward from the housing. The radially outward edge of the lip 86 is spaced from the opposed portion of the outer wall 78 thereby forming the aperture 84 with a sufficiently sized opening to receive a portion of the retainer 54 as described hereafter.

**[0028]** As is conventional, the male connector part 56, as shown in Figs. 4 and 5 is in the form of a conduit or tube having a generally cylindrical, hollow shape. An enlarged, annular, radially outward extending flange 90 is formed on the male connector part 56 spaced from one end 92 of the male connector part 56. A first end portion 94 on the male connector part 56 extending between the one end 92 and the annular flange 90 is adapted to be slidably inserted into the stepped bore 62 of the female connector part 52 and held in a fluid sealed coupled relationship with the female connector part 52 by means of the retainer 54.

**[0029]** As shown in Figs. 2, 4 and 5, the retainer 54 is in the form of an integral, one piece body form with a suitable plastic, such as filled Nylon 12. A hollow, generally cylindrical sleeve 100 is formed at one end of the retainer 54 and is adapted to be slidably inserted through the open first end 58 and into the initial portion of the stepped bore 62 in the female connector part 52. The inner surface of the cylindrical sleeve 100 serves as a bushing or bearing surface for the male connector part 56 and eliminates the need for a separate top hat or bushing as used in previous quick connector designs shown in Fig. 1.

**[0030]** An enlarged annular ring 102 is formed at one end of the cylindrical sleeve 100 and forms a mounting base for at least one and preferably a plurality, such as two, latching means 104 and 106. Each latch means 104 and 106 is identically constructed and includes a latch arm 108 and 110, respectively, which extends axially from the annular ring 102 parallel to and spaced from the outer surface of the cylindrical sleeve 100. The outer end of each latch arm 108 and 110 terminates in an angularly bent inward latch finger 112 and 114, respective-

ly, which extends reversely from an outer end of each latch arm 108 and 110 angularly inward toward the ring 102. Each latch finger 112 and 114 is angularly disposed with respect to the adjacent portion of each respective latch arm 108 and 110.

**[0031]** Due to the flexible nature of the plastic material used to form the retainer 54, the latch fingers 112 and 114 are capable of exhibiting movement with respect to the remaining portion of each latch arm 108 and 110 so as to be urged toward the adjacent portion of each latch arm 108 and 110 as the ends of each latch arm 108 and 110 are inserted into the apertures 84 in the receivers 70 and 72, respectively. When the outer free end of each latch finger 112 and 114 clears the lip 86 formed in each receiver 70 and 72, the latch fingers 112 and 114 snap radially inward, as shown in Fig. 4, behind the raised lip 86 to detachably couple the retainer 54 to the female connector part 52. As the aperture 84 formed in each receiver 70 and 72 by the top wall 78, the side walls 80 and 82 and the one end wall 74 has a size approximate the width of each latch arm 108 and 110, the latch arms 108 and 110 are fixably held in a non-rotatable position with respect to the female connector part 52 when the latch arms 108 and 110 are snapped into the respective receiver 70 and 72.

**[0032]** The retainer 54 also includes pressure receiving portions 120 and 122 which are pivotally cantilevered from one end of each latch means 104 and 106, respectively, oppositely from the latch arms 108 and 110. Preferably, thin, flexible tabs 124 and 126 are integrally formed between one end of each latch means 104 and 106, respectively, and one of the pressure receiving portions 120 and 122. A pair of notches denoted generally by reference number 128 are formed in each tab 124 and 126 proximate the juncture of one end of each tab 124 and 126 and one end of the respective latch means 104 and 106 as shown in Fig. 2. This provides a high degree of flexibility for the tabs 124 and 126 and the pressure receiving portions 120 and 122 connected thereto which permits repeated movement of the pressure receiving portions 120 and 122 without any decrease in pull out forces of the quick connector 50 as described hereafter.

**[0033]** Each pressure receiving portion 120 and 122 is generally in the form of an enlarged pad having a suitable finger gripping surface 130 in the form of serrated edge formed on an outer surface thereof.

**[0034]** A pair of generally arcuate shaped, ring members 132 and 134 are integrally formed with and extend from opposite sides of each pressure receiving portion or pad 120 and 122 to the edge of the opposite pad 122 or 120. The ring members 132 and 134 prevent the tabs 124 and 126 from bending outwardly during removal of the male connector part 56 from the female connector part 52.

**[0035]** As shown in Fig. 2, a pair of notches 135 are formed in the first end 58 of the female connector part 52, generally diametrically opposed to each other and

located between receivers 70 and 72. The notches 135 receive guide tabs 136 diametrically formed on and projecting axially from the ring 102 of the retainer 54 to guide and align the retainer 54 in the female connector part 52 in the proper orientation.

**[0036]** An addition pair of guide members 138 are also diametrically formed on the retainer 54 and extend from the ring 102 toward the ring members 132 and 134. An outer end 140 of each guide member 138 is spaced from the ring members 132 and 134 as shown in Fig. 2. The guide members 138 prevent any misalignment of the end of the male connector part 56 during insertion of the male connector part 56 through the retainer 54 into the female connector part 52.

**[0037]** A pair of angularly disposed fingers 144 and 146 are integrally formed on the retainer 54 and extend angularly and radially inward from the pads 120 and 122, respectively, as shown in Figs. 2, 4 and 5. Each finger 144 and 146 terminates in an outer end 145 and 147, respectively, which ends 145 and 147 are spaced apart a distance less than the nominal outer diameter of the radially enlarged flange 90 on the male connector part 56. In this manner, the fingers 144 and 146 are capable of angular radially outward displacement during insertion of the male connector part 56 into the female connector part 52 so as to be more radially outward from the nominal position shown in Fig. 4 until the enlarged flange 90 on the male connector part 52 is urged past the ends 145 and 147 of the fingers 144 and 146, respectively. The fingers 144 and 146 then snap back to their nominal position to retain the flange 90 on the male connector part 56 between the ends 145 and 147 of the fingers 144 and 146, respectively, and the end of the ring 102 on the retainer 54.

**[0038]** As shown in Fig. 4, the ends 145 and 147 of the fingers 144 and 146, respectively, are spaced a predetermined distance from the end surface of the ring 102 to allow for angular displacement of the ends 145 and 147 upon the application of pressure to the pads 120 and 122 as described hereafter.

**[0039]** It should also be noted that due to angular disposition of the fingers 144 and 146, any outward force on the male connector part 56 tending to pull the male connector part 56 from the female connector part 52 will cause the ends 145 and 147 of the fingers 144 and 146 to engage a shoulder formed between the flange 90 and the cylindrical body of the male connector part 56 and act as a stop to further disengagement movement of the male connector part 56 relative to the female connector part 52.

**[0040]** The quick connector 50 is also provide with a seal means preferably in the form of an elastomeric O-ring 142 as shown in Figs. 2 and 4. The O-ring 142 has an outer diameter to fit into the step bore 62 of the female connector 52 between an annular shoulder formed in the step bore 62 and the end 101 of the sleeve 100 of the retainer 54. The O-ring 142 and the inner diameter of the sleeve 100 act as sealing surfaces to provide a

complete fluid seal between the male connector 56 and the female connector 52.

**[0041]** In use, the retainer 54 is initially coupled to the female connector part 52 by sliding the latch arms 108 and 110 into the respective receivers 70 and 72 until the latch fingers 112 and 114 snap into position behind the raised lips 86 formed in each receiver 70 and 72 as shown in Fig. 4. Next, the end portion 94 of the male connector part 56 is inserted through rings 132 and 134 and the pads 120 and 122 and the cylindrical sleeve 100 of the retainer 54 and into the stepped bore portion 62 of the female part 52 to the position shown in Figs. 4 and 5. In this position, the fingers 144 and 146 hold the male connector part 56 in the female connector part 52.

**[0042]** When it is desired to decouple the male connector part 56 from the female connector part 52 by axial movement of the male connector part 56 in the direction of arrow 150 shown in Fig. 5, inward directed pressure or force in the direction of arrows 152 in Fig. 5 is exerted on the pressure receiving portions or pads 120 and 122 causing the pads 120 and 122 to move inward toward each other as well as causing flexing of the rings 132 and 134. This inward movement of the pads 120 and 122 caused the ends 145 and 147 of the fingers 144 and 146 connected to each pad 120 and 122 to also move inward and radially outward. When the pads 120 and 122 have been moved inward a sufficient distance to the position shown in Fig. 5, the ends 145 and 147 of the fingers 144 and 146 respectively, will have moved radially outward a sufficient distance to clear a distance the outer diameter of the enlarged flange 90 on the male connector part 56 so as to enable the male part 56 to be moved axially in the direction of the arrow 150 out of the female connector part 52.

**[0043]** In summary, there has disclosed a unique squeeze-to-release quick connector which provides higher pull out forces and reduced insertion forces as compared to previously devised squeeze-to-release quick connectors. The present squeeze-to-release quick connector also is capable of repeated usages without any decrease in the pullout forces.

## Claims

1. A squeeze-to-release quick connector (50) adapted for selective locking engagement with a male connector part (56) having a radially extending abutment surface comprising:

a female housing having a through bore (62, 64) extending from a first end (58) to an opposed second end (60);  
 a retainer (54); and receiver means (70, 72);  
 the retainer (54) including:  
 a body having a through bore, the body mountable through the first end (58) of the housing into the through bore (62, 64) in the housing;

latch means (104, 106), integrally extending from the body and detachably engagable with the receiver means (70, 72), for detachably coupling the retainer (54) to the housing;  
 pressure receiving portions (120, 122) formed on the body of the retainer (54) and pivotally extending from the body;  
 a finger (144, 146) extending radially and angularly inward from each pressure receiving portion (120, 122) to engage the abutment surface on the male connector part (56) to decouplingly mount the male connector part (56) in the bore (62,64) of the housing,

characterized in that

the receiver means (70, 72) are carried externally with the housing, for receiving the retainer (54) in a detachable connection, and that inward pressure on the pressure receiving portions (120, 122) urges the finger (144, 146) out of engagement with the abutment surface on the male connector part (56) allowing separation of the male connector part (56) from the housing while the retainer (54) remains connected to the receiver means (70, 72).

2. The quick connector of claim 1 wherein the pressure receiving portions (120, 122) comprise:

first and second pads; and  
 first and second tabs (124, 126) pivotally connecting the first and second pads, respectively, to the body of the retainer (54).

3. The quick connector of claim 2 further comprising: means for coupling the first and second pads together, the coupling means including flexible strips extending between one edge of each of the first and second pads.

4. The quick connector of claim 2 or 3 wherein: the first and second pads are spaced 180° apart on the body of the retainer (54).

5. The quick connector of one of claim 2, 3 or 4 further comprising:  
 at least one notch (128) formed at a juncture of the body of the retainer (54) and each of the first and second tabs (124, 126) for flexure of the respective first and second pads with respect to the body.

6. The quick connector of one of claims 2 to 5 further comprising:

flexible strips extending between one edge of each of the first and second pads; and  
 guide members (138) formed on the body of the retainer (54) and extending axially from the body toward the flexible strips, the guide mem-

- bers (138) spaced between the first and second pads.
7. The quick connector of one of claims 1 to 6 wherein the receiver means comprises: 5  
an abutment extending radially with respect to an exterior surface of the housing.
8. The quick connector of claim 7 wherein the receiver means further comprises: 10  
a hollow receptacle having a plurality of exterior walls (74, 76, 78, 80, 82) formed on the housing; and  
an aperture (84) formed in one of the walls (74) 15  
of the receptacle between one wall (78) of the receptacle and the abutment.
9. The quick connector of claim 8 wherein: 20  
each receptacle is an integral, one piece part of the housing.
10. The quick connector of claim 7 and one of claims 1 to 9 wherein the latch means (104, 106) comprises: 25  
at least one latch arm (108, 110) mounted on the body of the retainer (54) and extending therefrom; and  
a latch finger (112, 114) integrally extending 30  
from one end of the at least one latch arm (108, 110) and angularly spaced from the at least one latch arm (108, 110), the latch finger (112, 114) engagable with the abutment in the receiver means (70, 72) to detachably couple the retainer (54) to the receiver means (70, 72). 35
11. The quick connector of one of claims 1 to 10 wherein: 40  
the latch means (104, 106) includes first and second latch arms (108, 110) extending from the body and detachably engagable with the abutment in the receiver means (70, 72) to couple the retainer (54) to the housing; 45  
the pressure receiving portions (120, 122) include first and second pressure receiving portions formed on the body of the retainer (54) and pivotally extending from the body opposite from the first and second latch arms (108, 110), the pressure portions including first and second enlarged pads each pivotally connected to the body of the retainer by a tab (124, 126); and 50  
one finger (144) extending radially and angularly inward from each of the first and second pads to engage an abutment surface on a male connector part (56) to decouplingly mount the male connector part (56) in the housing. 55
12. The quick connector of claim 10 further comprising: 60  
the receiver means (70, 72) receiving the latch arm (108, 110) and momentarily compressing the latch finger (112, 114) toward the latch arm (108, 110) prior to engagement of the latch finger (112, 114) with the abutment in the receiver means (70, 72).
13. The quick connector of one of claims 1 to 12 further comprising: 65  
cooperatingly engagable alignment means, carried on the housing and the retainer (54), for circumferentially aligning and maintaining the housing and the retainer (54) in a circumferential relationship to align the latch means (104, 106) with the receiver means (70, 72).
14. The quick connector of claim 13 wherein the cooperatingly engagable alignment means comprises: 70  
a mating projection (136) and a recess (135) formed on the housing and the retainer (54).
15. The quick connector of claim 13 or 14 wherein: 75  
the cooperatingly engagable alignment means are circumferentially spaced on the housing and the retainer (54) from the receiver means (70, 72) and the latch means (104, 106).
16. The quick connector of one of claims 1 to 15 further comprising: 80  
the finger (144, 146) includes first and second fingers extending radially and angularly inward from the first and second pressure receiving portions (120, 122), respectively, to engage an abutment surface on a male connector part (56) to decouplingly mount the male connector part (56) in the housing; and 85  
the first pressure receiving portion (120) substantially coaxially aligned with the first finger (144) and the second pressure receiving portion (122) substantially co-axially aligned with the second finger (146) such that inward pressure on the first and second pressure receiving portions (120, 122) urges the first and second fingers (144, 146) out of engagement with the abutment surface on the male connector allowing separation of the male connector from the housing while the retainer (54) remains connected to the receiver means (70, 72).
17. The quick connector of claim 16 wherein: 90  
the latch means (104, 106) includes first and second circumferentially spaced latch arms (108, 110) mounted on the body of the retainer (54) and extending therefrom, the first and second latch arms (108, 110) substantially co-axially aligned with the first and second fingers (144, 146), respectively.

18. The quick connector of one of claims 1 to 17 wherein:

the receiver means (70, 72) is carried externally with one of the retainer (54) and the housing; and

the latch means (104, 106) integrally extends from the other of the housing and the body of the retainer (54) and is detachably engagable with the receiver means for detachably coupling the retainer (54) to the housing.

19. The quick connector of one of claims 1 to 18 wherein:

each finger (144, 146) is substantially co-axially aligned with one pressure receiving portion (120, 122) such that radially inward pressure on one pressure receiving portion (120, 122) urges the corresponding finger (144, 146) out of engagement with the abutment surface on the male connector allowing separation of the male connector from the housing while the retainer (54) remains connected to the housing.

#### Patentansprüche

1. Durch Zusammendrücken lösbarer Schnellverbinder (50), welcher für einen wahlweisen Verriegelungseingriff mit einem männlichen Verbinderteil (56) ausgelegt ist, welcher eine sich radial erstreckende Anlagefläche hat, umfassend:

ein weibliches Gehäuse mit einer Durchgangsbohrung (62, 64), die sich von einem ersten Ende (58) zu einem davon abgewandten zweiten Ende (60) hin erstreckt;

einen Halter (54); und  
Aufnahmemittel (70, 72);

wobei der Halter (54) umfaßt:

einen Körper mit einer Durchgangsbohrung, wobei der Körper durch das erste Ende (58) des Gehäuses hindurch in die Durchgangsbohrung (62, 64) in dem Gehäuse montierbar ist;

Rastmittel (104, 106), die sich integral von dem Körper aus erstrecken und lösbar mit den Aufnahmemitteln (70, 72) in Eingriff bringbar sind, und zwar für eine lösbare Kupplung des Halters (54) mit dem Gehäuse;

Druckaufnahmeabschnitte (120, 122), welche an dem Körper des Halters (54) ausgebildet sind und sich in schwenkbarer Weise von dem Körper aus erstrecken;

einen Finger (144, 146), welcher sich von jedem Druckaufnahmeabschnitt (120, 122) aus radial und im Winkel einwärts erstreckt, um sich an die Anlagefläche an dem männlichen Verbinderteil (56) anzulegen und den männlichen

Verbinderteil (56) entkuppelbar in der Bohrung (62, 64) des Gehäuses zu montieren,

dadurch **gekennzeichnet**, daß die Aufnahmemittel (70, 72) außen am Gehäuse gehalten werden, um den Halter (54) in einer lösbaren Verbindung aufzunehmen, und daß ein einwärts gerichteter Druck auf die

Druckaufnahmeabschnitte (120, 122) die Finger (144, 146) außer Eingriff mit der Anlagefläche an dem männlichen Verbinderteil (56) drückt und eine Trennung des männlichen Verbinderteils (56) von dem Gehäuse erlaubt, während der Halter (54) mit den Haltemitteln (70, 72) verbunden bleibt.

2. Schnellverbinder nach Anspruch 1, bei welchem die Druckaufnahmeabschnitte (120, 122) umfassen:

erste und zweite Platten; und  
erste und zweite Stege (124, 126), welche die ersten und zweiten Platten jeweils schwenkbar mit dem Körper des Halters (54) verbinden.

3. Schnellverbinder nach Anspruch 2, ferner umfassend: Mittel zum Zusammenkuppeln der ersten und zweiten Platten, wobei die Kupplungsmittel flexible Stege umfassen, die sich zwischen einer Kante einer jeden der ersten und zweiten Platten erstrecken.

4. Schnellverbinder nach Anspruch 2 oder 3, bei welchem:

die ersten und zweiten Platten um 180° voneinander beabstandet an dem Körper des Halters (54) angeordnet sind.

5. Schnellverbinder nach einem der Ansprüche 2, 3 oder 4, ferner umfassend:

wenigstens eine Kerbe (128), die an einer Verbindungsstelle des Körpers des Halters (54) und einer jeden der ersten und zweiten Platten (124, 126) zum Zwecke einer Biegung der jeweiligen ersten und zweiten Platten gegenüber dem Körper ausgebildet ist.

6. Schnellverbinder nach einem der Ansprüche 2 bis 5, ferner umfassend:

flexible Stege, die sich zwischen einer Kante einer jeden der ersten und zweiten Platten erstrecken; und

Führungselemente (138), die an dem Körper des Halters (54) ausgebildet sind und sich axial von dem Körper zu den flexiblen Stegen hin erstrecken, wobei die Führungselemente (138) zwischen den ersten und zweiten Platten mit Abstand angeordnet sind.

7. Schnellverbinder nach einem der Ansprüche 1 bis 6, bei welchem die Aufnahmemittel umfassen: einen Anschlag, der sich gegenüber einer Außenfläche des Gehäuses radial nach außen erstreckt. 5
8. Schnellverbinder nach Anspruch 7, bei welchem die Aufnahmemittel ferner umfassen:  
ein hohles Empfangsteil mit mehreren Außenwänden (74, 76, 78, 80, 82), das an dem Gehäuse ausgebildet ist; und eine Öffnung 84, die in einer der Wände (74) des Empfangsteils zwischen einer Wand (78) des Empfangsteils und dem Anschlag ausgebildet ist. 10
9. Schnellverbinder nach Anspruch 8, bei welchem: jedes Empfangsteil ein integrales, einstückiges Teil des Gehäuses ist. 15
10. Schnellverbinder nach Anspruch 7 und einem der Ansprüche 1 bis 9, bei welchem die Rastmittel (104, 106) umfassen:  
wenigstens einen Rastarm (108, 110), welcher an dem Körper des Halters (54) montiert ist und sich von diesem aus erstreckt; und einen Rastfinger (112, 114), welcher sich integral von einem Ende des wenigstens einen Rastarmes (108, 110) aus erstreckt und von dem wenigstens einen Rastarm (108, 110) im Winkel absteht, wobei der Rastfinger (112, 114) mit dem Anschlag in den Aufnahmemitteln (70, 72) in Eingriff bringbar ist, um den Halter (54) lösbar mit den Aufnahmemitteln (70, 72) zu kuppeln. 20
11. Schnellverbinder nach einem der Ansprüche 1 bis 10, bei welchem:  
die Rastmittel (104, 106) erste und zweite Rastarme (108, 110) umfassen, die sich von dem Körper aus erstrecken und mit dem Anschlag in den Aufnahmemitteln (70, 72) lösbar in Eingriff bringbar sind, um den Halter (54) mit dem Gehäuse zu kuppeln; die Druckaufnahmeabschnitte (120, 122) erste und zweite Druckaufnahmeabschnitte umfassen, die an dem Körper des Halters (54) ausgebildet sind und sich in schwenkbarer Weise den ersten und zweiten Rastarmen (108, 110) gegenüberliegend von dem Körper aus erstrecken, wobei die Druckaufnahmeabschnitte erste und zweite erweiterte Platten umfassen, deren jede in schwenkbarer Weise mit dem Körper des Halters über einen Steg (124, 126) verbunden ist; und wobei sich ein Finger (144) radial und im Winkel 25
12. Schnellverbinder nach Anspruch 10, ferner umfassend:  
daß die Aufnahmemittel (70, 72) den Rastarm (108, 110) aufnehmen und den Rastfinger (112, 114) zeitweilig vor dem Eingriff des Rastfingers (112, 114) mit dem Anschlag in den Aufnahmemitteln (70, 72) zu dem Rastarm (108, 110) hin zusammendrücken. 30
13. Schnellverbinder nach einem der Ansprüche 1 bis 12, ferner umfassend:  
zusammenwirkend in Eingriff bringbare Ausrichtmittel, welche an dem Gehäuse und dem Halter (54) angeordnet sind, um das Gehäuse und den Halter (54) in Umfangsrichtung auszurichten und in einer gegenseitigen Lage in Umfangsrichtung zu halten, um die Rastmittel (104, 106) zu den Aufnahmemitteln (70, 72) auszurichten. 35
14. Schnellverbinder nach Anspruch 13, bei welchem die zusammenwirkend in Eingriff bringbaren Ausrichtmittel umfassen:  
einen Paßvorsprung (136) und eine Ausnehmung (135), die an dem Gehäuse bzw. dem Halter (54) ausgebildet sind. 40
15. Schnellverbinder nach Anspruch 13 oder 14, bei welchem:  
die zusammenwirkend in Eingriff bringbaren Ausrichtmittel an dem Gehäuse bzw. dem Halter (54) in Umfangsrichtung von den Aufnahmemitteln (70, 72) und den Rastmitteln (104, 106) beabstandet sind. 45
16. Schnellverbinder nach einem der Ansprüche 1 bis 15, ferner umfassend:  
der Finger (144, 146) umfaßt erste und zweite Finger, die sich jeweils von den ersten bzw. zweiten Druckaufnahmeabschnitten (120, 122) aus radial und im Winkel einwärts erstrecken, um sich an eine Anlagefläche an einem männlichen Verbinderteil (56) anzulegen und den männlichen Verbinderteil (56) entkuppelbar in dem Gehäuse zu montieren; und der erste Druckaufnahmeabschnitt (120) ist im wesentlichen koaxial zu dem ersten Finger (144) ausgerichtet, und der zweite Druckaufnahmeabschnitt (122) ist im wesentlichen koaxial zu dem zweiten Finger (146) ausgerichtet derart, daß ein einwärts gerichteter Druck auf die ersten und zweiten Druckaufnahmeab- 50



schnitte (120, 122) die ersten und zweiten Finger (144, 146) außer Eingriff mit der Anlagefläche an dem männlichen Verbinder drückt, was eine Trennung des männlichen Verbinders von dem Gehäuse erlaubt, während der Halter (54) mit den Aufnahmemitteln (70, 72) verbunden bleibt.

17. Schnellverbinder nach Anspruch 16, bei welchem: die Rastmittel (104, 106) erste und zweite, in Umfangsrichtung beabstandete Rastarme (108, 110) umfassen, die an dem Körper des Halters (54) montiert sind und sich von diesem aus erstrecken, wobei die ersten und zweiten Rastarme (108, 110) im wesentlichen jeweils koaxial zu den ersten und zweiten Fingern (144, 146) ausgerichtet sind.

18. Schnellverbinder nach einem der Ansprüche 1 bis 17, bei welchem:

die Aufnahmemittel (7, 72) extern an einem der Teile, nämlich an dem Halter (54) bzw. dem Gehäuse angeordnet sind; und die Rastmittel (104, 106) sich integral von dem jeweils anderen Teil, nämlich dem Gehäuse bzw. dem Körper des Halters (54) aus erstrecken und lösbar mit den Aufnahmemitteln in Eingriff bringbar sind, um den Halter (54) lösbar mit dem Gehäuse zu kuppeln.

19. Schnellverbinder nach einem der Ansprüche 1 bis 18, bei welchem:

jeder Finger (144, 146) im wesentlichen koaxial zu einem Druckaufnahmeabschnitt (120, 122) ausgerichtet ist derart, daß ein radial einwärts gerichteter Druck auf einen Druckaufnahmeabschnitt (120, 122) den entsprechenden Finger (144, 146) außer Eingriff mit der Anschlagfläche an dem männlichen Verbinder drückt, was eine Trennung des männlichen Verbinders von dem Gehäuse erlaubt, während der Halter (54) mit dem Gehäuse verbunden bleibt.

## Revendications

1. Raccord rapide (50) à libération par pincement, adapté pour un engagement par verrouillage sélectif avec une partie de raccord mâle (56) ayant une surface de butée en extension radiale, comprenant :

- un boîtier femelle ayant un perçage traversant (62, 64) s'étendant depuis une première extrémité (58) jusqu'à une deuxième extrémité opposée (60) ;
- un élément de retenue (54) ; et
- des moyens récepteurs (70, 72) ;

les éléments de retenue (54) incluant :

- un corps ayant un passage traversant, le corps pouvant être monté à travers la première extrémité (58) du boîtier jusque dans le perçage traversant (62, 64) dans le boîtier ;
- des moyens de blocage (104, 106), qui s'étendent intégralement depuis le corps et sont susceptibles de s'engager de manière détachable avec les moyens récepteurs (70, 72), afin d'accoupler de façon détachable l'élément de retenue (54) sur le boîtier ;
- des parties de réception de pression (120, 122) formées sur le corps de l'élément de retenue (54) et s'étendant en pivotement depuis le corps ;
- un doigt (144, 146) s'étendant radialement et sous un angle vers l'intérieur depuis chaque partie de réception de pression (120, 122) pour engager la surface de butée sur la partie de raccord mâle (56) afin d'assurer un montage de la partie de raccord mâle (56) dans le perçage (62, 64) du boîtier, d'une manière susceptible d'être déconnectée,

caractérisé en ce que les moyens récepteurs (70, 72) sont portés à l'extérieur avec le boîtier, afin de recevoir les éléments de retenue (54) suivant une connexion détachable, et en ce qu'une pression exercée vers l'intérieur sur les parties de réception de pression (120, 122) repousse le doigt (144, 146) hors d'un engagement avec la surface de butée sur la partie de raccord mâle (56) en permettant la séparation de la partie de collecteur mâle (56) depuis le boîtier tandis que l'élément de retenue (54) reste connecté sur les moyens récepteurs (70, 72).

2. Raccord rapide selon la revendication 1, dans lequel les parties de réception de pression (120, 122) comprennent :

- un premier et un deuxième patin ; et
- une première et une deuxième languette (124, 126) assurant une connexion en pivotement du premier et du deuxième patin, respectivement, sur le corps de l'élément de retenue (54).

3. Raccord rapide selon la revendication 2, comprenant en outre des moyens pour accoupler le premier et le deuxième patin ensemble, les moyens d'accouplement comprenant des rubans souples qui s'étendent depuis une bordure de chacun du premier et du deuxième patin.

4. Raccord rapide selon l'une ou l'autre des revendications 2 et 3, dans lequel le premier et le deuxième patin sont espacés l'un de l'autre de 180° sur le

- corps de l'élément de retenue (54). 72).
5. Raccord rapide selon l'une des revendications 2, 3 et 4, comprenant en outre au moins une encoche (128) formée à une jonction du corps de l'élément de retenue (54) et de chacune de la première et de la deuxième languette (124, 126) pour permettre une flexion du premier et du deuxième patin respectif par rapport au corps. 5
6. Raccord rapide selon l'une des revendications 2 à 5, comprenant en outre : 10
- des rubans souples s'étendant entre une bordure de chacun du premier et du deuxième patin ; et 15
  - des éléments de guidage (138) formés sur le corps de l'élément de retenue (54) et s'étendant axialement depuis le corps en direction des rubans souples, les éléments de guidage (138) étant espacés entre le premier et le deuxième patin. 20
7. Raccord rapide selon l'une des revendications 1 à 6, dans lequel les moyens récepteurs comprennent une butée qui s'étend radialement par rapport à une surface extérieure du boîtier. 25
8. Raccord rapide selon la revendication 7, dans lequel les moyens récepteurs comprennent en outre : 30
- un réceptacle creux ayant une pluralité de parois extérieures (74, 76, 78, 80, 82) formées sur le boîtier ; et
  - une ouverture (84) formée dans l'une des parois (74) du réceptacle entre une paroi (78) du réceptacle et la butée. 35
9. Raccord rapide selon la revendication 8, dans lequel chaque réceptacle est une partie intégrée et d'une seule pièce du boîtier. 40
10. Raccord rapide selon la revendication 7 et l'une des revendications 1 à 9, dans lequel les moyens de blocage (104, 106) comprennent : 45
- au moins un bras de blocage (108, 110) monté sur le corps de l'élément de retenue (54) et s'étendant depuis celui-ci ; et
  - un doigt de blocage (112, 114) qui s'étend de manière intégrale depuis une extrémité dudit au moins un bras de blocage (108, 110), et angulairement espacé depuis ledit au moins un bras de blocage (108, 110), ledit doigt de blocage (112, 114) étant susceptible d'engager la butée dans les moyens récepteurs (70, 72) afin d'accoupler de façon détachable l'élément de retenue (54) sur les moyens récepteurs (70, 50
11. Raccord rapide selon l'une des revendications 1 à 10, dans lequel : 55
- les moyens de blocage (104, 106) incluent un premier et un deuxième bras de blocage (108, 110) qui s'étendent depuis le corps et qui sont susceptibles d'être engagés de façon détachable avec la butée dans les moyens récepteurs (70, 72) pour accoupler l'élément de retenue (54) sur le boîtier ;
  - les parties de réception de pression (120, 122) incluent une première et une deuxième partie de réception de pression, formées sur le corps de l'élément de retenue (54) et s'étendant en pivotement depuis le corps à l'opposé du premier et du deuxième bras de blocage (108, 110), les parties de réception de pression incluant un premier et un deuxième patin élargi, connecté chacun en pivotement sur le corps de l'élément de retenue par une languette (124, 126) ; et
  - un doigt (144) qui s'étend radialement et sous un angle vers l'intérieur depuis chacun du premier et du deuxième patin pour engager une surface de butée sur une partie de raccord mâle (56) afin d'assurer un montage de la partie de raccord mâle (56) dans le boîtier avec faculté de découplage.
12. Raccord rapide selon la revendication 10, dans lequel les moyens récepteurs (70, 72) reçoivent le bras de blocage (108, 110) et compriment momentanément le doigt de blocage (112, 114) vers le bras de blocage (108, 110) avant l'engagement du doigt de blocage (112, 114) avec la butée dans les moyens récepteurs (70, 72).
13. Raccord rapide selon l'une des revendications 1 à 12, comprenant en outre des organes d'alignement susceptibles d'être engagés en coopération, portés sur le boîtier et sur l'élément de retenue (54) afin d'aligner en sens circonférentiel et de maintenir le boîtier et l'élément de retenue (54) dans une relation circonférentielle pour aligner les moyens de blocage (104, 106) avec les moyens récepteurs (70, 72).
14. Raccord rapide selon la revendication 13, dans lequel les organes d'alignement susceptibles d'être engagés en coopération comprennent une projection appariée (136) et un évidement (135) formés sur le boîtier et sur l'élément de retenue (54).
15. Raccord rapide selon l'une ou l'autre des revendications 13 et 14, dans lequel les organes d'alignement susceptibles d'être engagés en coopération

sont espacés en sens circonférentiel sur le boîtier et sur l'élément de retenue (54) depuis les moyens récepteurs (70, 72) et les moyens de blocage (104, 106).

16. Raccord rapide selon l'une des revendications 1 à 15, dans lequel :

- le doigt (144, 146) inclut un premier et un deuxième doigt qui s'étendent radialement et sous un angle vers l'intérieur depuis la première et la deuxième partie de réception de pression (120, 122), respectivement, pour engager une surface de butée sur une partie de raccord mâle (56) afin d'assurer un montage de la partie de raccord mâle (56) dans le boîtier avec faculté de découplage ; et
- la première partie de réception de pression (120) est sensiblement coaxialement alignée avec le premier doigt (144), et la deuxième partie de réception de pression (122) est sensiblement coaxialement alignée avec le deuxième doigt (146) de sorte qu'une pression exercée vers l'intérieur sur la première et la deuxième partie de réception de pression (120, 122) repousse le premier et le deuxième doigt (144, 146) hors d'un engagement avec la surface de butée sur le raccord mâle, permettant la séparation du raccord mâle depuis le boîtier tandis que l'élément de retenue (54) reste connecté sur les moyens récepteurs (70, 72).

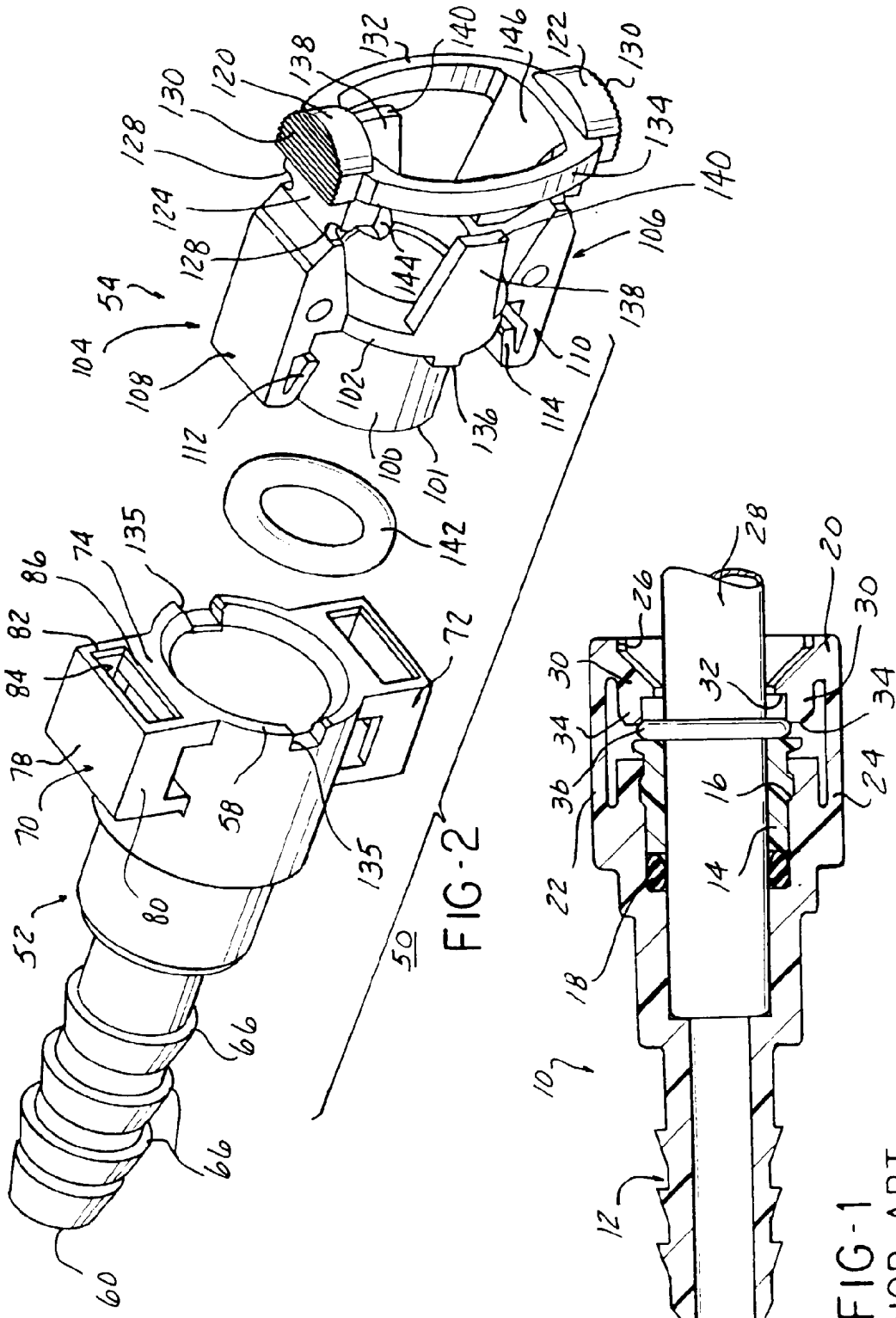
17. Raccord rapide d'un selon la revendication 16, dans lequel les moyens de blocage (104, 106) incluent un premier et un deuxième bras de blocage (108, 110) circonférentiellement écartés et montés sur le corps de l'élément de retenue (54) en s'étendant de celui-ci, le premier et le deuxième bras de blocage (108, 110) étant sensiblement coaxialement alignés avec le premier et le deuxième doigt (144, 146) respectivement.

18. Raccord rapide selon l'une des revendications 1 à 17, dans lequel :

- les moyens récepteurs (70, 72) sont portés à l'extérieur avec l'un parmi l'élément de retenue (54) et le boîtier ; et
- les moyens de blocage (104, 106) s'étendent de façon intégrale depuis l'autre parmi le boîtier et le corps de l'élément de retenue (54), et sont susceptibles d'être engagés de façon détachable avec les moyens récepteurs pour accoupler de façon détachable l'élément de retenue (54) sur le boîtier.

19. Raccord rapide selon l'une des revendications 1 à 18, dans lequel chaque doigt (144, 146) est sensi-

blement coaxialement aligné avec une partie de réception de pression (120, 122) de telle façon qu'une pression exercée radialement vers l'intérieur sur une partie de réception de pression (120, 122) repousse le doigt correspondant (144, 146) hors d'un engagement avec la surface de butée sur le raccord mâle, permettant la séparation du raccord mâle depuis le boîtier tandis que l'élément de retenue (54) reste connecté sur le boîtier.



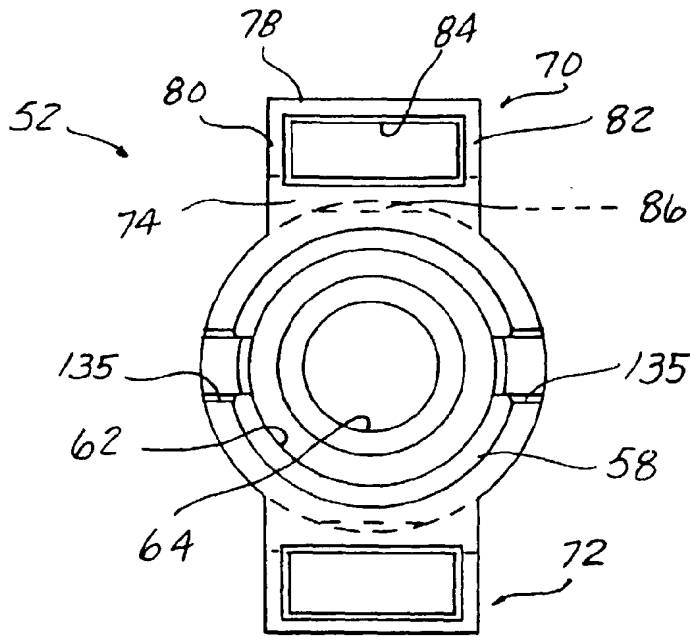


FIG-3

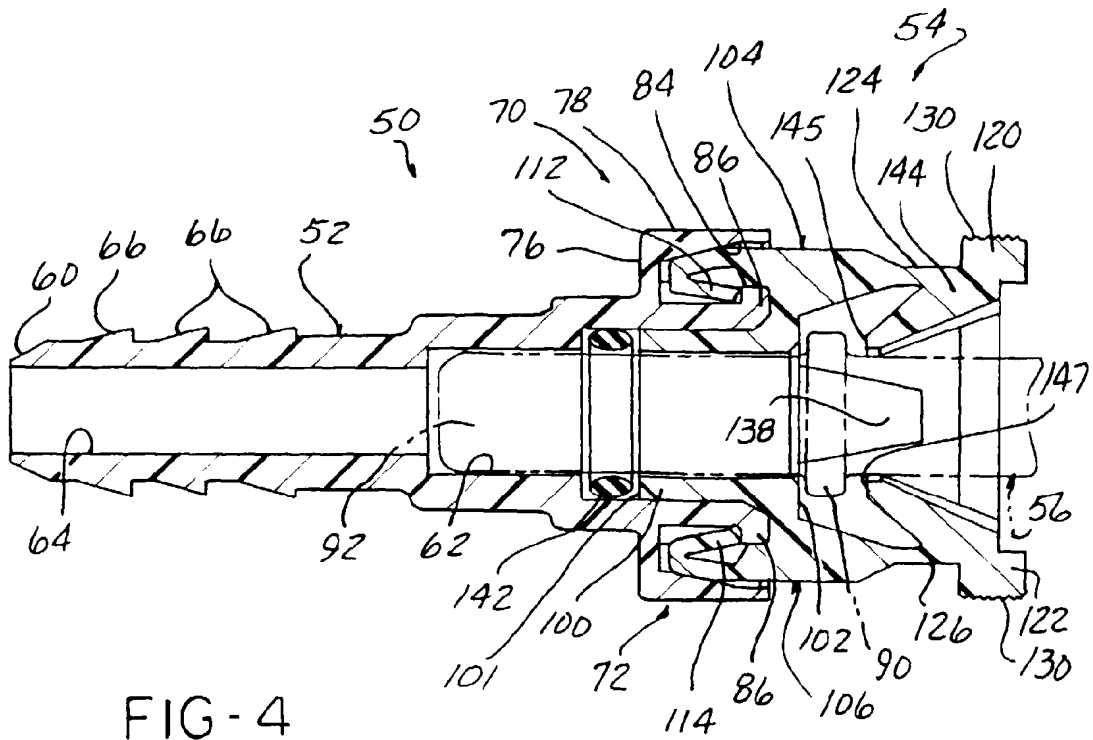
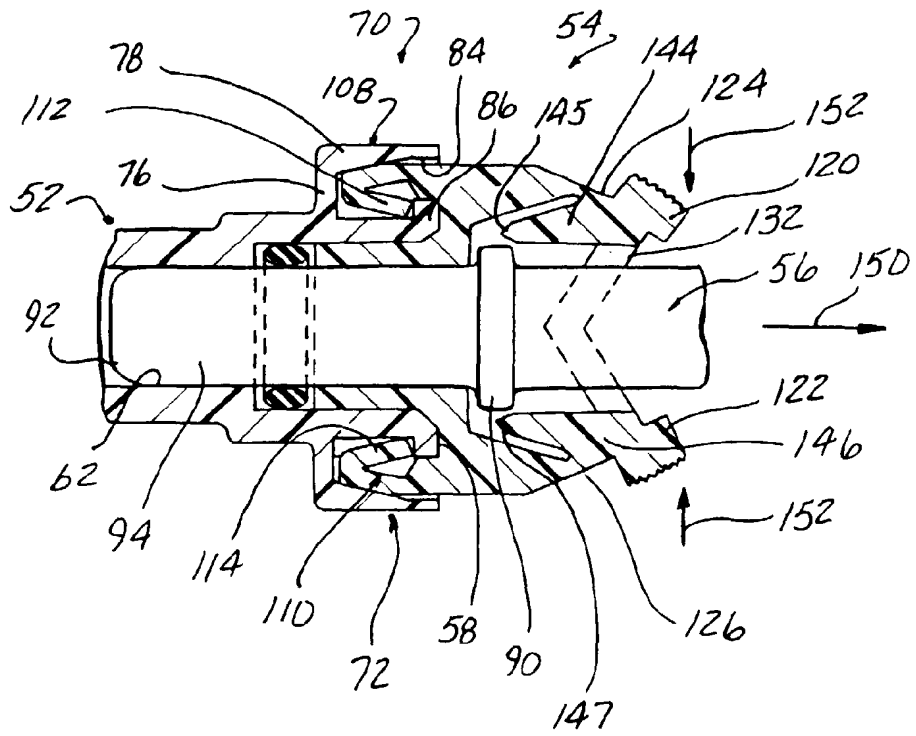


FIG-4



## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13617050
<b>Filing Date:</b>	14-Sep-2012
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Filer:</b>	Lawrence A. Stahl/Rizalina Mendiola
<b>Attorney Docket Number:</b>	00684.003330.18

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	1806	1	180	180
<b>Total in USD (\$)</b>				<b>180</b>



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	18859468
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Lawrence A. Stahl/Cu Tran
<b>Filer Authorized By:</b>	Lawrence A. Stahl
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	25-APR-2014
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	15:14:21
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$180
RAM confirmation Number	1253
Deposit Account	
Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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<b>Information:</b>					
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<b>Warnings:</b>					
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4	Non Patent Literature	DefendantsAmendedInvalidityContentions00684003330_18.pdf	4701979 4a86e5e4d2b3e9507e0e16d60b44b703754590d2	no	237
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<b>Information:</b>					
<b>Total Files Size (in bytes):</b>			6398449		

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**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/617,050	)	
	:	Examiner: Susan S. Y. Lee
First Named Inventor:	)	
YUSUKE YAMADA	:	Group Art Unit: 2852
	)	
Filed: September 14, 2012	:	Confirmation No.: 1149
	)	
For: SEALING MEMBER, TONER	:	
ACCOMMODATING	:	
CONTAINER AND IMAGE	)	
FORMING APPARATUS	:	April 25, 2014

**Mail Stop Amendment**  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

SECOND SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Madam:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56 and in accordance with the practice under 37 C.F.R. §§ 1.97 and 1.98, the Examiner’s attention is directed to the documents listed on the enclosed PTO/SB/08a.

The fee of \$180.00 pursuant to 37 C.F.R. §1.97(c)(2) and §1.17(p) is being paid electronically.

CONCLUSION

It is respectfully requested that the above information be considered by the Examiner and that an initialed copy of the enclosed Form PTO/SB/08a be returned indicating that such information has been considered.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

/Scott D. Malpede/

---

Scott D. Malpede  
Attorney for Applicant  
Registration No. 32,533

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, NY 10104-3800  
Facsimile: (212) 218-2200

SDM/rmm

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/617,050	)	
	:	Examiner: Susan S.Y. Lee
First Named Inventor:	)	
YUSUKE YAMADA	:	Group Art Unit: 2852
	)	
Filed: September 14, 2012	:	Confirmation No.: 1149
	)	
For: SEALING MEMBER, TONER	:	
ACCOMMODATING	)	
CONTAINER AND IMAGE	:	
FORMING APPARATUS	)	March 25, 2014

**Mail Stop Amendment**  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

SUBMISSION OF INFORMATION

Madam:

Enclosed for the Examiner’s information is a copy of an Australian Notice of Acceptance dated February 25, 2014, that was received in connection with Applicants’ corresponding Australian application.

The documents identified in the Australian Notice of Acceptance were cited in the Information Disclosure Statement of January 23, 2013.

It is submitted that no fee is necessary in connection with this paper. Nonetheless, any fee deemed necessary should be charged to Deposit Account No. 06-1205.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

/Scott D. Malpede/

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Scott D. Malpede  
Attorney for Applicants  
Registration No. 32,533

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, NY 10104-3800  
Facsimile: (212) 218-2200

SDM/rmm

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	18572972
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Lawrence A. Stahl/Denni Godfrey
<b>Filer Authorized By:</b>	Lawrence A. Stahl
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	25-MAR-2014
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	13:17:39
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	SubofInformation00684003330_18USA600.pdf	83728 <small>5e94cb7e998f3c5ee8e636bdfb8bdb2cc7d04ba4</small>	no	2

### Warnings:

### Information:

2	Non Patent Literature	AUNoticeofAccep00684003330 _18.pdf	120602  5874d3835253c15790c5bd152be3bcd60a 7c7cfb	no	2
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**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	204330
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

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**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**





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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/617,050 09/14/2012 Yusuke Yamada 00684.003330.18 1149

5514 7590 02/26/2014
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

EXAMINER

LEE, SUSAN SHUK YIN

ART UNIT PAPER NUMBER

2852

MAIL DATE DELIVERY MODE

02/26/2014

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.



Art Unit: 2852

The present application is being examined under the pre-AIA first to invent provisions.

## **DETAILED ACTION**

### ***Specification***

The abstract of the disclosure is objected to because it does not describe the instant invention that is now claimed. Correction is required. See MPEP § 608.01(b).

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

### ***Claim Objections***

Claims 58-66 and 74 are objected to because of the following informalities:

As to claim 58, line 2, "the displacing force receiving portion" lacks antecedent basis.

As to claim 59, line 27, "portion;" should be - - portion. - -.

As to claim 66, line 2, "the displacing force receiving portion" lacks antecedent basis.

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As to claim 74, line 2, “the displacing force receiving portion” lacks antecedent basis.

Appropriate correction is required.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit <http://www.uspto.gov/forms/>. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to <http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp>.

Claims 22, 23, 31, 32, 40, 50, 56, 57, 59, and 65 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 24, 25, 30, and 31 of U.S. Patent No. 7,647,012. Although the claims at issue are not identical, they are not patentably distinct from each other because the claims of US Patent No. 7,647,012 read on the instant invention's claims.

Claim 24 of US Patent No. 7,647,012 recites the same elements as the instant invention's claims 22 and 32 such as a toner supply container comprises a container body, and a sealing member. The sealing member includes a sealing portion and a coupling portion. The coupling portion includes a supporting portion, an engaging portion, and a displacing force receiving portion. The engaging portion has a rotational force receiving portion and a locking portion. Claim 24 of US Patent No. 7,647,012 recites the same elements as the instant invention's claims 50 and 59 such as a toner supply container comprises a container body, and a sealing member. The sealing member includes a sealing portion and a coupling portion. The coupling portion includes a supporting portion, an engaging portion, and a displacing force receiving

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portion that reads on the instant invention's "a projecting portion". Claim 25 of US Patent No. 7,647,012 recites the same elements as the instant invention's claims 23, 32, 57, 59 such as the coupling portion includes a plurality of supporting portions, each of which has an engaging portion and a displacing force receiving portion. Claim 31 of US Patent No. 7,647,012 recites the same elements as the instant invention's claims 31 and 40 such as the sealing portion and the coupling portion are integrally molded. Claim 30 of US Patent No. 7,647,012 recites the same elements as the instant invention's claims 56 and 65.

US Patent No. 7,647,012 differs from the instant invention by not reciting in claim 24 that the supporting portion, the engaging portion, and the displacing force receiving portion are integrally molded.

US Patent No. 7,647,012 recites in claim 24 that the supporting portion, the engaging portion, and the displacing force receiving portion are parts of the coupling portion. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make these pieces integrally molded, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893).

#### ***Allowable Subject Matter***

Claims 24-30, 33-39, 51-55, 58, 60-64, and 66 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in

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independent form including all of the limitations of the base claim and any intervening claims.

Claims 41-49 and 67-74 are allowed over the prior art of record.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUSAN LEE whose telephone number is (571)272-2137. The examiner can normally be reached on Mon. - Fri., 9:30-7:00, Second Monday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Lindsay can be reached on (571) 272-1674. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SUSAN LEE/  
Primary Examiner, Art Unit 2852

sl

Application/Control Number: 13/617,050  
Art Unit: 2852

Page 7



<b>Notice of References Cited</b>	Application/Control No. 13/617,050	Applicant(s)/Patent Under Reexamination YAMADA ET AL.	
	Examiner SUSAN LEE	Art Unit 2852	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-7647012	01-2010	Yamada et al.	----/----
	B US-			
	C US-			
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

**NON-PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

## EAST Search History

## EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3381	(g03g15/0834 or g03g15/0837 or g03g15/0839 or g03g2221/1657 or g03g2215/0678 or g03g2215/0692 or g03g2215/0668).cpc.	US-PGPUB; USPAT	OR	ON	2014/02/22 16:17
L2	165868	(toner\$1 or develop\$4) near10 (seal\$4 or gasket or cap\$4)	US-PGPUB; USPAT	OR	ON	2014/02/22 16:18
L3	1010667	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (hole\$4 or aperture or open\$4)	US-PGPUB; USPAT	OR	ON	2014/02/22 16:18
L4	127559	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)	US-PGPUB; USPAT	OR	ON	2014/02/22 16:18
L5	34950	(number or quantit\$4 or count\$4) near11 (rib\$4)	US-PGPUB; USPAT	OR	ON	2014/02/22 16:18
L6	15	L2 same L3 same L4 same L5	US-PGPUB; USPAT	OR	ON	2014/02/22 16:18
L7	68104	(toner\$1 or develop\$4) near10 (seal\$4 or gasket or cap\$4)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:18
L8	128738	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:18
L9	23267	(number or quantit\$4 or count\$4) near11 (rib\$4)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:18
L10	1079905	(project\$3 or projection or protrus\$3 or protrud\$3 or engagement or engag\$3) near11 (hole\$4 or aperture or open\$3 or opening)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:18
L11	2	L7 and L9 and L10	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:18
L12	2146	L8 and L9	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:18
L13	2	L12 and L7	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:18
L14	3	L13 or L11	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:18
L15	89	L7 and L8	FPRS; EPO; JPO;	OR	ON	2014/02/22


			DERWENT; IBM_TDB			16:18
L16	29	L15 and L10	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:18
L17	31	L14 or L16	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:18
L18	40	L7 same L8 same L10	USOCR	OR	ON	2014/02/22 16:19
L19	928	(yusuke near3 yamada).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:19
L20	537	(yutaka near3 ban).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:19
L21	470	(katsuya near3 murakami).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:19
L22	318	(fumio near3 tazawa).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:19
L23	303	(hironori near3 minagawa).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:19
L24	1674	L19 or L20 or L21 or L22 or L23	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:19
L25	58217	(number or quantit\$4 or count\$4) near11 (rib\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:19
L26	256297	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:19
L27	47	L24 and L25 and L26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2014/02/22 16:19

**EAST Search History (Interference)**

&lt;This search history is empty&gt;

**2/ 22/ 2014 4:25:39 PM**

**C:\Users\slee1\Documents\EAST\Workspaces\13617050.wsp**

<b>Index of Claims</b>  	<b>Application/Control No.</b> 13617050	<b>Applicant(s)/Patent Under Reexamination</b> YAMADA ET AL.
	<b>Examiner</b> SUSAN LEE	<b>Art Unit</b> 2852

✓	<b>Rejected</b>
=	<b>Allowed</b>


-	<b>Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	10/08/2012	05/22/2013	02/22/2014					
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	28			O					
	29			O					
	30			O					
	31			✓					
	32			✓					
	33			O					
	34			O					
	35			O					
	36			O					

<b>Index of Claims</b>  	<b>Application/Control No.</b>  13617050	<b>Applicant(s)/Patent Under Reexamination</b>  YAMADA ET AL.
	<b>Examiner</b>  SUSAN LEE	<b>Art Unit</b>  2852

✓	<b>Rejected</b>
=	<b>Allowed</b>


-	<b>Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
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	38			○					
	39			○					
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	42			=					
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	66			○					
	67			=					
	68			=					
	69			=					
	70			=					
	71			=					
	72			=					

<b><i>Index of Claims</i></b>  	<b>Application/Control No.</b> 13617050	<b>Applicant(s)/Patent Under Reexamination</b> YAMADA ET AL.
	<b>Examiner</b> SUSAN LEE	<b>Art Unit</b> 2852

✓	<b>Rejected</b>
=	<b>Allowed</b>


-	<b>Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	10/08/2012	05/22/2013	02/22/2014					
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	74			=					

<b>Search Notes</b>  	<b>Application/Control No.</b>  13617050	<b>Applicant(s)/Patent Under Reexamination</b>  YAMADA ET AL.
	<b>Examiner</b>  SUSAN LEE	<b>Art Unit</b>  2852

CPC- SEARCHED		
Symbol	Date	Examiner
g03g 15/0834, g03g 15/0837, g03g 15/0839, g03g 2221/1657, g03g 2215/0678, g03g 2215/0692, g03g 2215/0668	2/22/14	/sl/

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
399	106, 262, 119, 120	10/8/12	/sl/
222	dig.1	10/8/12	/sl/
	above to date	5/21/13	/s/
399	260	5/21/13	/sl/
	above to date	2/22/14	/sl/

SEARCH NOTES		
Search Notes	Date	Examiner
East - see text search history printout	10/8/12	/sl/
Inventor search - see text search history printout	10/8/12	/sl/
checked prior art in parent applications 13/231,388, 12/981,785, 12/615,012, 12/169,895, 11/200,179, 10/429,741, 10/076,430	10/8/12	/sl/
above to date	5/22/13	/sl/
above to date	2/22/14	/sl/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/617,050	)	
	:	Examiner: Susan S.Y. Lee
First Named Inventor:	)	
YUSUKE YAMADA	:	Group Art Unit: 2852
	)	
Filed: September 14, 2012	:	Confirmation No.: 1149
	)	
For: SEALING MEMBER, TONER	:	
ACCOMMODATING	)	
CONTAINER AND IMAGE	:	
FORMING APPARATUS	)	February 21, 2014

**Mail Stop Amendment**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

STATEMENT OF SUBSTANCE OF INTERVIEW

Madam:

Applicant wishes to thank the Examiner for the courtesy extended toward his representative during the personal interview of February 12, 2014.

The interview focused on the Preliminary Amendment filed January 31, 2014, and in particular independent Claims 22, 32, 41, 50, 59 and 67 as presented in the Preliminary Amendment. These claims were discussed *vis-à-vis* cancelled Claim 21 and selected claims in U.S. Patent No. 7,647,012, which is in the same patent family as the subject application.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

/Scott D. Malpede/

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Scott D. Malpede  
Attorney for Applicant  
Registration No. 32,533

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, NY 10104-3800  
Facsimile: (212) 218-2200

SDM/rnm  
FCHS\_WS 9898992v1.doc

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	18261602
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Lawrence A. Stahl/Cu Tran
<b>Filer Authorized By:</b>	Lawrence A. Stahl
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	21-FEB-2014
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	11:38:37
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant summary of interview with examiner	StatementofSubofInterview0068400330_18USB107.pdf	103080 314fff98ad833e4e77a413eb22970a24e5c3d7fd	no	1

### Warnings:

### Information:

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/617,050	09/14/2012	Yusuke Yamada	00684.003330.18	1149

5514                      7590                      02/19/2014  
FITZPATRICK CELLA HARPER & SCINTO  
1290 Avenue of the Americas  
NEW YORK, NY 10104-3800

EXAMINER
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LEE, SUSAN SHUK YIN

ART UNIT	PAPER NUMBER
----------	--------------

2852

MAIL DATE	DELIVERY MODE
-----------	---------------

02/19/2014

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Applicant-Initiated Interview Summary</b>	<b>Application No.</b> 13/617,050	<b>Applicant(s)</b> YAMADA ET AL.	
	<b>Examiner</b> SUSAN LEE	<b>Art Unit</b> 2852	

All participants (applicant, applicant's representative, PTO personnel):

- (1) SUSAN LEE. (3) \_\_\_\_\_.
- (2) Scott Malpede (32,533). (4) \_\_\_\_\_.

Date of Interview: 12 February 2014.

Type:     Telephonic     Video Conference  
 Personal [copy given to:  applicant     applicant's representative]

Exhibit shown or demonstration conducted:  Yes     No.  
If Yes, brief description: Toner Cartridge.

Issues Discussed    101    112    102    103    Others  
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 22, 32, 41, 50, 59, and 67.

Identification of prior art discussed: US 7,647,012.

**Substance of Interview**

(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Mr. Malpede discussed the differences between the limitations in claim 21 of this application and the limitations of the newly filed claims 22, 32, 41, 50, 59, and 67 in the RCE filed 1/31/2014. Also the reference to US 7,647,012 part of the patent family of this application was discussed specifically claim 24.

**Applicant recordation instructions:** The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview

**Examiner recordation instructions:** Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

Attachment

/SUSAN LEE/  
Primary Examiner, Art Unit 2852

## Summary of Record of Interview Requirements

### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number		13617050	
	Filing Date		2012-09-14	
	First Named Inventor	Yusuke Yamada		
	Art Unit		2852	
	Examiner Name	Susan S. Y. Lee		
	Attorney Docket Number		00684.003330.18	

U.S.PATENTS						Remove
Examiner Initial*	Cite No	Patent Number	Kind Code <sup>1</sup>	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Patent citation information please click the Add button. Add

U.S.PATENT APPLICATION PUBLICATIONS						Remove
Examiner Initial*	Cite No	Publication Number	Kind Code <sup>1</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1					

If you wish to add additional U.S. Published Application citation information please click the Add button. Add

FOREIGN PATENT DOCUMENTS								Remove
Examiner Initial*	Cite No	Foreign Document Number <sup>3</sup>	Country Code <sup>2</sup> j	Kind Code <sup>4</sup>	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T <sup>5</sup>
	1							<input type="checkbox"/>

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS				Remove
Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.		T <sup>5</sup>

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050
	Filing Date	2012-09-14
	First Named Inventor	Yusuke Yamada
	Art Unit	2852
	Examiner Name	Susan S. Y. Lee
	Attorney Docket Number	00684.003330.18

1	Court Order dated January 9, 2014, in Case No. 1:11-cv-03855-RLV in the U.S. District Court, Northern District of Georgia, Atlanta Division.	<input type="checkbox"/>
2	Special Master's Claims Construction Report and Recommendations dated November 8, 2013, in Case No. 1:11-cv-03855-RLV in the U.S. District Court, Northern District of Georgia, Atlanta Division.	<input type="checkbox"/>

If you wish to add additional non-patent literature document citation information please click the Add button **Add**

**EXAMINER SIGNATURE**

Examiner Signature		Date Considered	
--------------------	--	-----------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> See Kind Codes of USPTO Patent Documents at [www.USPTO.GOV](http://www.USPTO.GOV) or MPEP 901.04. <sup>2</sup> Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>3</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>4</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>5</sup> Applicant is to place a check mark here if English language translation is attached.



<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> ( Not for submission under 37 CFR 1.99)	Application Number	13617050
	Filing Date	2012-09-14
	First Named Inventor	Yusuke Yamada
	Art Unit	2852
	Examiner Name	Susan S. Y. Lee
	Attorney Docket Number	00684.003330.18

### CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

**OR**

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

See attached certification statement.

The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

A certification statement is not submitted herewith.

#### SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Scott D. Malpede/	Date (YYYY-MM-DD)	2014-02-03
Name/Print	Scott D. Malpede	Registration Number	32,533

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

## Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13617050
<b>Filing Date:</b>	14-Sep-2012
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Filer:</b>	Lawrence A. Stahl/Rizalina Mendiola
<b>Attorney Docket Number:</b>	00684.003330.18

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Miscellaneous:</b>				
Submission- Information Disclosure Stmt	1806	1	180	180
<b>Total in USD (\$)</b>				<b>180</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	18096457
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Lawrence A. Stahl/Cu Tran
<b>Filer Authorized By:</b>	Lawrence A. Stahl
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	03-FEB-2014
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	15:28:17
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$180
RAM confirmation Number	1957
Deposit Account	
Authorized User	

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Transmittal Letter	FirstSupplDS00684003330_18USA600.pdf	81881 dc3dc8141e565262f18aaa02970f1a06104c999a	no	2
<b>Warnings:</b>					
<b>Information:</b>					
2	Information Disclosure Statement (IDS) Form (SB08)	PTOSB08a00684003330_18USA600.PDF	612267 a2bc8d179bed5382628f03747b7b4231c801636c	no	4
<b>Warnings:</b>					
<b>Information:</b>					
A U.S. Patent Number Citation or a U.S. Publication Number Citation is required in the Information Disclosure Statement (IDS) form for autoloading of data into USPTO systems. You may remove the form to add the required data in order to correct the Informational Message if you are citing U.S. References. If you chose not to include U.S. References, the image of the form will be processed and be made available within the Image File Wrapper (IFW) system. However, no data will be extracted from this form. Any additional data such as Foreign Patent Documents or Non Patent Literature will be manually reviewed and keyed into USPTO systems.					
3	Non Patent Literature	CourtOrder00684003330_18.pdf	150404 e0b7178ae4c9cfc8644df363da00b772f35ce5b	no	2
<b>Warnings:</b>					
<b>Information:</b>					
4	Non Patent Literature	SpecialMasterClaimsConstructionReportandRecommendation00684003330_18.pdf	1597594 41860912a747a0cd1a2d5693cbb591b001a8c620	no	141
<b>Warnings:</b>					
<b>Information:</b>					
5	Fee Worksheet (SB06)	fee-info.pdf	30662 97291bde778e97b4112f764309fb0149924572c	no	2
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>				2472808	

**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/617,050	)	
	:	Examiner: Susan S. Y. Lee
First Named Inventor:	)	
YUSUKE YAMADA	:	Group Art Unit: 2852
	)	
Filed: September 14, 2012	:	Confirmation No.: 1149
	)	
For: SEALING MEMBER, TONER	:	
ACCOMMODATING	:	
CONTAINER AND IMAGE	)	
FORMING APPARATUS	:	February 3, 2014

**Mail Stop Amendment**  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

FIRST SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Madam:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56 and in accordance with the practice under 37 C.F.R. §§ 1.97 and 1.98, the Examiner’s attention is directed to the documents listed on the enclosed PTO/SB/08a.

The fee of \$180.00 pursuant to 37 C.F.R. §1.97(c)(2) and §1.17(p) is being paid electronically.

CONCLUSION

It is respectfully requested that the above information be considered by the Examiner and that an initialed copy of the enclosed Form PTO/SB/08a be returned indicating that such information has been considered.



Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

/Scott D. Malpede/

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Scott D. Malpede  
Attorney for Applicant  
Registration No. 32,533

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, NY 10104-3800  
Facsimile: (212) 218-2200

SDM/rmm

**REQUEST FOR CONTINUED EXAMINATION(RCE)TRANSMITTAL  
(Submitted Only via EFS-Web)**

Application Number	13/617,050	Filing Date	2012-09-14	Docket Number (if applicable)	00684.003330.18	Art Unit	2852
First Named Inventor	Yusuke Yamada			Examiner Name	Susan S. Y. Lee		

**This is a Request for Continued Examination (RCE) under 37 CFR 1.114 of the above-identified application.**  
Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application. The Instruction Sheet for this form is located at WWW.USPTO.GOV

**SUBMISSION REQUIRED UNDER 37 CFR 1.114**

Note: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

Previously submitted. If a final Office action is outstanding, any amendments filed after the final Office action may be considered as a submission even if this box is not checked.

Consider the arguments in the Appeal Brief or Reply Brief previously filed on \_\_\_\_\_

Other \_\_\_\_\_

Enclosed

Amendment/Reply

Information Disclosure Statement (IDS)

Affidavit(s)/ Declaration(s)

Other \_\_\_\_\_

**MISCELLANEOUS**

Suspension of action on the above-identified application is requested under 37 CFR 1.103(c) for a period of months \_\_\_\_\_ (Period of suspension shall not exceed 3 months; Fee under 37 CFR 1.17(i) required)

Other Applicants petition to extend the time for response to the final Office Action dated September 19, 2013, for two months from December 19, 2013 to February 19, 2014. The fee of \$600.00 is being paid electronically herewith.

**FEES**

**The RCE fee under 37 CFR 1.17(e) is required by 37 CFR 1.114 when the RCE is filed.**

The Director is hereby authorized to charge any underpayment of fees, or credit any overpayments, to Deposit Account No 061205

**SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED**

Patent Practitioner Signature

Applicant Signature

Signature of Registered U.S. Patent Practitioner			
Signature	/Scott D. Malpede/	Date (YYYY-MM-DD)	2014-01-31
Name	Scott D. Malpede	Registration Number	32533

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450.

*If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.*

## Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/617,050	)	
	:	Examiner: Susan S. Y. Lee
First Named Inventor:	)	
YUSUKE YAMADA	:	Group Art Unit: 2852
	)	
Filed: September 14, 2012	:	Confirmation No.: 1149
	)	
For: SEALING MEMBER, TONER	:	
ACCOMMODATING	)	
CONTAINER AND IMAGE	:	
FORMING APPARATUS	)	January 31, 2014

**Mail Stop RCE**  
 Commissioner for Patents  
 P.O. Box 1450  
 Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Sir:

Prior to examination on the merits and in response to the final Office Action dated September 19, 2013, the Examiner is respectfully requested to amend the above-identified application as follows.

IN THE CLAIMS:

Please cancel Claim 21 without prejudice or disclaimer of the subject matter recited therein.

Please add new Claims 22-74 as follows.

1. to 21. (Cancelled)

22. (New) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body, the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force for rotating the sealing member and the container body about the rotation axis of the container body, the coupling portion including:

ii-ii-i) a supporting portion provided on the sealing portion, the supporting portion being elastically displaceable in an inward direction toward the rotation axis of the container body and elastically restorable in an outward direction away from the rotation axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of the supporting portion and being displaceable with the supporting portion, the engaging portion including:

ii-ii-ii-i) a rotational force receiving portion capable of being abutted in a direction that is concentric with a circumference of the cylindrical portion of the container body to receive a rotational drive force for rotating the sealing member and the container body; and

ii-ii-ii-ii) a locking portion capable of being abutted in a direction parallel to the rotation axis of the container body to enable the relative movement of the sealing member and the container body from the first position, in which the opening is sealed, to the second position, in which the opening is unsealed; and

ii-ii-iii) a displacing force receiving portion provided on the supporting portion at a position closer to the container body than the engaging portion, the displacing force receiving portion being displaceable with the supporting portion and having a radially outermost part that is more remote from the rotation axis of the container body than a radially outermost part of the engaging portion,

wherein the supporting portion, the engaging portion, and the displacing force receiving portion are integrally molded.

23. (New) The toner supply container of claim 22, wherein the coupling portion includes a plurality of supporting portions, each of which has an engaging portion and a

displacing force receiving portion, and wherein the supporting portions are arranged discretely in a rotational direction of the coupling portion.

24. (New) The toner supply container of claim 22, wherein the engaging portion and the displacing force receiving portion are disposed along a line parallel to the rotation axis of the container body.

25. (New) The toner supply container of claim 22, wherein the engaging portion extends radially outwardly from the supporting portion.

26. (New) The toner supply container of claim 22, wherein the supporting portion has a uniform width over its entire length.

27. (New) The toner supply container of claim 22, wherein the engaging portion and the supporting portion have a same width.

28. (New) The toner supply container of claim 22, wherein the supporting portion is wider than the displacing force receiving portion.

29. (New) The toner supply container of claim 22, wherein the locking portion comprises a surface perpendicular to a line parallel to the rotation axis of the container body.

30. (New) The toner supply container of claim 29, wherein the rotational force receiving portion comprises a surface perpendicular to the locking portion surface.



31. (New) The toner supply container of claim 22, wherein the sealing portion and the coupling portion are integrally molded.

32. (New) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body, the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force for rotating the sealing member and the container body about the rotation axis of the container body, the coupling portion including:

ii-ii-i) at least two supporting portions provided on the sealing portion at diametrically opposed positions, each supporting portion being elastically displaceable in an inward direction toward the rotation axis of the container body and elastically restorable in an outward direction away from the rotation axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of each supporting portion and being displaceable with the supporting portion on which it is provided, each engaging portion including:

ii-ii-ii-i) a rotational force receiving portion capable of being abutted in a direction that is concentric with a circumference of the cylindrical portion of the container body to receive a rotational drive force for rotating the sealing member and the container body; and

ii-ii-ii-ii) a locking portion capable of being abutted in a direction parallel to the rotation axis of the container body to enable the relative movement of the sealing member and the container body from the first position, in which the opening is sealed, to the second position, in which the opening is unsealed; and

ii-ii-iii) a displacing force receiving portion provided on each supporting portion at a position closer to the container body than the engaging portion provided at the free end of that supporting portion, the displacing force receiving portion being displaceable with the supporting portion on which it is provided and having a radially outermost part that is more remote from the rotation axis of the container body than a radially outermost part of the engaging portion provided at the free end of that supporting portion.

33. (New) The toner supply container of claim 32, wherein the engaging portion and the displacing force receiving portion of each supporting portion are disposed along a line parallel to the rotation axis of the container body.

34. (New) The toner supply container of claim 32, wherein each engaging portion extends radially outwardly from its respective supporting portion.

35. (New) The toner supply container of claim 32, wherein each supporting portion has a uniform width over its entire length.

36. (New) The toner supply container of claim 32, wherein each engaging portion has a same width as the supporting portion on which it is provided.

37. (New) The toner supply container of claim 32, wherein each supporting portion is wider than the displacing force receiving portion provided on that supporting portion.

38. (New) The toner supply container of claim 32, wherein each locking portion comprises a surface perpendicular to a line parallel to the rotation axis of the container body.

39. (New) The toner supply container of claim 38, wherein each rotational force receiving portion comprises a surface perpendicular to the locking portion surface.

40. (New) The toner supply container of claim 32, wherein the sealing portion and the coupling portion are integrally molded.

41. (New) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body, the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force for rotating the sealing member and the container body about the rotation axis of the container body, the coupling portion including:

ii-ii-i) a plurality of supporting portions provided on the sealing portion, each supporting portion being elastically displaceable in an inward direction toward the rotation axis of the container body and elastically restorable in an outward direction away from the rotation axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of each supporting portion and being displaceable with the supporting portion on which it is provided, each engaging portion including:

ii-ii-ii-i) a rotational force receiving portion capable of being abutted in a direction that is concentric with a circumference of the cylindrical portion of the container body to receive a rotational drive force for rotating the sealing member and the container body; and

ii-ii-ii-ii) a locking portion capable of being abutted in a direction parallel to the rotation axis of the container body to enable the relative movement of the sealing member

and the container body from the first position, in which the opening is sealed, to the second position, in which the opening is unsealed; and

ii-ii-iii) a displacing force receiving portion provided on each supporting portion at a position closer to the container body than the engaging portion provided at the free end of that supporting portion, the displacing force receiving portion being displaceable with the supporting portion on which it is provided and having a radially outermost part that is more remote from the rotation axis of the container body than a radially outermost part of the engaging portion provided at the free end of that supporting portion,

wherein the engaging portions of at least two supporting portions are provided at diametrically opposed positions.

42. (New) The toner supply container of claim 41, wherein the engaging portion and the displacing force receiving portion of each supporting portion are disposed along a line parallel to the rotation axis of the container body.

43. (New) The toner supply container of claim 41, wherein each engaging portion extends radially outwardly from its respective supporting portion.

44. (New) The toner supply container of claim 41, wherein each supporting portion has a uniform width over its entire length.

45. (New) The toner supply container of claim 41, wherein each engaging portion has a same width as the supporting portion on which it is provided.

46. (New) The toner supply container of claim 41, wherein each supporting portion is wider than the displacing force receiving portion provided on that supporting portion.

47. (New) The toner supply container of claim 41, wherein each locking portion comprises a surface perpendicular to a line parallel to the rotation axis of the container body.

48. (New) The toner supply container of claim 47, wherein each rotational force receiving portion comprises a surface perpendicular to the locking portion surface.

49. (New) The toner supply container of claim 41, wherein the sealing portion and the coupling portion are integrally molded.

50. (New) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body,

the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and

the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force, the coupling portion including;

ii-ii-i) a supporting portion provided on the sealing portion, the supporting portion being elastically displaceable in an inward direction toward the axis of the container body and elastically restorable in an outward direction away from the axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of the supporting portion and being displaceable with the supporting portion; and

ii-ii-iii) a projecting portion provided at a position closer to the container body than the engaging portion, the projecting portion projecting radially from an outer surface of the supporting portion such that a radially outermost part of the projecting portion is more remote from the axis of the container body than a radially outermost part of the engaging portion, and the projecting portion being displaceable with the supporting portion,

wherein the supporting portion, the engaging portion, and the projecting portion are integrally molded.

51. (New) The toner supply container of claim 50, further comprising a feeding portion configured and positioned to feed the toner in the container body to discharge the toner out of the container body.

52. (New) The toner supply container of claim 51, wherein the feeding portion is integrally rotatable with the container body, and wherein the sealing member includes a

transmitting portion configured and positioned to transmit the rotational force to the container body.

53. (New) The toner supply container of claim 51, wherein the feeding portion includes a toner guiding portion extending helically on an inner surface of the container body.

54. (New) The toner supply container of claim 51, wherein the feeding portion includes a plate-like member extending substantially in a direction parallel with a rotation axis of the container body, and a plurality of projections inclined relative to the rotation axis on the plate-like member to guide the toner.

55. (New) The toner supply container of claim 54, wherein the plate-like member extends along substantially a full length of the container body.

56. (New) The toner supply container of claim 50, wherein the supporting portion is made of a plastic material so as to be elastically restorable substantially radially outwardly.

57. (New) The toner supply container of claim 50, wherein the coupling portion includes a plurality of supporting portions, each of which has an engaging portion and a displacing force receiving portion, and wherein the supporting portions are arranged discretely in a rotational direction of the coupling portion.



58. (New) The toner supply container of claim 50, wherein the engaging portion and the displacing force receiving portion are disposed along a line parallel to the rotation axis of the container body.

59. (New) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body,

the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force, the coupling portion including;

ii-ii-i) at least two supporting portions provided on the sealing portion at diametrically opposed positions, each supporting portion being elastically displaceable in an inward direction toward the axis of the container body and elastically restorable in an outward direction away from the axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of each supporting portion and being displaceable with the supporting portion, and

ii-ii-iii) a projecting portion provided on each supporting portion at a position closer to the container body than the engaging portion, the projecting portion projecting radially from an outer surface of the supporting portion such that a radially outermost part of the projecting portion is more remote from the axis of the container body than a radially outermost part of the engaging portion, and the projecting portion being displaceable with the supporting portion;

60. (New) The toner supply container of claim 59, further comprising a feeding portion configured and positioned to feed the toner in the container body to discharge the toner out of the container body.

61. (New) The toner supply container of claim 60, wherein the feeding portion is integrally rotatable with the container body, and wherein the sealing member includes a transmitting portion configured and positioned to transmit the rotational force to the container body.

62. (New) The toner supply container of claim 60, wherein the feeding portion includes a toner guiding portion extending helically on an inner surface of the container body.

63. (New) The toner supply container of claim 60, wherein the feeding portion includes a plate-like member extending substantially in a direction parallel with a rotation axis of

the container body, and a plurality of projections inclined relative to the rotation axis on the plate-like member to guide the toner.

64. (New) The toner supply container of claim 63, wherein the plate-like member extends along substantially a full length of the container body.

65. (New) The toner supply container of claim 59, wherein each supporting portion is made of a plastic material so as to be elastically restorable substantially radially outwardly.

66. (New) The toner supply container of claim 59, wherein the engaging portion and the displacing force receiving portion associated with each supporting portion are disposed along a line parallel to the rotation axis of the container body.

67. (New) A toner supply container comprising:

i) a container body configured to contain toner and rotatable about an axis thereof, the container body including a cylindrical portion and an opening provided at one axial end portion thereof and configured to permit discharge of the toner contained in the container body; and

ii) a sealing member provided at the one axial end portion of the container body, the sealing member being movable relative to the container body in an axial direction of the container body,

the sealing member including:

ii-i) a sealing portion provided at a side adjacent the container body and configured to seal the opening when the sealing member and the container body are in a first position relative

to one another, the opening becoming unsealed by relative movement of the sealing member and the container body away from one another from the first position to a second position relative to one another; and

ii-ii) a coupling portion provided at a side remote from the container body and configured and positioned to receive a rotational drive force, the coupling portion including;

ii-ii-i) a plurality of supporting portions provided on the sealing portion, each supporting portion being elastically displaceable in an inward direction toward the axis of the container body and elastically restorable in an outward direction away from the axis of the container body;

ii-ii-ii) an engaging portion provided at a free end of each supporting portion and being displaceable with the supporting portion, and

ii-ii-iii) a projecting portion provided on each supporting portion at a position closer to the container body than the engaging portion, the projecting portion projecting radially from an outer surface of the supporting portion such that a radially outermost part of the projecting portion is more remote from the axis of the container body than a radially outermost part of the engaging portion, and the projecting portion being displaceable with the supporting portion,

wherein the engaging portions of at least two supporting portions are provided at diametrically opposed positions.

68. (New) The toner supply container of claim 67, further comprising a feeding portion configured and positioned to feed the toner in the container body to discharge the toner out of the container body.

69. (New) The toner supply container of claim 68, wherein the feeding portion is integrally rotatable with the container body, and wherein the sealing member includes a transmitting portion configured and positioned to transmit the rotational force to the container body.

70. (New) The toner supply container of claim 68, wherein the feeding portion includes a toner guiding portion extending helically on an inner surface of the container body.

71. (New) The toner supply container of claim 68, wherein the feeding portion includes a plate-like member extending substantially in a direction parallel with a rotation axis of the container body, and a plurality of projections inclined relative to the rotation axis on the plate-like member to guide the toner.

72. (New) The toner supply container of claim 71, wherein the plate-like member extends along substantially a full length of the container body.

73. (New) The toner supply container of claim 67, wherein each supporting portion is made of a plastic material so as to be elastically restorable substantially radially outwardly.

74. (New) The toner supply container of claim 67, wherein the engaging portion and the displacing force receiving portion associated with each supporting portion are disposed along a line parallel to the rotation axis of the container body.

REMARKS

Claims 22-74 are presented for consideration, with Claims 22, 32, 41, 50, 59 and 67 being independent.

Claim 21 has been cancelled and replaced with Claims 22-74. No new matter is contained in the newly-submitted claims.

Claims 21 is rejected on obviousness-type double patenting grounds as allegedly being unpatentable over Claim 1 of U.S. Patent No. 7,890,027 in view of Cipolla '628. This rejection is deemed to be moot in view of the cancellation of Claim 21.

It is submitted that Applicants' invention as set forth in independent Claims 22, 32, 41, 50, 59 and 67 is patentable. In addition, dependent Claims 23-31, 33-40, 42-48, 51-58, 60-66 and 68-74 set forth additional features of Applicants' invention. Independent consideration of the dependent claims is respectfully requested.

In view of the foregoing, reconsideration and allowance of this application is deemed to be in order and such action is respectfully requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

/Scott D. Malpede/

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SDM/rmm

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	13617050
<b>Filing Date:</b>	14-Sep-2012
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Filer:</b>	Lawrence A. Stahl/Rizalina Mendiola
<b>Attorney Docket Number:</b>	00684.003330.18

Filed as Large Entity

### Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
Claims in Excess of 20	1202	33	80	2640
Independent claims in excess of 3	1201	3	420	1260

### Miscellaneous-Filing:

**Petition:**

**Patent-Appeals-and-Interference:**

**Post-Allowance-and-Post-Issuance:**

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
Extension - 2 months with \$0 paid	1252	1	600	600
<b>Miscellaneous:</b>				
Request for Continued Examination	1801	1	1200	1200
<b>Total in USD (\$)</b>				<b>5700</b>



## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	18082520
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Lawrence A. Stahl/Denni Godfrey
<b>Filer Authorized By:</b>	Lawrence A. Stahl
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	31-JAN-2014
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	14:58:28
<b>Application Type:</b>	Utility under 35 USC 111(a)

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Payment Type	Credit Card
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**File Listing:**

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Continued Examination (RCE)	RCETransmittalandEOT00684003330_18USB500_USB902.PDF	697948 cf8322b37b31a3406702336fb0941e7bd66edc0c	no	3

**Warnings:**

**Information:**

2		PrelAmd00684003330_18USB401.pdf	107889 2df58740656133317d0175d3ad810c2a1400c2c5	yes	18
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**Multipart Description/PDF files in .zip description**

Document Description	Start	End
Amendment Submitted/Entered with Filing of CPA/RCE	1	1
Claims	2	17
Applicant Arguments/Remarks Made in an Amendment	18	18

**Warnings:**

**Information:**

3	Fee Worksheet (SB06)	fee-info.pdf	35360 0b450511ea486af606d06b41e4f0070b28242270	no	2
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**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>			841197
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<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875	Application or Docket Number <b>13/617,050</b>	Filing Date <b>09/14/2012</b>	<input type="checkbox"/> To be Mailed
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ENTITY:    LARGE    SMALL    MICRO

**APPLICATION AS FILED – PART I**

FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE <small>(37 CFR 1.16(a), (b), or (c))</small>	N/A	N/A	N/A	
<input type="checkbox"/> SEARCH FEE <small>(37 CFR 1.16(k), (l), or (m))</small>	N/A	N/A	N/A	
<input type="checkbox"/> EXAMINATION FEE <small>(37 CFR 1.16(o), (p), or (q))</small>	N/A	N/A	N/A	
TOTAL CLAIMS <small>(37 CFR 1.16(i))</small>	minus 20 =	*	X \$ =	
INDEPENDENT CLAIMS <small>(37 CFR 1.16(h))</small>	minus 3 =	*	X \$ =	
<input type="checkbox"/> APPLICATION SIZE FEE <small>(37 CFR 1.16(s))</small>	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$310 (\$155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT <small>(37 CFR 1.16(j))</small>				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

**APPLICATION AS AMENDED – PART II**

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>	<b>01/31/2014</b>	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		
		*	Minus	**	=	
	Total <small>(37 CFR 1.16(i))</small>	53		20	=	33
	Independent <small>(37 CFR 1.16(h))</small>	6	Minus	***	3	=
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>					
					TOTAL ADD'L FEE	<b>3900</b>

	(Column 1)	(Column 2)	(Column 3)	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR		
		*	Minus	**	=	
	Total <small>(37 CFR 1.16(i))</small>				=	
	Independent <small>(37 CFR 1.16(h))</small>	*	Minus	***	=	
	<input type="checkbox"/> Application Size Fee <small>(37 CFR 1.16(s))</small>					
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <small>(37 CFR 1.16(j))</small>					
					TOTAL ADD'L FEE	

\* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.  
 \*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE  
/LAJUAN HICKSON/

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Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/617,050 09/14/2012 Yusuke Yamada 00684.003330.18 1149

5514 7590 09/19/2013
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

EXAMINER

LEE, SUSAN SHUK YIN

ART UNIT PAPER NUMBER

2852

MAIL DATE DELIVERY MODE

09/19/2013

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.



The present application is being examined under the pre-AIA first to invent provisions.

## **DETAILED ACTION**

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the claims at issue are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit <http://www.uspto.gov/forms/>. The filing date of the application will determine what form should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to <http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp>.

Claim 21 is rejected on the ground of nonstatutory double patenting as being unpatentable over claim 1 of U.S. Patent No. 7,890,027 in view of Cipolla et al. (4,937,628).

Claim 21 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 7,890,027 in view of Cipolla et al. (4,937,628).

US Patent No. 7,890,027 recite the same elements in claim 1 as the instant invention's claim 21, such as a container body and a coupling portion having a supporting portion, an engaging portion, and a displacing force receiving portion.

US Patent No. 7,890,027 differs from the instant invention by not disclosing a shutter for opening and closing the opening.

Cipolla et al. disclose a toner cartridge having a tube-like container 54 storing toner material and dispensing it through an opening 56. The opening 56 is provided a closure and sealing device which an interactive door frame member 59, a movable door 60 or shuttle 60 and a foam seal 61. The door or shuttle 60 is movable between an



Art Unit: 2852

open position wherein the dispensing opening is open and closed position wherein the dispensing opening is closed. Note column 6, lines 3-56, and Figs. 2 and 3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus as claimed in US Patent No. 7,890,027 with that of Cipolla to prevent the toner material from escaping from the container as disclosed by Cipolla et al. Note abstract of Cipolla et al.

### ***Response to Arguments***

Applicant's arguments with respect to claim 1 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUSAN LEE whose telephone number is (571)272-2137. The examiner can normally be reached on Mon. - Fri., 9:30-7:00, Second Monday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Lindsay can be reached on (571) 272-1674. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/SUSAN LEE/  
Primary Examiner, Art Unit 2852

sl

<b>Notice of References Cited</b>	Application/Control No. 13/617,050	Applicant(s)/Patent Under Reexamination YAMADA ET AL.	
	Examiner SUSAN LEE	Art Unit 2852	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-4,937,628	06-1990	Cipolla et al.	399/106
*	B US-7,890,027	02-2011	Yamada et al.	399/262
	C US-			
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			

**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

**NON-PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application No.: 13/617,050	)	
	:	Examiner: Susan Shuk Yin Lee
First Named Inventor:	)	
	:	Group Art Unit: 2852
Yusuke YAMADA	)	
	:	Confirmation No.: 1149
Filed: September 14, 2012	)	
	:	
For: SEALING MEMBER, TONER	)	
ACCOMMODATING CONTAINER	:	September 13, 2013
AND IMAGE FORMING APPARATUS	)	

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

STATEMENT OF SUBSTANCE OF INTERVIEW AND  
REQUEST FOR REMAILING OF OFFICE ACTION AND  
RESTART OF REPLY PERIOD

Sir:

Initially, Applicants wish to thank the Examiner for the courtesies extended to Applicants' representative during telephone discussions held on September 6, and September 10, 2013. During these discussions, Applicants' representative informed the Examiner that although an Office Action was issued on May 24, 2013 in the instant application, Applicants did not receive the mailing of the Office Action.

As discussed, Applicants further note that on September 5, 2013, an attorney of record in the application, Mr. Lawrence Stahl, received an email regarding the application from an unrelated party. In the email, the unrelated party notified Mr. Stahl that such party was in receipt

of the Office Action, which had been commingled with such party's other USPTO correspondence. A copy of the email is attached herewith.

Applicants discovered the Office Action only through receipt of the attached email and a subsequent check of the USPTO PAIR database.

Applicants submit that, as evidenced by the attached email, the Office Action was not mailed to the correct correspondence address. In accordance with MPEP 707.13, Applicants request that the USPTO re-mail the Office Action and restart the reply period from the date of remailing of the Office Action.

Applicants' undersigned attorney may be reached in the Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to the below listed address.

Respectfully submitted,

/Stephen K Yam/

---

Stephen K. Yam  
Attorney for Applicants  
Registration No. 64,927

FITZPATRICK, CELLA, HARPER & SCINTO  
1290 Avenue of the Americas  
New York, New York 10104-3800  
Facsimile: (212) 218-2200  
SKY:yr

## Yam, Stephen

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**From:** Chinaryan, Azatuhi <achinaryan@la.ladas.com>  
**Sent:** Thursday, September 05, 2013 2:30 PM  
**To:** Stahl, Lawrence  
**Subject:** Final Office Action Issued for 13/617,050  
**Attachments:** 2013-05-24 13617050-2 Final Office Action.pdf

Dear Mr. Stahl,

The USPTO accidentally sent the Final Office Action issued for the above referenced application to our office mixed together with our correspondence. Hence, I am attaching a copy of this Action in case your office didn't receive it.

Best Regards,

Aza Chinaryan (Ms.)  
Assistant to Young Seok Koo, Abhay Kulkarni & Shannon Miller



Ladas & Parry LLP | Direct: 323.988.4450 | Main: 323.934.2300 | Fax 323.934.0202  
[achinaryan@la.ladas.com](mailto:achinaryan@la.ladas.com) | [www.ladas.com](http://www.ladas.com)  
5670 Wilshire Blvd., Suite 2100, Los Angeles, California 90036 USA

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	16845625
<b>Application Number:</b>	13617050
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1149
<b>Title of Invention:</b>	SEALING MEMBER, TONER ACCOMMODATING CONTAINER AND IMAGE FORMING APPARATUS
<b>First Named Inventor/Applicant Name:</b>	Yusuke Yamada
<b>Customer Number:</b>	5514
<b>Filer:</b>	Stephen Kai-Tung Yam/Denni Godfrey
<b>Filer Authorized By:</b>	Stephen Kai-Tung Yam
<b>Attorney Docket Number:</b>	00684.003330.18
<b>Receipt Date:</b>	13-SEP-2013
<b>Filing Date:</b>	14-SEP-2012
<b>Time Stamp:</b>	11:52:40
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	00684_003330_18_Request_to _Remail_Office_Action.pdf	54383 f9cf1a92c0937f7cf1f59c7d6f8264ddb95cd 93	no	2

### Warnings:

### Information:

2	Miscellaneous Incoming Letter	00684_003330_18_Email_From _Attorney.pdf	126002  86133db87deb01b09b9f6d5a88821b8f399 b5232	no	1
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**Warnings:**

**Information:**

<b>Total Files Size (in bytes):</b>	180385
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**This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.**

**New Applications Under 35 U.S.C. 111**

**If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.**

**National Stage of an International Application under 35 U.S.C. 371**

**If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.**

**New International Application Filed with the USPTO as a Receiving Office**

**If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.**





UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/617,050 09/14/2012 Yusuke Yamada 00684.003330.18 1149

5514 7590 05/24/2013
FITZPATRICK CELLA HARPER & SCINTO
1290 Avenue of the Americas
NEW YORK, NY 10104-3800

EXAMINER

LEE, SUSAN SHUK YIN

Table with 2 columns: ART UNIT, PAPER NUMBER

2852

Table with 2 columns: MAIL DATE, DELIVERY MODE

05/24/2013

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.



## DETAILED ACTION

### *Double Patenting*

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 21 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 7,890,027 in view of Cipolla et al. (4,937,628).

US Patent No. 7,890,027 recite the same elements in claim 1 as the instant invention's claim 21, such as a container body and a coupling portion having a supporting portion, an engaging portion, and a displacing force receiving portion.

US Patent No. 7,890,027 differs from the instant invention by not disclosing a shutter for opening and closing the opening.

Cipolla et al. disclose a toner cartridge having a tube-like container 54 storing toner material and dispensing it through an opening 56. The opening 56 is provided a closure and sealing device which an interactive door frame member 59, a movable door 60 or shuttle 60 and a foam seal 61. The door or shuttle 60 is movable between an open position wherein the dispensing opening is open and closed position wherein the dispensing opening is closed. Note column 6, lines 3-56, and Figs. 2 and 3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus as claimed in US Patent No. 7,890,027 with that of Cipolla to prevent the toner material from escaping from the container as disclosed by Cipolla et al. Note abstract of Cipolla et al.

***Response to Arguments***

Art Unit: 2852

Applicant's arguments with respect to claim 1 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUSAN LEE whose telephone number is (571)272-2137. The examiner can normally be reached on Mon. - Fri., 9:30-7:00, Second Monday Off.

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Art Unit: 2852

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/SUSAN LEE/  
Primary Examiner, Art Unit 2852

sl

<b>Notice of References Cited</b>	Application/Control No. 13/617,050	Applicant(s)/Patent Under Reexamination YAMADA ET AL.	
	Examiner SUSAN LEE	Art Unit 2852	Page 1 of 1

**U.S. PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A US-4,937,628	06-1990	Cipolla et al.	399/106
*	B US-7,890,027	02-2011	Yamada et al.	399/262
	C US-			
	D US-			
	E US-			
	F US-			
	G US-			
	H US-			
	I US-			
	J US-			
	K US-			
	L US-			
	M US-			


**FOREIGN PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

**NON-PATENT DOCUMENTS**

*	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)				
	U				
	V				
	W				
	X				

\*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)  
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<b>Search Notes</b>  	<b>Application/Control No.</b>  13617050	<b>Applicant(s)/Patent Under Reexamination</b>  YAMADA ET AL.
	<b>Examiner</b>  SUSAN LEE	<b>Art Unit</b>  2852

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner
399	106, 262, 119, 120	10/8/12	/s/
222	dig.1	10/8/12	/s/
	above to date	5/21/13	/s/
399	260	5/21/13	/s/

SEARCH NOTES		
Search Notes	Date	Examiner
East - see text search history printout	10/8/12	/s/
Inventor search - see text search history printout	10/8/12	/s/
checked prior art in parent applications 13/231,388, 12/981,785, 12/615,012, 12/169,895, 11/200,179, 10/429,741, 10/076,430	10/8/12	/s/
above to date	5/22/13	/s/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

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## EAST Search History

## EAST Search History (Prior Art)


Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	("6438345").PN.	US-PGPUB; USPAT	OR	OFF	2013/05/22 18:20
L2	61	("4827307"   "4878603"   "4937628" "5268722"   "5385181"   "5526101"   "5548384"   "5579101" "5669044"   "5708925"   "5870652"   "5970291"   "6185401").PN. OR ("6438345").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2013/05/22 18:20
L3	156170	(toner\$1 or develop\$4) near10 (seal\$4 or gasket or cap\$4)	US-PGPUB; USPAT	OR	ON	2013/05/22 19:34
L4	966120	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (hole\$4 or aperture or open\$4)	US-PGPUB; USPAT	OR	ON	2013/05/22 19:34
L5	121844	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)	US-PGPUB; USPAT	OR	ON	2013/05/22 19:34
L6	33296	(number or quantit\$4 or count\$4) near11 (rib\$4)	US-PGPUB; USPAT	OR	ON	2013/05/22 19:34
L7	15	L3 same L4 same L5 same L6	US-PGPUB; USPAT	OR	ON	2013/05/22 19:34
L8	54978	(toner\$1 or develop\$4) near10 (seal\$4 or gasket or cap\$4)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L9	97891	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L10	69	L8 and L9	FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L11	841890	(project\$3 or projection or protrus\$3 or protrud\$3 or engagement or engag\$3) near11 (hole\$4 or aperture or open\$3 or opening)	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L12	40	L8 same L9 same L11	USOCR	OR	ON	2013/05/22 19:35
L13	541	(yusuke near3 yamada).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L14	284	(yutaka near3 ban).in.	US-PGPUB; USPAT; USOCR; FPRS;	OR	ON	2013/05/22 19:35

			EPO; JPO; DERWENT; IBM_TDB			
L15	194	(katsuya near3 murakami).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L16	106	(fumio near3 tazawa).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L17	156	(hironori near3 minagawa).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L18	962	L13 or L14 or L15 or L16 or L17	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L19	51589	(number or quantit\$4 or count\$4) near11 (rib\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L20	219735	(project\$4 or protrus\$3 or protrud\$4 or engage\$4 or engag\$3) near11 (rib\$4)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35
L21	46	L18 and L19 and L20	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2013/05/22 19:35

**EAST Search History (Interference)**

&lt; This search history is empty &gt;

**5/ 22/ 2013 7:43:27 PM****C:\Users\slee1\Documents\EAST\Workspaces\13617050.wsp**

<b><i>Index of Claims</i></b>  	<b>Application/Control No.</b>  13617050	<b>Applicant(s)/Patent Under Reexamination</b>  YAMADA ET AL.
	<b>Examiner</b>  SUSAN LEE	<b>Art Unit</b>  2852

✓	<b>Rejected</b>
=	<b>Allowed</b>

-	<b>Cancelled</b>
÷	<b>Restricted</b>

N	<b>Non-Elected</b>
I	<b>Interference</b>

A	<b>Appeal</b>
O	<b>Objected</b>

Claims renumbered in the same order as presented by applicant
  CPA
  T.D.
  R.1.47

CLAIM		DATE							
Final	Original	10/08/2012	05/22/2013						
	1	✓	-						
	2	-	-						
	3	-	-						
	4	-	-						
	5	-	-						
	6	-	-						
	7	-	-						
	8	-	-						
	9	-	-						
	10	-	-						
	11	-	-						
	12	-	-						
	13	-	-						
	14	-	-						
	15	-	-						
	16	-	-						
	17	-	-						
	18	-	-						
	19	-	-						
	20	-	-						
	21		✓						

Amendment

In response to the Office Action dated October 11, 2012, Applicants respectfully submit the following amendments and remarks.

In the Specification

Please enter the attached clean and marked-up copies of a Substitute Specification.

Amendments to the Claims:

Please cancel Claim 1, without prejudice to or disclaimer of the subject matter recited therein; and add Claim 21, as follows.

Claims 1 through 20 (Cancelled).

21. (New) A toner supply container detachably mountable to an assembly of an electrophotographic image forming apparatus having a hollow cylindrical driving member that has a slot formed therein, which slot extends in a circumferential direction and defines a plurality of interior surfaces of the hollow cylindrical driving member, and a hollow cylinder that is substantially concentric with the hollow cylindrical driving member, said toner supply container comprising:

i) a cylindrical container body configured to contain toner and rotatable about an axis thereof, said container body including an opening provided at a cylindrical surface of said container body and configured to permit discharge of toner contained in said container body;

ii) a shutter for opening and closing said opening; and

iii) a coupling portion provided at a side of said container body and configured and positioned to engage with the hollow cylindrical driving member so as to receive a rotational drive force, said coupling portion including:

iii-i) a supporting portion provided on said coupling portion, said supporting portion being elastically displaceable in an inward direction toward the axis of said container body and elastically restorable in an outward direction away from the axis of said container body;

iii-ii) an engaging portion provided at a free end of said supporting portion, said engaging portion configured and positioned to (a) displace in an inward direction with said supporting portion as said engaging portion enters the hollow cylindrical driving member and (b) engage with the slot of the hollow cylindrical driving member when said supporting portion elastically restores in an outward direction; and

iii-iii) a displacing force receiving portion provided at a position closer to said container body than said engaging portion, said displacing force receiving portion configured and positioned to receive a force from the hollow cylinder and cause said supporting portion to elastically displace in an inward direction.

## REMARKS

Favorable reconsideration and withdrawal of the rejection set forth in the above-mentioned Office Action in view of the foregoing amendments and the following remarks are respectfully requested.

### Claim Status

Newly-presented independent Claim 21 is now pending in the application. Claim 1 has been cancelled herein, and Claims 2 through 20 have been previously cancelled. It is respectfully submitted that no new matter has been added.

### Specification

The specification has been amended to reflect the updated domestic priority information and/or to improve its form as shown in the attached clean and marked-up copies of a Substitute Specification, including an amended Abstract. It is respectfully submitted that no new matter has been added.

### Claim Rejections

Claim 1 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claim 1 of U.S. Patent No. 6,990,301.

The rationale underlying the rejection is succinctly set forth in the Office Action.

### Response to Claim Rejection

Without conceding the propriety of the rejection, Claim 1 has been cancelled.



None of the claims of U.S. Patent No. 6,990,301 recite a toner supply container including a shutter for opening and closing an opening provided at a cylindrical surface of a container body. It is respectfully submitted that the rejection has been overcome and should be withdrawn.

Conclusion

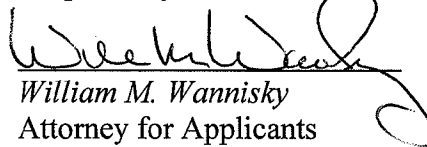
In view of the foregoing amendments and remarks, it is respectfully submitted that the pending claim is allowable, and that the application is in condition for allowance.

Favorable reconsideration and early passage to issue of the application are earnestly solicited.

The Commissioner is hereby authorized to charge any fee which may be deemed necessary in connection with this paper to Deposit Account No. 06-1205.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address given below.

Respectfully submitted,



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- 1 -

SEALING MEMBER,  
TONER ACCOMMODATING CONTAINER AND  
IMAGE FORMING APPARATUS

5 FIELD OF THE INVENTION AND RELATED ART:

This application is a divisional application of Application No. 13/231,388, filed  
September 13, 2011, which issued as U.S. Patent No. 8,290,394 on October 16, 2012, which is a  
divisional application of Application No. 12/981,785, filed December 30, 2010, which issued as  
U.S. Patent No. 8,045,901 on October 25, 2011, which is a divisional application of Application  
10 No. 12/615,012, filed November 9, 2009, which issued as U.S. Patent No. 7,890,027 on February  
15, 2011; which is divisional application of Application No. 12/169,895, filed July 9, 2008,  
which issued as U.S. Patent No. 7,647,012 on January 12, 2010; which is a divisional application  
of Application No. 11/200,179, filed August 10, 2005, which issued as U.S. Patent No. 7,430,384  
on September 30, 2008; which is a divisional application of Application No. 10/429,741 filed  
15 May 6, 2003, which issued as U.S. Patent No. 6,990,301 on January 24, 2006; and which is a  
continuation-in-part application of Application No. 10/076,430 filed February 19, 2002, which  
issued as U.S. Patent No. 6,879,789 on April 12, 2005.

The present invention relates to a toner accommodating container, a sealing member  
therefor and an image forming apparatus, suitably usable with an image forming apparatus such  
20 as a copying machine, a printer, and a facsimile machine.

In a conventional electrophotographic image forming apparatus such as an  
electrophotographic copying machine or a printer, ~~fine particles~~ particle toner is used as a

developer. When the toner in the main assembly of the electrophotographic image forming apparatus is used up, the toner is supplied into the main assembly of the image forming apparatus using a toner accommodating container (toner supply container).

5 Here, the electrophotographic image forming apparatus is an apparatus which forms images on a recording material through an electrophotographic image formation type process. The electrophotographic image forming apparatus includes [[a,]] an electrophotographic copying machine, an electrophotographic printer (laser beam printer, LED printer, for example), a facsimile machine, word processor or the like.

10 Since the toner is a very fine powder, it is known to place, upon toner supplying operation, a toner supply container inside the main assembly of the image forming apparatus and to gradually supply the toner through a small opening to avoid scattering of the toner.

15 Any one of the above-described toner supply containers receives a driving force from the main assembly of an image forming apparatus to drive the feeding member in the toner supply container or the main body itself to discharge the toner. As for such a drive transmitting means, there are some methods. For example, Japanese Laid-Open Utility Model Application Hei 05-75768 discloses that a gear portion is provided on an outer surface of the toner bottle (toner supply container), and the gear is engaged with a driving gear, by which the toner bottle is rotated.

20 Japanese Laid-open Patent Application Hei 10-63084 discloses that an end surface of the toner bottle is provided with a projection, which is engaged with a recess ~~recesses~~ formed in a

driving portion of the main assembly of the image forming apparatus, thus transmitting the driving force.

Japanese Laid-open Patent Application Hei 10-63076 discloses another type. A rotating force transmitting portion of ~~the~~ a main assembly of an image forming apparatus has an inner diameter which is provided with a plurality of engaging grooves, and the toner container is provided with projections engageable with the engaging grooves. The rotational driving force is transmitted through the engagement therebetween.

As described, various drive transmission methods are proposed for driving the toner supply container.

10 However, the conventional structures involve some problems.

In the case of Japanese Laid-Open Utility Model Application Hei 05-75768, when the toner bottle is inserted into the main assembly of the image forming apparatus, it is necessary to make the gear portion on the outer surface of the toner bottle properly engage with the driving gear portion in the main assembly of an image forming apparatus. This requires the user to be careful for the proper engagement. In addition, since the toner bottle is rotated through the meshing engagement between gears, the toner bottle receives forces tending to deviate the bottle in a direction perpendicular to the axis. Therefore, there is a possibility that the toner bottle is raised or is laterally deviated with a result of improper rotation. In ~~other~~ order to avoid such a deviation, it is required that the entire outer circumference of the toner bottle is be enclosed.

15  
20 This imposes difficulty in the toner bottle mounting and ~~mounting operation~~ demounting operations. Additionally, the supplying system becomes complicated and ~~inexpensive~~ expensive.

In the methods disclosed in Japanese Laid-open Patent Application Hei 10-63084 and Japanese Laid-open Patent Application Hei ~~10-68076~~ 10-63076, when the toner bottle is inserted such that projection (or recess) provided at the end surface of toner bottle is properly engaged with the basis (or projection) of the main assembly side driving portion (main assembly driving portion), an indexing operation in the rotational direction is required. This degrades the developer supplying operativity, and even a slight deviation may result in ~~an~~ inoperability.

In order to avoid such an improper engagement, it is required that toner bottle is provided on its outer surface with a guiding rib so as to determine the position of the toner bottle in the rotational direction upon the insertion thereof, or that a rotating operation of the engaging recess of the main assembly driving portion is controlled to stop at a predetermined rotational position whenever it stops. This also ~~results result~~ in ~~complications complication~~ and a cost increase.

In most of the coupling drive ~~transmission~~ transmissions using projection/recess engagement, when the phase deviation occurs between the toner bottle and the main assembly driving portion, it is required that the main assembly driving portion is retracted against a spring force, and the engaging position is established when the phase becomes aligned. With such a structure, even if there is a phase difference when the toner bottle is inserted, the main assembly driving portion is retracted, and when the bottle is rotated ~~with the~~ in this state, the ~~face~~ phase differences ~~is~~ are eliminated sooner or later, and therefore, the engagement is established. However, the structure of the main assembly driving portion is complicated. In addition, the main assembly driving portion has to be movable toward the rear side, which requires ~~an~~ additional space and therefore ~~hinder~~ hinders downsizing of the main assembly of the apparatus.

In the conventional example, it is not disclosed as to how to disengage the projection from the recess. Assuming that the operator forces uses force to pull the toner supply container out, or the operator pushes the small projection by the with a finger, the usability is not good, or the driving portion of the image forming apparatus or the toner supply container may be  
5 damaged.

#### SUMMARY OF THE INVENTION:

Accordingly, it is a principal object of the present invention to provide a sealing member in which a sealing member is locked with an image forming apparatus in order to open or unseal  
10 a toner discharge opening of a toner accommodating container, and yet the sealing member can be released from the image forming apparatus with a simple structure.

It is another object of the present invention to provide a toner accommodating container in which a locking portion of the toner accommodating container is locked with an image forming apparatus, and ~~the~~ the locking of the locking portion with the image forming apparatus  
15 can be released with a simple structure.

It is a further object of the present invention to provide a toner accommodating container in which a sealing member is locked with an image forming apparatus to open or unseal a toner discharge opening of the toner accommodating container, and yet the sealing member can be released from the image forming apparatus with a simple structure.

20 It is a further object of the present invention to provide an image forming apparatus in which a locking portion of a toner accommodating container is engaged with a portion to be

locked of a mounting means, and the locking portion can be released from the portion to be locked with a simple structure.

It is a further object of the present invention to provide an image forming apparatus in which a locking portion of a sealing member is engaged with a portion to be locked of the mounting means to open or unseal a toner discharge opening of a toner accommodating container, and yet the locking portion can be released from the portion to be locked with a simple structure.

These and other objects, features and advantages of the present invention will become more apparent upon a 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:

Figure 1 is a sectional view of an image forming apparatus according to an embodiment of the present invention.

Figure 2 is a perspective view of the image forming apparatus shown in Figure 1.

Figure 3 is a perspective view illustrating mounting of a toner supply container into an image forming apparatus.

Figure 4 is a front view of an image forming apparatus of Figure 1.

Figure 5 is a side view of the image forming apparatus of Figure 1.

Figure 6 is a top plan view of the image forming apparatus in which a toner container exchange front cover is shown as being in an open position.

Figures 7(A) through 7(C) are ~~Figure 7 is~~ sectional views illustrating a toner supply container mounting operation, wherein Figure 7(A) [(A)] shows an initial stage of the mounting operation, Figure 7(B) [(B)] shows the state in the process of mounting operation, and Figure 7(C) [(C)] shows the state after the completion of the mounting operation.

5           Figure 8 is a partly broken perspective view of a toner supply container according to an embodiment of the present invention.

Figure 9 is a partly enlarged ~~section of~~ sectional view of a drive transmitting portion according to an embodiment of the present invention in which a driving shaft is provided on the main body side of the toner supply container.

10           Figure 10 is a partly broken perspective view of a toner supply container according to another embodiment of the present invention.

Figure 11 is a partly enlarged ~~section of~~ sectional view of a drive transmitting portion according to another embodiment of the present invention in which a driving shaft is provided on a sealing member side.

15           Figures 12(A) through 12(C) are ~~Figure 12 is a side views~~ [(view)] of a sealing member according to an embodiment of the present invention, wherein Figure 12(A) [(A)] is a front view, Figure 12(B) [(B)] is a side view as seen in the direction X of Figure 12(A), [(A)], and Figure 12(C) [(C)] is a side view as seen in the direction Y of Figure 12(A). [(A).]

20           Figure 13 is a sectional view of a sealing member taken along a line [(x-x)] Z-Z of ~~(B)~~ of Figure [(12)] 12(B).



Figure 14 is a perspective view of a driving force transmitting portion and a driving force receiving portion according to an embodiment of the present invention.

5 Figures 15(A) through 15(C) are ~~Figure 15 is a~~ partially sectional views ~~[[view]]~~ illustrating engaging action of a drive transmitting portion of a toner bottle, in which Figure 15(A) [[(A)]] shows a state before insertion of a toner bottle, Figure 15(B) [[(B)]] shows a state in the process of insertion, and Figure 15(C) [[(C)]] shows a state after the completion of an inserting operation.

Figure 16 is a perspective view of a driving force receiving portion according to another embodiment of the present invention.

10 Figure 17 is a sectional view of the sealing member of Figure 16.

Figures 18(A) through 18(C) are illustrations ~~Figure 18 is an illustration~~ of phase alignment when the toner bottle is inserted into the main assembly of the apparatus wherein Figure 18(A) [[(A)]] shows a state in which an engaging rib and an engaging projection are aligned with each other, Figure 18(B) [[(B)]] shows a state in which they are not aligned after rotation to a certain extent, and Figure 18(C) [[(C)]] shows a state in which the engaging rib is abutted to the engaging projection to enable drive transmission.

Figures 19(A) through 19(C) show ~~Figure 19 shows~~ a sealing member according to an embodiment of the present invention, wherein Figure 19(A) [[(A)]] is a left side view, Figure 19(B) [[(B)]] is a front view, and Figure 19(C) [[(C)]] is a right-hand side view.

Figure 20 is a perspective view of a driving force transmitting portion and a driving force receiving portion according to a further embodiment of the present invention, in which phase control operation is not necessary.

5 Figures 21(A) through 21(C) illustrate ~~Figure 21 illustrates~~ the drive transmitting portion of Figure 20 during a toner bottle inserting operation, wherein Figure 21(A) [(A)] shows a state before insertion of the toner bottle, Figure 21(B) [(B)] shows a state in the process of the inserting operation, and Figure 21(C) [(C)] shows a state after completion of the inserting operation.

10 Figures 22(A) through 22(C) illustrate ~~Figure 22 illustrates~~ disengagement action at the drive transmitting portion of the toner bottle, wherein Figure 22(A) [(A)] is before disengagement, Figure 22(B) [(B)] is in the process of disengagement, and Figure 22(C) [(C)] is after completion of the disengagement action.

15 Figures 23(A) through 23(C) are ~~Figure 23 is a~~ sectional views ~~view~~ of a sealing member according to a further embodiment of the present ~~convention~~ invention, wherein Figure 23(A) [(A)] is a side view, Figure 23(B) [(B)] is a front view, and Figure 23(C) [(C)] is a sectional view.

Figure 24 is a sectional view illustrating engagement of the sealing member of Figure 23 with a driving portion.

20 Figures 25(A) through 25(C) are illustrations ~~Figure 25 is an illustration~~ of disengagement action at the drive transmitting portion of the toner bottle, wherein Figure 25(A)

[(A)] is before disengagement, Figure 25(B) [(B)] is in the process of disengagement, and Figure 25(C) [(C)] is after the completion of the disengagement action.

Figures 26(A) and 26(B) illustrate ~~Figure 26 illustrates~~ a sealing member according to a further embodiment of the present invention, wherein Figure 26(A) [(A)] is a side view, and  
5 Figure 26(B) [(B)] is a sectional view taken along a line X-X.

Figures 27(A) through 27(D) show ~~Figure 27 shows~~ a driving portion engageable with the sealing member of Figures 26(A) and 26(B) Figure 26 according to a further embodiment of the present invention, wherein Figure 27(A) [(A)] is a front view, Figure 27(B) [(B)] is a side view, Figure 27(C) [(C)] is a sectional view taken along a line C-C of Figure 27(B), [(B),]  
10 andFigure 27(D) [(C)] is a sectional view taken along a line D-D of Figure 27(A), [(A).]

Figures 28(A) through 28(C) illustrate ~~Figure 28 illustrates~~ engaging action between the sealing member of Figures 26(A) and 26(B) Figure 26 and the driving portion of Figures 27(A) through 27(D), Figure 27, wherein Figure 28(A) [(A)] shows a state in which the toner bottle is being inserted, Figure 28(B) [(B)] shows a state in the process of insertion, and Figure 28(C) [(C)] shows a state after the completion of insertion.  
15

Figures 29(A) through 29(C) illustrate ~~Figure 29 illustrates~~ disengagement action after the engagement shown in Figures 28(A) through 28(C), Figure 28, wherein Figure 29(A) [(A)] is before the disengagement, Figure 29(B) [(B)] is in the process of the disengagement, and Figure 29(C) [(C)] is after completion of the disengagement action.

Figures 30(A) and 30(B) are Figure 30 is a sectional views ~~Figure 30 is a sectional views~~ [[view]] of a sealing member according to a further embodiment of the present invention, wherein Figure 30(A) [[(A)]] is before disengagement, and Figure 30(B) [[(B)]] is in the process of disengagement.

Figure 31 is a perspective view of a toner supply container according to a further  
5 embodiment of the present invention.

Figures 32(A) through 32(C) show Figure 32 shows a sealing member according to a modified embodiment of Embodiment 2.

Figure 33 is a perspective view illustrating a drive transmission for a photosensitive drum according to a further embodiment of the present invention.

10 ~~Figure 34~~ Figures 34(A) and 34(B) schematically shows show the sealing member which is rotating.

~~Figure 35 illustrates~~ Figures 35(A) through 35(C) illustrate another example in which the phase alignment is not required.

~~Figure 36 is a section of view Figure 36(A) shows in which~~ the sealing member shown in  
15 ~~Figure 35~~ Figures 35(A) through 35(C) and is engaged with the driving portion, and Figure 36(B) shows a sectional view of the sealing member engaged with the driving portion.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS:

A sealing member, a toner accommodating container and an image forming apparatus  
20 according to the preferred embodiments of the present invention will be described in conjunction with the accompanying drawings.

(Embodiment 1)

Referring to Figure 1, ~~the~~ a description will first be made as to an electrophotographic image forming apparatus which is an exemplary image forming apparatus ~~to~~ which is mounted with a toner supply container (toner accommodating container) according to an embodiment of  
5 the present invention.

(Electrophotographic image forming apparatus)

Figure 1 shows an electrophotographic copying machine. An original 101 in a main assembly (main assembly of the apparatus) 100 is placed on an original supporting platen glass 102. A light image corresponding to the image information of the original 101 is an image on an  
10 electrophotographic photosensitive drum (image bearing member) 104 through a plurality of mirrors M and a lens Ln of an optical portion ~~[[103.On]]~~ 103. On the basis of selection by the user on an operating portion 100a shown in Figure 2 or on the basis of automatic selection in accordance with the paper size of the original 101, an optimum sheet P is selected from the cassettes 105, 106, 107, 108. The recording material is not limited to the sheet of paper, but may  
15 be an OHP sheet, for example.

A single sheet P supplied from one of separating devices 105A, 106A, 107A, 108A, is fed to registration rollers 110 by way of a feeding portion 109, and the sheet P is fed to the transfer portion by the registration rollers 110 in synchronism with the rotation of the photosensitive drum 104 and the scanning timing of the optical portion 103. In the transfer portion, a toner  
20 image formed on the photosensitive drum 104 is transferred onto the sheet P by the transfer

discharger ~~[[111.]]~~ 111. The sheet P now having the transferred toner image is separated from the photosensitive drum 104 by a separation discharger 112.

The sheet P is fed into a fixing portion 114 by a feeding portion 113. In the fixing portion 114, the toner image is fixed on the sheet P by heat and pressure. Thereafter, the sheet P is  
5 passed through a discharged sheet reversing portion 115 and discharged to a sheet discharge tray 117 by sheet discharging rollers 116 in the case of a ~~one-sided~~ one-sided copy mode. In the case of a duplex copy mode, the sheet P is ~~refed~~ re-fed to the registration rollers 110 through sheet refeeding paths 119, 120, under the control of a flapper 118 provided in the discharged sheet reversing portion 115. Then, the sheet is fed similarly to the case of the one-sided copy mode,  
10 and is finally discharged to the sheet discharge tray 117.

In the case of a superimposed copy mode, the sheet P is temporarily and partly discharged by the sheet discharging rollers 116 through the discharged sheet reversing portion 115. Thereafter, at the timing when the trailing edge of the sheet passes by the flapper 118 while it is still nipped by the sheet discharging rollers 116, the flapper 118 is controlled, and the sheet  
15 discharging roller 116 is rotated in the reverse direction, so that it is ~~refed~~ re-fed into the main assembly 100. Thereafter, the sheet is fed to the registration rollers 110 through the sheet refeeding portions 119, 120, and then the sheet is processed similarly to the case of the one-sided copy mode. It is finally discharged to the sheet discharge tray 117.

In the main assembly 100 of the apparatus, there are provided a developing device 201  
20 (developing means), a cleaning device 202, the primary charger 203 and so on, around the photosensitive drum 104.

An electrostatic latent image is formed by exposing the photosensitive drum 104 to uniformly ~~to~~ double to the image light corresponding to the image information of the original 101. The electrostatic latent image is developed with toner by a developing device 201. In order to supply the toner (developer) into the developing device 201, a toner supply container 1 is detachably mountable by the user into the main assembly 100 of the apparatus. The present invention ~~needs~~ is applicable to the case in which only the toner is supplied into the image forming apparatus from the toner supply container and to the case in which the toner and carrier are supplied therefrom. In this embodiment, the former is the case.

The developing device 201 comprises a toner hopper 201a (accommodating means) and a developing device 201b. The toner hopper 201a is provided with a stirring member 201c for stirring the toner supply designated from the toner supply container 1. The toner stirred by the stirring member 201c is supplied into the developing device 201b by a magnet roller 201d. The developing device 201b comprises a developing roller 201f and a feeding member 201e. The toner fed from the toner hopper 201a by the magnet roller 201d is fed to the developing roller 201f by the feeding member 201e, and ~~it~~ is supplied to the photosensitive drum 104 by the developing roller 201f.

The cleaning device 202 functions to remove the toner remaining on the photosensitive drum 104. The primary charger 203 functions to electrically charge the photosensitive drum 104.

When the user opens a front cover 15 for exchange of the toner supply container (~~front cover~~) which is a part of an outer casing shown in Figure 2, a container receiving tray 50, which is a part of the mounting means, is drawn out to a predetermined position by an

unshown driving system. The user places the toner supply container 1 on the container receiving tray 50. When the user takes the toner supply container 1 out of the main assembly 100 of the apparatus, the container receiving tray 50 is drawn out, and the toner supply container 1 is taken out of the tray 50.

5           The front cover 15 is provided exclusively for mounting and demounting (exchange) of the toner supply container 1, and therefore, it is opened and closed only for ~~the~~ that purpose. When the maintenance operation for the main assembly 100 of the apparatus is to be carried out, the front cover 100c is opened.

10           The toner supply container 1 may be directly mounted to the main assembly 100 of the apparatus, and may be taken out.

(Toner supply operation)

15           Referring to ~~Figure 7, (A), Figure 7, (C)~~ 7(A) and Figure 7(C), the toner supply operation from the toner supply container (toner bottle) in this embodiment, will be described. ~~Figure 7, (A) - (C) illustrates~~ Figures 7(A) - 7(C) illustrate the process of toner supply in which the toner bottle 1 of this embodiment is inserted into the main assembly 100 of the apparatus.

20           As shown in the ~~Figure~~ Figures, the main assembly 100 of the ~~its~~ apparatus is provided with a toner supply device 400, and the toner supply device 400 is provided with a driving portion (driving force transmitting portion) 20 for ~~collecting~~ connecting with and rotating the toner bottle 1. The driving portion 20 is rotatably supported by bearings 23, and is rotated by an unshown driving motor provided in the main assembly 100 of the apparatus.



The main assembly 100 of the apparatus is further provided with a partition 25 constituting a toner supply path 24 connecting with a hopper 201a, and to the partition 25, inner and outer ~~bearing~~ bearings 26a, 26b ~~as~~ for rotatably bearing a part of the toner bottle 1 and for sealing the toner supply path 24, are fixed. Furthermore, a screw member 27 is disposed in the  
5 toner supply path 24 to feed the toner to the hopper 201a.

Figure ~~7, (A)~~ 7(A) illustrates insertion of the toner bottle 1 into the main assembly 100 of the apparatus. One end of the toner bottle 1 is provided with a toner supply opening 1a, which will be called simply "opening", formed by a cylindrical member in this embodiment, the opening 1a sealed by a sealing member 2 at the free end of the cylinder.

10 Figure ~~7, (B)~~ 7(B) shows a state in which the toner bottle 1 has been further inserted, and an engaging projection 3 (as a locking projection) provided at a free end portion of the sealing member 2 is engaged with a locking hole (retaining) with the driving portion 20 provided in the main assembly. The engagement between the driving portion 20 and the sealing member 2 is accomplished in the following manner. The user inserts the toner bottle 1 into the main  
15 assembly, and by this, the driving portion 20 is brought into contact with an upper surface (locking force receiving portion) of the engaging projection. By further inserting the toner bottle 1, the driving portion 20 presses down the engaging projection to displace it. Thereafter, when the pressing action by the driving portion 20 is released, the portion supporting the locking projection restores by its own elastic force, so that engagement is accomplished.

20 Thus, in this embodiment, the engagement is a so-called "snap-fit" ~~so-called "snap fit"~~ type.

Since the locking surface 3b (locking portion) provided in the engaging projection 3 is locked with a locking hole (portion to be locked) against a thrust direction (axial direction) motion, and therefore, as long as the locking is maintained, the sealing member 2 is retained at the fixed position by the driving portion 20, although small play is permissible.

5 As will be understood from Figure ~~7~~(C) 7(C), after the sealing member 2 and the driving portion 20 are engaged, a slidable member 300 is retracted in a direction indicated by an arrow b in interrelation with a closing operation of the front cover 15 for exchange of the bottle. By this, the toner bottle 1 is retracted, too, but the sealing member is locked with the main assembly side of the image forming apparatus, and therefore, the sealing member 2 is away from the toner  
10 bottle 1, thus opening the opening 1a to enable toner supply.

At the time, the driving shaft 1b fixed to the main body 1A of the toner bottle 1, is not completely disengaged from the sealing member 2 even in the state of the opening 1a being sealed by the sealing member and even in the state of the opening being opened, and the engaging portion (hole portion) of the sealing member is kept engaged with the driving shaft 1b  
15 (portion to be engaged). The driving shaft 1b has a non-circular cross-sectional configuration, such as rectangular or triangular shape ~~shape~~ to permit driving force transmission. Correspondingly, the hole (engaging portion) has a complementary configuration for slidable fitting.

When an unshown motor is driven in this state, the rotational driving force is transmitted  
20 to a driving force receiving surface (driving force receiving portion) of the engaging projection of the sealing member 2 from the main assembly driving portion 20 (the driving portion provided

in the main assembly), and the driving force is transmitted from the sealing member 2 to the driving shaft 1b, which rotates the toner bottle 1 to feed and discharge the toner.

Thus, the sealing member 2 has a function of sealing the opening 1a, a function of receiving the rotational driving force from the main assembly side of the image forming apparatus, ~~as~~ and a function of transmitting the rotational driving force to the toner bottle 1 side.

The toner bottle 1 is rotatably supported by bottle receiving roller 23 provided on a container receiving ~~Table~~ tray 50, and therefore, can be smoothly rotated by a small driving torque. The bottle receiving roller 23 is disposed at each of four positions forming a saddle with respect to the main body 1A of the ~~bottom~~ bottle. The bottle receiving rollers 23 are rotatably supported on the toner supply device 400 of the main assembly 100 of the apparatus. By the rotation of the toner bottle 1, the toner accommodated in the toner bottle 1 is discharged through the opening 1a gradually, and the screw member 27 provided in the toner supply path 24 feeds the toner into the hopper 201a provided in the main assembly 100 of the apparatus, thus accomplishing the toner supply.

15 (Exchanging method for toner supply container)

~~The~~ A description will be made as to an exchanging method of the toner bottle.

With the image forming operation, the toner in the toner bottle 1 is consumed. When substantially all the toner therein is used up, the "no toner" is detected by a detecting means (unshown) provided in the main assembly 100 of the apparatus, and the event is notified to the user by a displaying means 100b (Figure 2) such as liquid crystal display.

In this embodiment, the toner bottle 1 is easily exchanged by the user, through the following steps.

First, the front cover 15 which is in the ~~else~~ closed state is rotated about a hinge 18 to an open position indicated by broken lines in Figure 6. In interrelation with the action of opening the front cover 15, the main body 1A of the bottle which takes the position indicated in ~~(C)~~ of Figure ~~[[7]]~~ 7(C) is moved in a direction indicated by an arrow ~~an a~~ a in ~~(A)~~ of Figure ~~[[7]]~~ 7(A) which is opposite from the direction of arrow b, by opening and closing means for the toner supplying portion which will be described hereinafter. By this, ~~the,~~ the sealing member 2 which is at an open position (away from the main body 1A of the bottle to open the toner supply opening 1a) is press-fitted into the toner supply opening 1a, so that the toner supply opening 1a is plugged (Figure ~~7,~~ ~~(B)~~ 7(B)). At this time, the sealing member still maintains engagement with the main assembly of the image forming apparatus. Thereafter, a releasing ring applies a releasing force to a releasing projection, by which the releasing projection is depressed together with the engaging projection, so that engagement is released. By retracting the main body 1A of the bottle in a longitudinal direction of the bottle, the releasing operation between the sealing member and the main assembly of the image forming apparatus is completed.

Then, the user draws the ~~vacant~~ empty toner bottle 1 which has been released from the main assembly 100 of the apparatus out of the main assembly 100 of the apparatus in the direction of arrow b (Figure ~~7,~~ ~~(C)~~ 7(C)) which is opposite from the direction of arrow a (Figure ~~7~~ ~~(A)~~ 7(A) ~~arrow a~~).

The user then inserts a new toner bottle 1 into the main assembly 100 of the apparatus in the direction of arrow a, and then ~~elose~~ closes the front cover 15. In interrelation with the front cover 15 closing action, the sealing member 2 locked with the main assembly of the image forming apparatus is moved away from the main body of the container by the toner supplying portion opening and closing means, so that the toner supply opening la is unsealed (Figure 7, ~~(C)~~ 7(C)). The foregoing is the exchanging process of the toner supply container.

(Toner bottle)

Referring to Figure 8 and Figure 9, the toner bottle will be described.

The toner bottle 1 is generally cylindrical, and one end thereof is provided substantially at a center with an opening la by a projected portion. The diameter of the opening la is smaller than the diameter of the cylindrical portion 1A which is the main body of the bottle. The opening la is plugged with a sealing member 2 for sealing the opening la, and as will be understood from the description in conjunction with ~~Figure 7, (A)–(C)~~ Figures 7(A)–(C), the opening la is unsealed and resealed automatically by the sliding motion of the sealing member 2 relative to the toner bottle 1 in the longitudinal direction (arrow b) of the toner bottle 1.

At the free end portion of the sealing member 2, there is formed a cylindrical portion having an engaging projection 3 and a releasing force receiving portion 4 for disengaging from the driving portion 20 provided in the main assembly of the apparatus, and such a portion of the cylindrical portion as which supports the engaging projection and the releasing projection is elastically deformable (in order to enhance or assist the elastic ~~information~~ deformation, slits are

formed at lateral sides of the region so as to extend to the free end of the cylindrical portion, as will be described hereinafter).

The engaging projection 3 is engaged with the driving portion 20 and functions to transmit the rotation to the toner bottle 1. The structures of the engaging projection 3 and the releasing force will be described in detail hereinafter.

The internal structure of the toner bottle 1 will be described.

As described in the foregoing, the toner bottle 1 is generally cylindrical in shape and is disposed generally horizontally in the main assembly 100 of the apparatus. It is rotated by the main assembly 100 of the apparatus. An inside of the toner bottle 1 has a projection 1c in the form of a rib which extends helically. When the toner bottle 1 rotates, the toner is fed in the axial direction along the helical projection 1c, and the toner is discharged through the opening 1a formed at an end of the toner bottle 1.

The internal structure of the toner bottle 1 according to the present invention is not limiting, and the configuration ~~of~~ of the structure may be any as long as the toner can be discharged by rotation of the toner bottle 1. The main body of the toner bottle is not limited to that described in the foregoing. For example, it may have a rotation screw or the like for feeding the toner, and the rotation screw is driven by a rotational driving force received by the sealing member from the image forming apparatus, while the main body is fixed (not rotatable) on the main assembly of the image forming apparatus.

~~The~~ A feature of this embodiment is in the structure of the drive transmitting portion for connection with the main assembly 100 of the apparatus, and therefore, the internal structure of

the toner bottle 1 may be any, and the bottle may have a helical projection 1c on the inner surface of the bottle.

For example, the internal structure of the bottle may be modified as shown in Figure 10. In this modified example, there is provided in the main body of the bottle is a baffle member 40 generally in the form of a plate. The surface of the baffle member 40 has, on a surface, a  
5 plurality of inclined projections 40a which are inclined with respect to the direction of the axis of the toner bottle 1. One end of ~~one~~ of the inclined projection 40a extends to a neighborhood of the opening 1a. The toner is finally discharged from the inclined projection 40a through the opening 1a. By the rotation of the toner bottle 1, the toner is scooped by the baffle member 40  
10 and then falls sliding on the surface of the baffle member 40. Because of the inclination of the inclined projection 40a, the toner is advanced toward the front side of the toner bottle 1. By repeating this operation, the toner in the toner bottle is gradually fed to the opening 1a while being stirred, and is discharged therethrough.

The driving type of this invention is not limited to the rotational driving type such as the  
15 type of this embodiment or modification. The toner bottle may be vibrated, swung or may be moved in another fashion to supply the toner. In other words, the driving may be rotation, swinging, vibration or another motion as long as the toner is discharged from the bottle ~~by~~ as the toner bottle is moved by the main assembly 100 of the apparatus.

In the above-described modified example, the baffle member 40 in the form of the plate  
20 is a separate member from the toner bottle 1, and the rotational driving force is transmitted to the baffle member 40 through the sealing member 2 to indirectly rotate the toner bottle 1.

In ~~the~~ this manner, the present invention is applicable when the toner bottle 1 is directly or indirectly driven through a sealing member 2.

In Figures 8 and 9, the main body 1A of the bottle is provided with the opening 1a at the one longitudinal end surface thereof, and a driving shaft 1b (portion to be engaged) is projected  
5 out of the opening 1a, the driving shaft 1b being integral with the main body 1A of the bottle and being provided in the opening 1a. The driving shaft 1b is disposed substantially coaxially with the opening 1a, and is slidably engaged with an engaging hole 2a (engaging portion) formed in the sealing member 2. The engaging hole, as shown in Figure 9, is closed at an end remote from the driving shaft, so that toner leakage through the engaging hole is prevented.

10 The driving shaft 1b functions to transmit the rotational driving force from the main assembly 100 of the apparatus to the main body 1A of the bottle through the sealing member 2, and the cross-sectional configuration of the driving shaft 1b is non-circular, for example, rectangular configuration, H shape, D shape or the like to transmit the rotational driving force. The driving shaft 1b is fixed on the main body 1A of the bottle by proper means.

15 The driving shaft 1b may not be fixed on the main body 1A of the bottle but ~~is~~ can be integral with the sealing member 2 as shown in Figure 11. In this case, the engaging hole 2a for transmitting the driving force from the driving shaft 1b is provided in the toner bottle 1 side, and that opening is formed so that they are ~~its~~ maintained engaged with each other after the toner bottle is unsealed. In the modified example, the member defining the engaging hole 2a ~~its~~ is  
20 supported by a member 1c provided inside the opening 1a, but the discharge of the toner is permitted.



In this embodiment, the driving shaft 1b is fixed on the main body 1A of the bottle.

(Sealing member)

Referring to Figures 12 and 13, a description will be made as to the sealing member 2 (drive receiving member).

5 In Figures 12 and 13, the sealing member 2 comprises a sealing portion 2b for unsealably sealing the opening 1a of the toner bottle 1, and a coupling engagement portion 2c (cylindrical portion) in the form of a cylinder engageable with the driving portion 20 of the main assembly of the apparatus. An outer diameter of a large diameter portion of the sealing portion 2b is larger than the inner diameter of the opening 1a by a proper degree. The sealing portion 2b is press-  
10 fitted into the opening 1a, by which the opening 1a (toner supply opening) is sealed by the sealing member 2.

As described in the foregoing, the sealing member 2 has an engaging hole 2a for transmitting the driving force received from the main assembly 100 of the apparatus to the driving shaft 1b by engagement with the driving shaft 1b. The engaging hole 2a extends  
15 continuously in the sealing portion 2b and the engaging portion 2c. The engaging hole 2a has a cross-sectional configuration which is complementary with the driving shaft 1b and which is slightly larger than the ~~cross-section~~ cross section of the driving shaft 1b. Because of this, the driving shaft 1b is loosely fitted in the engaging hole 2a. The engaging hole 2a and the driving shaft 1b have complementary polygonal configurations. In this embodiment, it is square.

20 Because of the loose fitting of the driving shaft 1b in the engaging hole 2a having such ~~cross-sections~~ cross sections, the main body 1A of the bottle and the sealing member 2 are

slidable relative to each other in the axial direction while being prevented from relative rotational motion therebetween. With this structure, when the toner bottle 1 is mounted (locked) on the toner supply device 400, the sealing member 2 is movable relative to the main body 1A of the bottle, that is, the unsealing of the opening 1a (toner supply opening) is enabled.

5           The engagement length between the engaging hole 2a and the driving shaft 1b is determined such that they are not ~~this engaged~~ disengaged from each other upon the relative movement between the sealing member 2 and the main body 1A of the bottle for the unsealing. By doing so, the driving shaft 1b can receive the driving force through the sealing member 2 even if the sealing member 2 is moved away relatively from the main body ~~[[1]]~~ 1A.

10           The A description will be made as to the engaging projection 3 (locking projection) which is one of the features of the present invention.

          The coupling engagement portion 2c of the sealing member 2 has an engaging projection 3 for receiving the driving force from the main assembly 100 of the apparatus. The engaging projection 3 is projected radially outwardly from the peripheral surface of the cylindrical portion  
15 of the coupling engagement portion 2c. The engaging projection comprises a drive receiving surface 3a (driving force receiving portion) for receiving the rotational driving force from the main assembly of the apparatus; and a locking surface 3b (locking portion) for ~~snap-fit~~ snap-fit type locking of the sealing member 2 into a locking hole (portion to be locked) provided in the main assembly 100 of the apparatus when the sealing member 2 and the toner bottle 1 are moved  
20 away from each other (from the closed state to the open state). Thus, by the drive receiving surface 3a, the engaging hole 2a and the locking surface 3b, the engaging projection 3 performs

three different functions, namely, a coupling function for receiving the rotational driving force from the main assembly of the apparatus, a transmitting function of transmitting the rotation to the toner bottle 1, and a locking function (retention function) for permitting relative sliding motion between the sealing member 2 and the main body of the toner bottle 1 so as to  
5 automatically open and close the opening.

When the driving force is transmitted with the locking surface 3b locked with the main assembly driving portion 20, the surface 3b is effective to maintain a constant distance between the sealing member 2 and the toner bottle 1. This assures the formation of the path of the toner between the toner bottle 1 and the sealing member 2, so that the toner discharging amount is  
10 maintained constant. Thus, a toner bottle having an excellent constant amount discharging property can be accomplished. In addition, the sealing member 2 is assuredly locked with the main assembly driving portion 20 of the apparatus, and therefore, the sealing member 2 is not likely to disengage from the driving shaft during the toner discharging operation, thus further assuring the toner discharging.

15 According to such a structure, the automatic opening and closing operation of the sealing member 2 and the driving force transmitting operation can be accomplished by a single sealing member, so that an inexpensive and compact toner supply container can be provided.

The engaging projection 3 is preferably ~~in general~~ integral with the sealing member 2 from this standpoint of reduction of the number of constituent parts, but a separate member for  
20 the engaging projection 3 may be mounted to the sealing member 2. Such an example will be described in conjunction with a fourth embodiment.

The engaging projection 3 has a driving force receiving function as well as the locking function, and therefore, it has a certain degree of rigidity. In view of this, slits 2e or the like are formed at lateral ends of the engaging projection 3, so that only the part of the coupling engagement portion 2c where the engaging projection 3 is provided, can relatively freely deform  
5 elastically toward the inside. This is because the engaging projection 3 is displaced by the main assembly 100 of the apparatus to effect the engagement and disengagement relative to the main assembly of the apparatus, as will be described hereinafter.

In this embodiment, the engaging projection 3 is integral with the sealing member 2.

The free end portion of the engaging projection 3 is provided with a ~~taper~~ tapered surface  
10 3c (locking force receiving portion) so as to permit smooth insertion when the sealing member 2 is inserted into the driving portion 20 of the main assembly 100 of the apparatus. The tapered surface 3c receives a locking force from an inner surface of the driving portion 20 so that the engaging projection 3 (locking portion) is displaced inwardly to lock into the locking hole when the tapered surface 3c approaches ~~relatively~~ relative to the locking hole 20h of the driving  
15 portion 20. When the locking surface further approaches ~~to~~ the locking hole to such an extent that contact of the tapered portion 3c to the inner surface of the driving portion 20, that is, the locking force is released, the portion supporting the engaging projection (locking portion) restores from the displaced position, thus completing the locking between the sealing member (locking portion) and the main assembly (portion to be locked) of the image forming apparatus.

20 After the completion of the locking action, the relative motion between the sealing member and the main body of the bottle is automatically imparted in the direction away from

each other, by which the opening is unsealed to enable the toner to discharge. In this embodiment, the sealing member is engaged with the main assembly of the apparatus such that movement in the sliding direction is prevented, and in this state, the main body of the bottle is retracted or advanced to automatically open or close the opening.

5           In addition, the coupling engaging portion 2c functions to minimize the ~~formation~~  
deformation of the engaging projection 3 when the rotational driving force is imparted to the  
engaging projection 3. As shown in Figure 34, ~~(A)~~ 34(A), when ~~the in a~~ driving force F is  
imparted to the engaging projection 3, the engaging projection elastically deforms as shown in  
(A) and (B). However, it abuts the coupling engaging portion 2c, so that further ~~the formation~~  
10 deformation is prevented. Therefore, even when a large rotational driving force is imparted, the  
engaging projection 3 does not deform beyond the width of the slot because of the provision of  
the coupling engaging portion 2c. Therefore, the structure is ~~enough~~ suitable for use with a large  
capacity toner bottle. The amount of deformation of the engaging projection 3 is dependent on  
the width of the groove 2e, and therefore, the width of the groove 2e is preferably as small as  
15 possible.

Referring to Figures 12 and 13, a description will be made as to the structure of a releasing force receiving portion which is another one of the features of the present invention.

The engaging projection 3 described above is provided at each of two positions which are diametrically opposed to each other, and the two engaging projections 3 are connected by a  
20 connecting portion which functions as a releasing force receiving portion 4. When the releasing force receiving portion (releasing portion) 4 receives a force from the main assembly of the

apparatus in the direction indicated by an arrow b, the engaging projections 3 are elastically deformed as indicated by chain lines in Figure 13. If the force application is stopped, the original position is restored. The releasing portion 4 has a relatively small thickness to permit elastic deformation, and the material is selected in consideration of such an elastic deformation.

5           It is preferable that sealing member 2 is manufactured through an injection molding from a plastic resin material or the like, but another material, or another manufacturing method is usable. They may be provided by connecting separate members. The sealing member 2 desirably has a proper elasticity since it is press-fitted into the opening 1a to seal it. The best material is low density polyethylene material, and preferable materials are polypropylene,  
10 normal chain polyamide, Nylon (tradename), high density polyethylene, polyester, ABS, HIPS (shock-resistant polystyrene) or the like.

          By employing an elastically deformable elastic member for the parts supporting the engaging projection 3 and for the releasing portion 4, the locking and releasing between the driving portion 20 and the engaging projection 3 can be accomplished with a simple structure,  
15 utilizing the elastic deformation and restoration. The above-described materials have proper elasticities, and therefore, the engagement and disengagement of the driving portion 20 and the engaging projection 3 are easily effected with sufficient durability.

          The releasing portion 4 is in the form of a bridge connecting the engaging projections 3, so that such a plurality of engaging projections 3 can be uniformly displaced by pushing one  
20 releasing portion.

It is not inevitable to integrally connect the engaging projections, but releasing portions may be provided for the respective engaging projections, as shown in Figures 16 and 17.

(Driving force receiving portion)

Referring to Figure 14, a description will be made as to the structure of the coupling engagement portion 2c provided in the sealing member 2, which is another one of the features of the present invention.

In this embodiment, the sealing member 2 is provided with the coupling engagement portion 2c in the form of a cylinder. As described in the foregoing, it also functions as a drive receiving member to receive the driving force from the driving force transmitting portion 20 provided in the toner supply device 400.

In the cylindrical coupling engagement portion 2c of the sealing member 2, the two parts provided with the respective engaging projections 3 are elastically deformable, such that parts are easily and elastically deformed by the tapered portion 3c of the engaging projection 3 being pressed by the driving portion 20. The releasing portion 4 is provided so as to connect the engaging projections 3, and the engaging projection 3 and the releasing portion 4 are integral with each other.

On the other hand, the locking hole 20h of the driving portion 20 provided in the main assembly 100 side of the apparatus is constructed so as to be locked with the engaging projection 3 (locking surface) of the sealing member 2. When the sealing member 2 is inserted into the driving portion 20, the smooth insertion is accomplished by providing the driving portion 20 with a tapered surface 20b defining a gradually decreasing inner diameter at the free end of 10 an

inner diameter gradually increasing toward the free end of the driving portion 20. The sealing member 2 is smoothly inserted into the driving portion 20 because of the provision of the tapered surface 20b.

5 The driving portion 20 is provided with an engaging rib 20a for rotating the toner bottle 1, and the engaging rib 20a abuts the drive receiving surface 3a to transmit the rotational driving force to the sealing member after the engaging projection is engaged with the locking hole 20h.

Referring to Figure 15, the engagement between the driving portion 20 and the sealing member 2 in this embodiment will be described.

10 ~~In~~ Figure 15, ~~(A)~~ 15(A) shows a state when the user is setting a new toner bottle 1 in the direction indicated by an arrow a in order to install it into the main assembly 100 of the apparatus, in which the toner bottle 1 ~~is~~ has not yet ~~been~~ engaged with the driving portion 20 in the main assembly of the apparatus.

15 When the toner bottle 1 is further inserted, the tapered portion 3c of the engaging projection 3 of the sealing member 2 is brought into contact with the tapered surface 20b of the driving portion 20, as shown ~~in (B)~~ in Figure ~~[[15]]~~ 15(B), and the engaging projection 3 is being guided by the tapered surface 20b while being elastically deformed toward the inside.

20 With the further insertion of the toner bottle 1, the engaging projection 3 passes by the straight portion 20g ~~containing~~ extending from the tapered surface 20b, the engaging projection 3 ~~restores~~ is restored because of the provision of the space portion 20h (locking hole) not having the engaging rib 20a, by which the engaging projection 3 is locked with the driving portion 20, as shown ~~in (C)~~ in Figure ~~[[15]]~~ 15(C). In ~~the~~ this state, the engaging projection 3 is firmly



locked relative to the driving portion 20, and the position of the sealing member 2 in the thrust direction (axial direction) is substantially fixed relative to the main assembly of the apparatus.

Therefore, even if the toner bottle 1 is retracted in the direction indicated by an arrow ~~arrow~~ b, as shown in ~~(C)~~ in Figure ~~[[7]]~~ 7(C), the sealing member 2 does not move in the same direction, but is firmly fixed to the driving portion 20. On ~~[[20.On]]~~ the other hand, since the toner bottle 1 is ~~instructed~~ inserted, the sealing member 2 is separated away from the toner bottle 1 with certainty, so that the opening 1a is unsealed or opened. The sliding retracting operation of the toner bottle 1 may be interrelated with the opening and closing operation of the front cover 15 provided in the main assembly 100 of the apparatus.

As for the sliding operation, the toner bottle 1 may be slid with the sealing member 2 fixed, or the sealing member 2 may be slid with the toner bottle 1 fixed, or both of them may be slid away from each other.

When the toner is used up from the toner bottle, the empty toner bottle is taken out to exchange it with a new toner bottle. The dismounting operation is carried out by the above-described steps in a reverse order.

In detail, when the operator opens the front cover, the following occurs. First, the main body of the toner bottle advances toward the sealing member while the sealing member is locked in the main assembly of the apparatus, by which the sealing member of the opening is automatically sealed. By a pushing member 21 which will be described hereinafter, a releasing projection is actuated to release the engaging projection from the locking hole. Then, the main body of the toner bottle is retracted together with the sealing member re-press-fitted into the

opening, so that the sealing member is disengaged from the main assembly of the apparatus. By this, the toner bottle is prepared for being removed from the main assembly of the apparatus.

(Structure eliminating necessity of phase alignment)

5 The A description will be made as to the structure eliminating the necessity of phase alignment when the toner bottle 1 is brought into engagement with the main assembly driving portion 20.

In a conventional drive transmitting means using a combination of projection and ~~recesses~~ recess type coupling drive, it is necessary to engage a recess and a projection with phase alignment. This is not necessary according to this embodiment. Referring to Figure 18, this will  
10 be described.

Figure 18 shows a positional relation in the rotational direction between the engaging projection 3 and the engaging rib 20a when the sealing member 2 is inserted into the driving portion 20. The engaging rib 20a is provided at one position, and the engaging projection 3 is provided at two positions (3A, 3B).

15 Assuming that engaging rib 20a and the engaging projection 3 are not aligned with each other when the user inserts the toner bottle 1, when the toner bottle 1 is inserted into the predetermined position, the sealing member 2 is locked with the driving portion 20, and when the toner bottle 1 is retracted, the sealing member 2 is away from the toner bottle 1 to establish the toner dischargeable state.

20 However, depending on the position in the rotational direction of the toner bottle 1 upon the insertion of the toner bottle, the engaging projection 3A is aligned with the engaging rib 20a

as shown in ~~(A)~~ of Figure ~~[[18]]~~ 18(A). In this case, even if the toner bottle 1 is inserted into the predetermined position, the engaging projection 3A interferes with the engaging rib 20a so that it is not released outwardly. Then, the locking is incomplete. If the toner bottle 1 is retracted in this state, the toner bottle 1 is retracted together with the sealing member 2 since the locking with the main assembly driving portion 20 is incomplete. The opening 1a cannot be unsealed or opened.

In order to avoid this, the number of engaging projections 3 is larger than that of the engaging ribs 20a by at least one, by which not all of the engaging ~~rib(s)~~ ribs and engaging ~~projection(s)~~ projections are aligned.

10 In the case of ~~(A)~~ of Figure ~~[[18]]~~ 18(B), one of the engaging projections 3A interferes with the engaging rib 20a, and therefore, is not locked with the main assembly driving portion 20. However, the other one of the engaging projections 3B does not interfere with the engaging rib 20a, and therefore, it is correctly locked with the driving portion 20. Thus, even if one of the engaging projections 3A is not locked correctly, the other engaging projection 3B is correctly  
15 locked, and therefore, the toner bottle 1 is separated away from the sealing member 2 without problem, so that opening 1a is unsealed. After the opening 1a is unsealed, the incompletely engaged engaging rib 20a is brought out of the interference sooner or later by the rotation of the main assembly driving portion 20 in the direction indicated by an arrow c, and therefore, correct locking of the engaging projection 3A is established. With further rotation, as shown in ~~(C)~~ of  
20 Figure ~~[[18]]~~ 18(C), the engaging rib 20a is engaged with the engaging projection 3B, so that rotation is transmitted to rotate the toner bottle 1.

By providing the number of engaging projections 3 which is at least one larger than the number of engaging ribs 20a, at least one of the engaging projections is engaged with the locking hole without an interference with the engaging rib irrespective of the position of the toner bottle 1 in the rotational direction. In this manner, the toner bottle 1 can be assuredly set in the apparatus.

The number of the engaging projections 3 may be four rather than two as in this embodiment. In that case, the number of the engaging ribs is not more than three.

In this case, even if the number of the engaging ribs and the number of the engaging projections are the same, as shown in Figures 35 and 36, the distance (phase) between the engaging ribs may be made different from the distance (phase) between the engaging projections, by which at least one engaging projection is not in line with the engaging rib upon the insertion of the bottle, so that correct ~~locking~~ locking can be accomplished there.

When a plurality of engaging ribs are provided at different circumferential ~~position~~ positions, it is preferable that engaging ribs are disposed at regular intervals in consideration of the drive transmission property.

Figure 20 shows another example which also eliminates the necessity for the phase alignment. In this modified example, a shallow locking groove 20e is extended in the entire inner circumference of the engaging portion 20d of the main assembly driving portion 20, and an engaging hole 20d for engagement with the engaging projection 3 is formed in the locking groove 20e. The locking groove 20e is not so deep as to completely engage with the engaging

projection 3, but is so shallow as to permit ~~half engagement~~ half-engagement to permit automatic unsealing action.

Referring to Figure 21, ~~the~~ an operation upon the engagement in this modified example will be described.

5 In Figure 21, ~~(A)~~ 21(A), there is shown a state in which the toner bottle 1 has not yet been inserted into the main assembly driving portion 20, and the engaging hole 20d of the main assembly driving portion 20 and the engaging projection 3 and sealing member 2 are not aligned in the positions in the rotational direction, as indicated in X-X ~~cross-section~~ cross section. With the insertion of the toner bottle 1, the state shown in ~~(B)~~ of Figure ~~[[21]]~~ 21(B) is reached, in  
10 which the engaging projection 3 is half-engaged with the locking groove 20e. In this state, when the toner bottle 1 is retracted, only the toner bottle 1 is retracted in the direction indicated by the arrow b since the sealing member 2 is locked with the locking groove 20e, so that sealing member 2 and the toner bottle 1 are spaced apart with certainty to unseal the opening 1a. When the main assembly driving portion 20 rotates in the direction indicated by an arrow c, the  
15 engaging hole 20d and the engaging projection 3 are aligned as shown in ~~(c)~~ of Figure ~~[[21]]~~ 21(C), and the engaging projection 3 is now completely engaged with the engaging hole 20d to permit transmission of the rotational driving force.

In this manner, according to this embodiment, the toner bottle 1 can be properly set in the main assembly 100 of the apparatus simply by inserting the toner bottle 1 into the main assembly  
20 100, without the necessity of adjusting the position of the bottle 1 in the rotational direction. Therefore, the exchange operation is simple and easy.

Additionally, since the opening and closing operation for the opening of the toner supply container is automatically executed in the main assembly of an image forming apparatus, and therefore, the user is not required to open or close the opening. This eliminates the possibility of contaminating the hands of the user.

5 (Releasing method)

Referring to Figure 22, a description will be made as to releasing between the engaging projection 3 and the main assembly driving portion 20.

When the toner supply is completed, and the toner bottle 1 becomes empty, the current toner bottle 1 is removed, and a new toner bottle is set.

10 At this time, it is necessary to release the sealing member 2 from the driving portion 20.

As shown in Figure 22, the inside of the main assembly of the apparatus, more particularly, the inside of the driving portion 20 is provided with a pushing member 21. The pushing member 21 is movable in the same direction as the direction of the axis of the driving shaft 1b of the toner bottle 1.

15 ~~In~~ Figure 22, (A) 22(A) shows a state in which the toner supply is completed, and the opening 1a of the toner bottle 1 is in an open state.

When the locking between the driving portion 20 and the sealing member 2 is released, the pushing member 21 is advanced in a direction indicated by an arrow a to the releasing portion 4 at the free end of the sealing member 2, by which the releasing portion 4 is elastically deformed in the same direction, and correspondingly, the engaging projection 3 integral with the

20

releasing portion 4 ~~the forms~~ deforms toward the inside. By this, the engaging projection 3 is disengaged from the main assembly driving portion 20.

The pushing member 21 further advances in the direction of arrow a, by which the sealing member 2 is press-fitted into the opening 1a, thus resealing the opening 1a of the toner bottle 1. The pushing member 21 is even further advanced in the direction of arrow a, by which the toner bottle 1 per se is retracted to slide the toner bottle 1 to a position to facilitate the user who is going to remove it.

As for the driving structure for the pushing member 21, it may be interrelated with the opening and closing operation of the front cover of the main assembly 100 of the apparatus such that when the front cover 15 is opened, the pushing member 21 moves in the direction of arrow a to effect disengagement between the sealing member 2 of the toner bottle 1 and the driving portion 20, and when the front cover 15 is closed, it is advanced in the direction of arrow b. Alternatively, a driving motor or the like is used to effect the disengaging operation independently. In another alternative, it is not interrelated with the front cover 15 of the main assembly 100 of the apparatus, but a manual lever is provided, which is manipulated by the user and is interrelated with the pushing member.

As described in the foregoing, according to the embodiments, the toner supply container can be locked in the main assembly of the electrophotographic image forming apparatus by a ~~snap-fit~~ snap-fit type engagement with certainty by inserting the toner supply container. When it is to be taken out, the ~~snap-fit~~ snap-fit type locking is easily released by pushing the releasing portion. Thus, the supplying operation from the toner supply container is accomplished with a

very simple operation. Accordingly, a toner supply container of high operativity can be provided.

In addition, the disengagement of the drive transmission for the toner supply container is simultaneously effected, and also the opening and closing operation for the opening can be  
5 simultaneously effected.

These advantageous effects can be provided by very simple action at low cost with compact structure and reliable drive transmission.

In the toner dischargeable state, it is not necessary to provide means for rotatably supporting the driving shaft 1b at the main body side of the toner bottle. This simplifies the  
10 structure and avoids the problem of toner leakage, torque increase, production of coarse particles and so on.

(Embodiment 2)

Referring to Figures 23-25, and 32, a second embodiment of the present invention will be described. The same reference numerals as with the first embodiment are assigned to the  
15 elements having the corresponding functions, and ~~the~~ a detailed description of the common structure is omitted for simplicity.

As shown in Figure 23, in this embodiment, the releasing projection 4 (releasing portion) is provided on an outer surface not inside the cylindrical coupling engagement portion 2c of the sealing member 2 as in the first embodiment. In this embodiment, engaging projection 3 and the  
20 releasing portion 4 are provided at each of four circumferentially equidistant positions so as to



constitute pairs. The structures of the driving portion 20 for locking engagement with the engaging projection of the sealing member are the same as with the Embodiment 1.

Correspondingly, the pushing member 21 is in the form of a cylinder covering the outside periphery of the driving portion 20 as shown in Figure 24 and is slidable for engagement with the releasing portion 4, rather than a slidable rod as in the first embodiment. The inner surface of the free end portion of the pushing member 21 (cylindrical member) is tapered such that inner diameter increases, that is, the thickness of the cylinder reduces, toward the free end, by which the tapered portion 21a is engaged with the apex of the releasing portion 4 upon the engagement. Slits 2e are formed at the lateral sides of the supporting portion 2f for the engaging projection 3 and the releasing portion 4 to facilitate inward elastic deformation of the engaging projection 3 and the releasing portion 4 and restoration.

According to this embodiment, the entire sealing member can be integrally molded, and therefore, the production property of the sealing members is drastically improved, and the manufacturing cost can be reduced.

In Figure 25, (A) 25(A) shows a state in which the toner supply is completed, and the opening 1a of the toner bottle 1 is still open.

When the engagement between the main assembly driving portion 20 and the sealing member 2 ~~are~~ is to be released, the pushing member 21 is advanced to the releasing portion 4, as shown in (B) in Figure 25(B), so that releasing portion 4 is pressed inwardly by the inner surface of the pushing member 21. This displaces the releasing portion 4 inwardly (arrow d) by the elastic deformation of the supporting portion 2f, and simultaneously, the engaging projection

3 is displaced inwardly together with the releasing portion 4. By this, the engaging projection 3 is disengaged from the main assembly driving portion 20. The releasing steps are carried out in interrelation with the opening operation of the ~~exchange~~ front cover by the operator.

Thereafter, the pushing member 21 is advanced in the direction of arrow a, so that sealing member 2 is returned to the sealing position of the toner bottle 1, as shown in ~~(C)~~ of Figure [[25]] 25(C). Subsequently, the pushing member 21 is further advanced to slide the toner bottle 1 *per se* to a position facilitating the user who is going to take the toner bottle 1 out.

As described in the foregoing, according to this embodiment, by the provision of the releasing portion 4 on the outer surface of the cylindrical portion 2c, the same advantageous effects as with the first embodiment described in the following can be provided. According to this embodiment, when the sealing member 2 is produced by injection molding of a resin material, the mold can be easily removed, ~~and~~ thus improving the production property.

A width of the engaging projection is larger than the width of the releasing projection, so that when the main body of the bottle is retracted for automatic unsealing of the opening, the engagement between the engaging projection (locking surface) and the driving portion 20 is maintained. The releasing projection does not have such a function, and therefore, the width is reduced to minimize the resin material cost in the manufacturing.

It is a possible alternative that thin portion 2y is provided as shown in Figure 32 to make the base portions of the supporting portion 2f (supporting the engaging projection and the releasing projection) easy to deform. With this structure, the disengagement action is made sure

while maintaining a sufficient rigidity of the sealing member including the engaging projection which receives the rotational driving force.

(Embodiment 3)

Referring to Figures 26 through 29, a third embodiment of the present invention will be  
5 described.

In the second embodiment, as shown in Figure 24, the engaging projection 3 and the releasing portion (releasing projection) 4 for the sealing member 2 are provided at the outer surface of the engaging portion 2b. In this embodiment, as shown in Figure 26, the engaging projection 3 and the releasing projection 4 are provided at each of four circumferentially  
10 equidistant positions on an inner surface of the engaging portion 2b.

Corresponding to such a structure of the sealing member 2, the main assembly driving portion 20 has a configuration shown in Figure 27. The main assembly driving portion 20 comprises ~~[[a]] cylindrical portion~~ portions including a free end portion 20b, a small diameter portion 20c, a large diameter portion 20d and a rear end 20e which have different outer  
15 diameters. It also comprises a through-hole 20f through which the pushing member 21 is penetrated. The inner diameter of the through-hole 20f is constant. The small diameter portion 20c has a minimum outer diameter and is provided with an engaging rib 20a extending in the longitudinal direction of the driving portion 20 at each of the diametrically opposite positions.

Referring to Figure 28, a description will be made as to engagement between the driving  
20 portion 20 and the sealing member 2 in this embodiment.

~~In~~ Figure 28, ~~(A)~~ 28(A) shows a state in which the toner bottle 1 is inserted in a direction indicated by an arrow b for a user to install a new toner bottle 1 into the main assembly of the apparatus, in which the toner bottle 1 ~~is~~ has not yet been locked with the driving portion 20 provided in the main assembly of the apparatus.

5 As shown in ~~(B)~~ of Figure ~~[[28]]~~ 28(B), when the toner bottle 1 is further inserted, the engaging projection 3 provided in the sealing member 2 is brought into contact with the main assembly driving portion 20 and is guided by the tapered surface 3c formed at the free end portion of the engaging projection 3, and is gradually and elastically deformed.

10 With further insertion, the engaging projection 3 having passed by the straight portion 20g, as shown in ~~(C)~~ of Figure ~~[[28]]~~ 28(C), the forced deformation is released by the space portion 20h not having the engaging rib 20a, and the engaging projection 3 is firmly locked with the main assembly driving portion 20.

15 In the state shown in ~~(C)~~ of Figure ~~[[28]]~~ 28(C), the engaging projection 3 is firmly engaged with the main assembly driving portion 20 such that position of the sealing member 2 in the thrust direction (axial direction) is fixed relative to the main body of the toner bottle 1. Therefore, when the toner bottle 1 is retracted thereafter, the sealing member 2 is not retracted together with the toner bottle 1 but is firmly fixed to the main assembly driving portion ~~20.0n~~ 20. On the other hand, only the toner bottle 1 is ~~destructive~~ discarded, the sealing member 2 ~~becomes~~ away separates from the toner bottle 1 ~~the~~ to unseal or open the opening 1a. The retracting  
20 operation of the toner bottle 1 may be such that the toner bottle 1 is slid in interrelation with the opening and closing operation of the front cover 15 (Figure, 2).

Referring to Figure 29, the releasing or disengaging action in this embodiment will be described.

When the sealing member 2 is to be disengaged from the main assembly driving portion 20, the pushing member 21 disposed at the central portion of the main assembly driving portion 20 is slid in the direction of arrow a, ~~and only~~ by which it is disengaged from the main assembly driving portion 20.

By advancing the pushing member 21 in the direction of arrow a relative to the releasing portion 4 provided in the inside of the sealing member 2, the part supporting the releasing portion 21, as shown in ~~(B)~~ of Figure ~~[[29]]~~ 29(B), deforms outwardly so that releasing portion 21 displaces outwardly, and therefore, the engaging projection 3 displaces outwardly. By this, the engaging projection 3 is disengaged from the main assembly driving portion 20.

With further advancement of the pushing member 21 in the direction of arrow a, the sealing member 2 is press-fitted into the opening 1a as shown in ~~(C)~~ of Figure ~~[[29]]~~ 29(C). In this position, the sealing member 2 ~~unseals~~ unseals the opening 1a of the toner bottle 1. By further advancement of the pushing member 21 in the direction of arrow a, the toner bottle 1 per se is slid backward to a position where the user can easily take the toner bottle 1 out.

As for the driving structure for the pushing member 21, it may be interrelated with the opening and closing operation of the front cover 15 of the main assembly 100 of the apparatus such that when the front cover 15 is opened, the pushing member 21 moves in the direction of arrow a to effect disengagement between the sealing member 2 of the toner bottle 1 and the driving portion 20, and when the front cover 15 is closed, it is advanced in the direction of arrow

b. Alternatively, a driving motor or the like is used to effect the disengaging operation independently. In another alternative, it is not interrelated with the front cover 15 of the main assembly 100 of the apparatus, but a manual lever is provided, which is manipulated by the user and is interrelated with the pushing member.

5           In this embodiment, ~~not the~~ releasing portion is not exposed to outside, and therefore, in case that toner supply container is unintentionally ~~let fall falls~~, the releasing portion is not damaged, and therefore, the ~~shock-resistant~~ shock-resistant property is high during the transportation.

10           In addition, by a very simple sliding of the pushing member in the forward and backward directions, the drive transmission of the toner bottle can be easily disengaged, and simultaneously, the opening and closing of the opening of the toner bottle can be accomplished.

          These advantageous effects can be provided by very simple action at low cost with compact structure and reliable drive transmission.

(Embodiment 4)

15           Referring to Figure 30, a fourth embodiment of the present invention will be described.

          In this embodiment as shown in Figure 30, a sealing member 2, an engaging projection 3 and a releasing portion 4 mounted to the opening 1a of the toner bottle 1 are manufactured separately with respect to each other, and then they are assembled.

20           As shown in this Figure, two movable arms 3e are mounted by hinge portions 3h on the end surface of the sealing member 2 such that they are opposed to each other. Each of the

movable arms 3e is provided at its free end portion with an engaging projection 3 for the engagement which is similar to that in the first embodiment.

The engaging projections 3 are connected with each other by a link 3g through hinge portions ~~[[31]]~~ 3i. The link 3g includes two members connected by a hinge which functions as a releasing portion 4.

From an inside of the movable arm 3e fixed projections 3f are projected opposed to each other at a central portion. A spring 3j is compressed between the fixed projections 3f. By the urging force provided by the spring 3j, the movable arm 3e is urged outwardly, so that engaging projection 3 is engageable with the main assembly driving portion 20 as shown in ~~(A)~~ of Figure ~~[[30]]~~ 30(A). The main assembly driving portion 20 suitable in this embodiment is for example that shown in Figure 14.

With such a structure, when the toner bottle 1 is to be engaged with the main assembly driving portion 20 by the engaging projection 3, it is enough to insert the toner bottle 1 into the main assembly of the apparatus, similarly to Embodiment 1. More particularly, when the toner bottle 1 is inserted, the engaging projections 3 are brought into contact with the main assembly driving portion 20, by which the movable arms 3e are tilted inwardly against the spring force of the spring 3j together with the engaging projections 3. With further insertion, the engaging ~~projection~~ projections 3 are engaged with the main assembly driving portion 20 at a predetermined position by the spring force of the spring 3j, and simultaneously, the movable arms 3e restore the original position shown in ~~(A)~~ of Figure ~~[[30]]~~ 30(A).

On the other hand, when they are to be disengaged from each other, as shown in ~~(B)~~ of Figure ~~[[30]]~~ 30(B), the pushing member 21 is pushed against the releasing portion 4 in a direction indicated by an arrow a, the engaging projections 3 are easily tilted, so that they are disengaged.

5 Similarly to the following embodiments, the structure of this embodiment also provides the same advantageous effects.

In this embodiment, the elastic deformation is not used, the engaging projection 3 may be made of any material not exhibiting elastic deformation per se, and therefore, the choice of the material is very ~~big~~ broad. For example, various materials such as aluminum, ~~[[a]]~~ steel or  
10 magnesium, or wood, hard resin material or the like is usable. A higher engagement strength can be maintained, and ~~the~~ durability is improved.

The parts are connected with a linking mechanism, which provides larger movable range than the elastic deformation, and therefore, a larger engagement area is usable. Therefore, the engagement is very firm with high reliability.

15 In this embodiment, the elastic deformation of the sealing member is not utilized unlike Embodiments 1-3, but a link type is employed. Therefore, ~~the~~ durability is better, but the structure is rather complicated with the possible result of cost increase.

(Embodiment 5)

The present invention is not limited to the foregoing Embodiments. In Embodiment 5,  
20 the structures are the same as that of said embodiment (~~Figure 20~~) shown in Figure 20 except for the portions which will be described.



For ~~example. example~~, as shown in Figure 31, the opening 1a of the toner bottle 1 may be provided in the cylindrical surface 1d adjacent to the longitudinal end surface. In such a case, the coupling engagement portion 2c is not provided in the sealing member 2 and may be mounted rotatably in an end surface of the main body 1A of the toner bottle. In this case, the opening 1a is  
5 unsealably sealed by a shutter member S.

The coupling engagement portion 2c performs a function of locking the main body 1A of the toner bottle with the main assembly (driving portion 20 shown in Figure 20) of the image forming apparatus by a locking portion (locking surface of the engaging projection 3), a function of receiving a rotational driving force from the main assembly side of the image forming  
10 apparatus by a driving force receiving portion (a drive receiving surface of the engaging projection 3), a function of disengaging the main body 1A of the toner bottle from the main assembly (driving portion 20) of the image forming apparatus by a releasing portion 4, and a function of transmitting the driving force received by the driving force receiving portion to the coupling engagement portion 2c and the toner feeding member fixed in the toner bottle. With  
15 this structure, a force of separating the toner bottle from the driving portion 20 of the main assembly of the apparatus for some reason or another, while the rotation is received from the main assembly of the apparatus, they are maintained engaged with each other, and therefore, it is avoided that transmission of the rotational driving force to the toner bottle is unintentionally disengaged.

20 (Embodiment 6)

Referring to Figure 33, a sixth embodiment will be described.

In the foregoing embodiment, the locking mechanism, the releasing mechanism and the drive transmission mechanism are used between an image forming apparatus and a toner supply container (sealing member). In this embodiment, ~~the~~ use is made ~~between~~ of an image forming apparatus and an electrophotographic photosensitive member detachably mountable relative to  
5 the main assembly of the image forming apparatus, in which the photosensitive drum is exchanged with a new one after the service life. In the other aspects, the structures are the same as with Embodiment 1.

In Figure 33, the coupling engaging portion 2c provided at an end of a photosensitive drum 104 is engaged with a driving portion 20 of the main assembly of the image forming  
10 apparatus similarly to Embodiment 1, so that rotational driving force is transmitted from the driving portion 20 to the photosensitive member. The structures for the disengagement therebetween ~~is~~ are similar to that of Embodiment 1.

As will be understood, the drive transmission mechanism of this invention is not limited to the toner supply container or the image forming apparatus, but is applicable to a structure for  
15 transmitting rotational, swing or reversing motion about a rotation axis.

The automatic sealing operation for the opening may be accomplished in the following manner.

In interrelation with ~~and~~ an opening operation of the ~~exchange~~ front cover by the operator, the main body of the toner bottle is advanced toward the sealing member with the  
20 engagement between the sealing member and the driving portion 20 maintained, by which the sealing member is press-fitted into the opening, thus accomplishing automatic sealing.

Thereafter, the pushing member 21 slides to be contacted into the releasing portion, and the engaging projection is disengaged from the driving portion 20. Furthermore, the pushing member 21 pushes the main body of the toner bottle together with the sealing member toward the ~~change~~ front cover to a position where the operator can easily take the toner bottle out.

5           In this manner, the sliding movement (retraction, advancement) of the main body of the bottle used for unsealing the opening can be used for resealing the ~~open~~ opening with a simple structure. In addition, the slide movement distance of the pushing member can be made shorter than in the foregoing embodiments, and therefore, complication of the apparatus at the main body side can be avoided.

10           The structure for the engagement and disengagement between the main assembly of the image forming apparatus and the toner bottle or the photosensitive member may be used in Embodiments 2, 3 and 4.

In Embodiments 1-6, only by the movement of the releasing projection of the main assembly of the apparatus in a direction (axial direction, for example) of relative motion of the sealing member relative to the main body, the engaging projection or projections are moved in a direction or directions substantially perpendicular to the direction (radial direction, for example), and therefore, the structure for the disengagement is simple. Even when a plurality of engaging projections are provided, all the engaging projections are brought into disengaging positions by a force applied substantially at one position, and therefore, the structure for the disengagement is simple. In Embodiments 1, 4, 5 and 6, the releasing force receiving portion of the sealing member is disposed substantially at the free end portion of the sealing member, so that releasing

15  
20

force receiving portion can be engaged with the main assembly at a relatively early stage after the start of insertion of the toner bottle.

In ~~embodiments~~ Embodiments 1-4, the driving portion 20 provided in the main assembly of the image forming apparatus is provided with a locking hole and an engaging rib, and the sealing member 2 is provided with an engaging projection portion 3 engageable with the locking hole and the engaging rib of the driving portion 20, but the projection and recess relationship 15 may be ~~reverse~~ reversed. In other words, the driving portion 20 of the main assembly of the apparatus is provided with the engaging projection and the releasing portion (releasing projection), and the sealing member 2 is provided with the locking hole and the engaging rib.

10 With such a structure, the same advantageous effects are provided.

As described in the foregoing, according to these embodiments, the toner accommodating container and the main assembly of the image forming apparatus are locked in a ~~snap-fit~~ snap-fit type engagement, and the sealing member can be automatically engaged into or disengaged from the opening of the toner accommodating container, wherein the locking engagement can be

15 released with a simple structure without ~~load-on~~ effort by the user.

Therefore, the toner supply operation can be carried out by the user with much less ~~load~~ effort.

Such a sealing member, a toner accommodating container and an image forming apparatus can be provided at low cost.

20 While the invention has been described with reference to the structures disclosed herein, it is not confined to the details set forth and this application is intended to cover such

modifications or changes as may come within the purpose of the improvements or the scope of the following claims.

ABSTRACT OF THE DISCLOSURE:

A toner container detachably mountable to an image forming apparatus, includes a main body for containing toner; a sealing portion for sealing the toner discharge opening; locking projections for snap fitting engagement with holes provided in a cylindrical member of an image forming apparatus, wherein the projections receive from the cylindrical member unsealing forces for unsealing the toner discharge opening by a relative movement between the sealing portion and the toner container, wherein a number of the locking projections is larger than a number of ribs provided between the holes of the cylindrical member.

A toner supply container is detachably mountable to an assembly of an electrophotographic image forming apparatus having a driving member. The toner supply container includes a container body including an opening provided at a cylindrical surface of the container body configured to permit discharge of toner contained in the container body; a shutter for opening and closing the opening; and a coupling portion provided at a side of the container body and configured and positioned to engage with the driving member so as to receive a rotational drive force.

- 1 -

SEALING MEMBER,  
TONER ACCOMMODATING CONTAINER AND  
IMAGE FORMING APPARATUS

5 FIELD OF THE INVENTION AND RELATED ART:

This application is a divisional application of Application No. 13/231,388, filed  
September 13, 2011, which issued as U.S. Patent No. 8,290,394 on October 16, 2012, which is a  
divisional application of Application No. 12/981,785, filed December 30, 2010, which issued as  
U.S. Patent No. 8,045,901 on October 25, 2011, which is a divisional application of Application  
10 No. 12/615,012, filed November 9, 2009, which issued as U.S. Patent No. 7,890,027 on February  
15, 2011; which is divisional application of Application No. 12/169,895, filed July 9, 2008,  
which issued as U.S. Patent No. 7,647,012 on January 12, 2010; which is a divisional application  
of Application No. 11/200,179, filed August 10, 2005, which issued as U.S. Patent No. 7,430,384  
on September 30, 2008; which is a divisional application of Application No. 10/429,741 filed  
15 May 6, 2003, which issued as U.S. Patent No. 6,990,301 on January 24, 2006; and which is a  
continuation-in-part application of Application No. 10/076,430 filed February 19, 2002, which  
issued as U.S. Patent No. 6,879,789 on April 12, 2005.

The present invention relates to a toner accommodating container, a sealing member  
therefor and an image forming apparatus, suitably usable with an image forming apparatus such  
20 as a copying machine, a printer, and a facsimile machine.

In a conventional electrophotographic image forming apparatus such as an  
electrophotographic copying machine or a printer, fine particle toner is used as a developer.

When the toner in the main assembly of the electrophotographic image forming apparatus is used up, the toner is supplied into the main assembly of the image forming apparatus using a toner accommodating container (toner supply container).

5 Here, the electrophotographic image forming apparatus is an apparatus which forms images on a recording material through an electrophotographic image formation type process. The electrophotographic image forming apparatus includes an electrophotographic copying machine, an electrophotographic printer (laser beam printer, LED printer, for example), a facsimile machine, word processor or the like.

10 Since the toner is a very fine powder, it is known to place, upon toner supplying operation, a toner supply container inside the main assembly of the image forming apparatus and to gradually supply the toner through a small opening to avoid scattering of the toner.

Any one of the above-described toner supply containers receives a driving force from the main assembly of an image forming apparatus to drive the feeding member in the toner supply container or the main body itself to discharge the toner. As for such a drive transmitting means, 15 there are some methods. For example, Japanese Laid-Open Utility Model Application Hei 05-75768 discloses that a gear portion is provided on an outer surface of the toner bottle (toner supply container), and the gear is engaged with a driving gear, by which the toner bottle is rotated.

20 Japanese Laid-open Patent Application Hei 10-63084 discloses that an end surface of the toner bottle is provided with a projection, which is engaged with a recess formed in a driving portion of the main assembly of the image forming apparatus, thus transmitting the driving force.



Japanese Laid-open Patent Application Hei 10-63076 discloses another type. A rotating force transmitting portion of a main assembly of an image forming apparatus has an inner diameter which is provided with a plurality of engaging grooves, and the toner container is provided with projections engageable with the engaging grooves. The rotational driving force is transmitted through the engagement therebetween.

As described, various drive transmission methods are proposed for driving the toner supply container.

However, the conventional structures involve some problems.

In the case of Japanese Laid-Open Utility Model Application Hei 05-75768, when the toner bottle is inserted into the main assembly of the image forming apparatus, it is necessary to make the gear portion on the outer surface of the toner bottle properly engage with the driving gear portion in the main assembly of an image forming apparatus. This requires the user to be careful for the proper engagement. In addition, since the toner bottle is rotated through the meshing engagement between gears, the toner bottle receives forces tending to deviate the bottle in a direction perpendicular to the axis. Therefore, there is a possibility that the toner bottle is raised or is laterally deviated with a result of improper rotation. In order to avoid such a deviation, it is required that the entire outer circumference of the toner bottle be enclosed. This imposes difficulty in the toner bottle mounting and demounting operations. Additionally, the supplying system becomes complicated and expensive.

In the methods disclosed in Japanese Laid-open Patent Application Hei 10-63084 and Japanese Laid-open Patent Application Hei 10-63076, when the toner bottle is inserted such that

projection (or recess) provided at the end surface of toner bottle is properly engaged with the basis (or projection) of the main assembly side driving portion (main assembly driving portion), an indexing operation in the rotational direction is required. This degrades the developer supplying operativity, and even a slight deviation may result in inoperability.

5           In order to avoid such an improper engagement, it is required that toner bottle is provided on its outer surface with a guiding rib so as to determine the position of the toner bottle in the rotational direction upon the insertion thereof, or that a rotating operation of the engaging recess of the main assembly driving portion is controlled to stop at a predetermined rotational position whenever it stops. This also results in complications and a cost increase.

10           In most of the coupling drive transmissions using projection/recess engagement, when the phase deviation occurs between the toner bottle and the main assembly driving portion, it is required that the main assembly driving portion is retracted against a spring force, and the engaging position is established when the phase becomes aligned. With such a structure, even if there is a phase difference when the toner bottle is inserted, the main assembly driving portion is  
15           retracted, and when the bottle is rotated in this state, the phase differences are eliminated sooner or later, and therefore, the engagement is established. However, the structure of the main assembly driving portion is complicated. In addition, the main assembly driving portion has to be movable toward the rear side, which requires additional space and therefore hinders  
              downsizing of the main assembly of the apparatus.

20           In the conventional example, it is not disclosed as to how to disengage the projection from the recess. Assuming that the operator uses force to pull the toner supply container out, or

the operator pushes the small projection with a finger, the usability is not good, or the driving portion of the image forming apparatus or the toner supply container may be damaged.

#### SUMMARY OF THE INVENTION:

5           Accordingly, it is a principal object of the present invention to provide a sealing member in which a sealing member is locked with an image forming apparatus in order to open or unseal a toner discharge opening of a toner accommodating container, and yet the sealing member can be released from the image forming apparatus with a simple structure.

10           It is another object of the present invention to provide a toner accommodating container in which a locking portion of the toner accommodating container is locked with an image forming apparatus, and the locking of the locking portion with the image forming apparatus can be released with a simple structure.

15           It is a further object of the present invention to provide a toner accommodating container in which a sealing member is locked with an image forming apparatus to open or unseal a toner discharge opening of the toner accommodating container, and yet the sealing member can be released from the image forming apparatus with a simple structure.

20           It is a further object of the present invention to provide an image forming apparatus in which a locking portion of a toner accommodating container is engaged with a portion to be locked of a mounting means, and the locking portion can be released from the portion to be locked with a simple structure.

It is a further object of the present invention to provide an image forming apparatus in which a locking portion of a sealing member is engaged with a portion to be locked of the mounting means to open or unseal a toner discharge opening of a toner accommodating container, and yet the locking portion can be released from the portion to be locked with a simple structure.

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

#### 10 BRIEF DESCRIPTION OF THE DRAWINGS:

Figure 1 is a sectional view of an image forming apparatus according to an embodiment of the present invention.

Figure 2 is a perspective view of the image forming apparatus shown in Figure 1.

Figure 3 is a perspective view illustrating mounting of a toner supply container into an image forming apparatus.

Figure 4 is a front view of an image forming apparatus of Figure 1.

Figure 5 is a side view of the image forming apparatus of Figure 1.

Figure 6 is a top plan view of the image forming apparatus in which a toner container front cover is shown as being in an open position.

Figures 7(A) through 7(C) are sectional views illustrating a toner supply container mounting operation, wherein Figure 7(A) shows an initial stage of the mounting operation,

Figure 7(B) shows the state in the process of mounting operation, and Figure 7(C) shows the state after the completion of the mounting operation.

Figure 8 is a partly broken perspective view of a toner supply container according to an embodiment of the present invention.

5           Figure 9 is a partly enlarged sectional view of a drive transmitting portion according to an embodiment of the present invention in which a driving shaft is provided on the main body side of the toner supply container.

Figure 10 is a partly broken perspective view of a toner supply container according to another embodiment of the present invention.

10           Figure 11 is a partly enlarged sectional view of a drive transmitting portion according to another embodiment of the present invention in which a driving shaft is provided on a sealing member side.

            Figures 12(A) through 12(C) are side views of a sealing member according to an embodiment of the present invention, wherein Figure 12(A) is a front view, Figure 12(B) is a side view as seen in the direction X of Figure 12(A), and Figure 12(C) is a side view as seen in the direction Y of Figure 12(A).

Figure 13 is a sectional view of a sealing member taken along a line Z-Z of Figure 12(B).

Figure 14 is a perspective view of a driving force transmitting portion and a driving force receiving portion according to an embodiment of the present invention.

20           Figures 15(A) through 15(C) are partially sectional views illustrating engaging action of a drive transmitting portion of a toner bottle, in which Figure 15(A) shows a state before insertion

of a toner bottle, Figure 15(B) shows a state in the process of insertion, and Figure 15(C) shows a state after the completion of an inserting operation.

Figure 16 is a perspective view of a driving force receiving portion according to another embodiment of the present invention.

5 Figure 17 is a sectional view of the sealing member of Figure 16.

Figures 18(A) through 18(C) are illustrations of phase alignment when the toner bottle is inserted into the main assembly of the apparatus wherein Figure 18(A) shows a state in which an engaging rib and an engaging projection are aligned with each other, Figure 18(B) shows a state in which they are not aligned after rotation to a certain extent, and Figure 18(C) shows a state in which the engaging rib is abutted to the engaging projection to enable drive transmission.

Figures 19(A) through 19(C) show a sealing member according to an embodiment of the present invention, wherein Figure 19(A) is a left side view, Figure 19(B) is a front view, and Figure 19(C) is a right-hand side view.

Figure 20 is a perspective view of a driving force transmitting portion and a driving force receiving portion according to a further embodiment of the present invention, in which phase control operation is not necessary.

Figures 21(A) through 21(C) illustrate the drive transmitting portion of Figure 20 during a toner bottle inserting operation, wherein Figure 21(A) shows a state before insertion of the toner bottle, Figure 21(B) shows a state in the process of the inserting operation, and Figure 21(C) shows a state after completion of the inserting operation.

Figures 22(A) through 22(C) illustrate disengagement action at the drive transmitting portion of the toner bottle, wherein Figure 22(A) is before disengagement, Figure 22(B) is in the process of disengagement, and Figure 22(C) is after completion of the disengagement action.

Figures 23(A) through 23(C) are sectional views of a sealing member according to a further embodiment of the present invention, wherein Figure 23(A) is a side view, Figure 23(B) is a front view, and Figure 23(C) is a sectional view.

Figure 24 is a sectional view illustrating engagement of the sealing member of Figure 23 with a driving portion.

Figures 25(A) through 25(C) are illustrations of disengagement action at the drive transmitting portion of the toner bottle, wherein Figure 25(A) is before disengagement, Figure 25(B) is in the process of disengagement, and Figure 25(C) is after the completion of the disengagement action.

Figures 26(A) and 26(B) illustrate a sealing member according to a further embodiment of the present invention, wherein Figure 26(A) is a side view, and Figure 26(B) is a sectional view taken along a line X-X.

Figures 27(A) through 27(D) show a driving portion engageable with the sealing member of Figures 26(A) and 26(B) according to a further embodiment of the present invention, wherein Figure 27(A) is a front view, Figure 27(B) is a side view, Figure 27(C) is a sectional view taken along a line C-C of Figure 27(B), and Figure 27(D) is a sectional view taken along a line D-D of Figure 27(A).

Figures 28(A) through 28(C) illustrate engaging action between the sealing member of Figures 26(A) and 26(B) and the driving portion of Figures 27(A) through 27(D), wherein Figure 28(A) shows a state in which the toner bottle is being inserted, Figure 28(B) shows a state in the process of insertion, and Figure 28(C) shows a state after the completion of insertion.

5            Figures 29(A) through 29(C) illustrate disengagement action after the engagement shown in Figures 28(A) through 28(C), wherein Figure 29(A) is before the disengagement, Figure 29(B) is in the process of the disengagement, and Figure 29(C) is after completion of the disengagement action.

10           Figures 30(A) and 30(B) are sectional views of a sealing member according to a further embodiment of the present invention, wherein Figure 30(A) is before disengagement, and Figure 30(B) is in the process of disengagement.

Figure 31 is a perspective view of a toner supply container according to a further embodiment of the present invention.

15           Figures 32(A) through 32(C) show a sealing member according to a modified embodiment of Embodiment 2.

Figure 33 is a perspective view illustrating a drive transmission for a photosensitive drum according to a further embodiment of the present invention.

Figures 34(A) and 34(B) schematically show the sealing member which is rotating.

20           Figures 35(A) through 35(C) illustrate another example in which the phase alignment is not required.



Figure 36(A) shows the sealing member shown in Figures 35(A) through 35(C) and the driving portion, and Figure 36(B) shows a sectional view of the sealing member engaged with the driving portion.

5 DESCRIPTION OF THE PREFERRED EMBODIMENTS:

A sealing member, a toner accommodating container and an image forming apparatus according to the preferred embodiments of the present invention will be described in conjunction with the accompanying drawings.

(Embodiment 1)

Referring to Figure 1, a description will first be made as to an electrophotographic image forming apparatus which is an exemplary image forming apparatus which is mounted with a toner supply container (toner accommodating container) according to an embodiment of the present invention.

(Electrophotographic image forming apparatus)

Figure 1 shows an electrophotographic copying machine. An original 101 in a main assembly (main assembly of the apparatus) 100 is placed on an original supporting platen glass 102. A light image corresponding to the image information of the original 101 is an image on an electrophotographic photosensitive drum (image bearing member) 104 through a plurality of mirrors M and a lens Ln of an optical portion 103. On the basis of selection by the user on an operating portion 100a shown in Figure 2 or on the basis of automatic selection in accordance with the paper size of the original 101, an optimum sheet P is selected from the cassettes 105, 106, 107, 108. The recording material is not limited to the sheet of paper, but may be an OHP sheet, for example.

A single sheet P supplied from one of separating devices 105A, 106A, 107A, 108A, is fed to registration rollers 110 by way of a feeding portion 109, and the sheet P is fed to the transfer portion by the registration rollers 110 in synchronism with the rotation of the photosensitive drum 104 and the scanning timing of the optical portion 103. In the transfer portion, a toner image formed on the photosensitive drum 104 is transferred onto the sheet P by the transfer

discharger 111. The sheet P now having the transferred toner image is separated from the photosensitive drum 104 by a separation discharger 112.

The sheet P is fed into a fixing portion 114 by a feeding portion 113. In the fixing portion 114, the toner image is fixed on the sheet P by heat and pressure. Thereafter, the sheet P is  
5 passed through a discharged sheet reversing portion 115 and discharged to a sheet discharge tray 117 by sheet discharging rollers 116 in the case of a one-sided copy mode. In the case of a duplex copy mode, the sheet P is re-fed to the registration rollers 110 through sheet refeeding paths 119, 120, under the control of a flapper 118 provided in the discharged sheet reversing  
10 portion 115. Then, the sheet is fed similarly to the case of the one-sided copy mode, and is finally discharged to the sheet discharge tray 117.

In the case of a superimposed copy mode, the sheet P is temporarily and partly discharged by the sheet discharging rollers 116 through the discharged sheet reversing portion 115. Thereafter, at the timing when the trailing edge of the sheet passes by the flapper 118 while it is still nipped by the sheet discharging rollers 116, the flapper 118 is controlled, and the sheet  
15 discharging roller 116 is rotated in the reverse direction, so that it is re-fed into the main assembly 100. Thereafter, the sheet is fed to the registration rollers 110 through the sheet refeeding portions 119, 120, and then the sheet is processed similarly to the case of the one-sided copy mode. It is finally discharged to the sheet discharge tray 117.

In the main assembly 100 of the apparatus, there are provided a developing device 201  
20 (developing means), a cleaning device 202, the primary charger 203 and so on, around the photosensitive drum 104.

An electrostatic latent image is formed by exposing the photosensitive drum 104 to uniformly double to the image light corresponding to the image information of the original 101. The electrostatic latent image is developed with toner by a developing device 201. In order to supply the toner (developer) into the developing device 201, a toner supply container 1 is detachably mountable by the user into the main assembly 100 of the apparatus. The present invention is applicable to the case in which only the toner is supplied into the image forming apparatus from the toner supply container and to the case in which the toner and carrier are supplied therefrom. In this embodiment, the former is the case.

The developing device 201 comprises a toner hopper 201a (accommodating means) and a developing device 201b. The toner hopper 201a is provided with a stirring member 201c for stirring the toner supply designated from the toner supply container 1. The toner stirred by the stirring member 201c is supplied into the developing device 201b by a magnet roller 201d. The developing device 201b comprises a developing roller 201f and a feeding member 201e. The toner fed from the toner hopper 201a by the magnet roller 201d is fed to the developing roller 201f by the feeding member 201e, and is supplied to the photosensitive drum 104 by the developing roller 201f.

The cleaning device 202 functions to remove the toner remaining on the photosensitive drum 104. The primary charger 203 functions to electrically charge the photosensitive drum 104.

When the user opens a front cover 15 for exchange of the toner supply container which is a part of an outer casing shown in Figure 2, a container receiving tray 50, which is a part of the mounting means, is drawn out to a predetermined position by an unshown driving system. The

user places the toner supply container 1 on the container receiving tray 50. When the user takes the toner supply container 1 out of the main assembly 100 of the apparatus, the container receiving tray 50 is drawn out, and the toner supply container 1 is taken out of the tray 50.

5 The front cover 15 is provided exclusively for mounting and demounting (exchange) of the toner supply container 1, and therefore, it is opened and closed only for that purpose. When the maintenance operation for the main assembly 100 of the apparatus is to be carried out, the front cover 100c is opened.

The toner supply container 1 may be directly mounted to the main assembly 100 of the apparatus, and may be taken out.

10 (Toner supply operation)

Referring to Figure 7(A) and Figure 7(C), the toner supply operation from the toner supply container (toner bottle) in this embodiment, will be described. Figures 7(A) - 7(C) illustrate the process of toner supply in which the toner bottle 1 of this embodiment is inserted into the main assembly 100 of the apparatus.

15 As shown in the Figures, the main assembly 100 of the apparatus is provided with a toner supply device 400, and the toner supply device 400 is provided with a driving portion (driving force transmitting portion) 20 for connecting with and rotating the toner bottle 1. The driving portion 20 is rotatably supported by bearings 23, and is rotated by an unshown driving motor provided in the main assembly 100 of the apparatus.

20 The main assembly 100 of the apparatus is further provided with a partition 25 constituting a toner supply path 24 connecting with a hopper 201a, and to the partition 25, inner

and outer bearings 26a, 26b for rotatably bearing a part of the toner bottle 1 and for sealing the toner supply path 24, are fixed. Furthermore, a screw member 27 is disposed in the toner supply path 24 to feed the toner to the hopper 201a.

Figure 7(A) illustrates insertion of the toner bottle 1 into the main assembly 100 of the apparatus. One end of the toner bottle 1 is provided with a toner supply opening 1a, which will be called simply "opening", formed by a cylindrical member in this embodiment, the opening 1a sealed by a sealing member 2 at the free end of the cylinder.

Figure 7(B) shows a state in which the toner bottle 1 has been further inserted, and an engaging projection 3 (as a locking projection) provided at a free end portion of the sealing member 2 is engaged with a locking hole (retaining) with the driving portion 20 provided in the main assembly. The engagement between the driving portion 20 and the sealing member 2 is accomplished in the following manner. The user inserts the toner bottle 1 into the main assembly, and by this, the driving portion 20 is brought into contact with an upper surface (locking force receiving portion) of the engaging projection. By further inserting the toner bottle 1, the driving portion 20 presses down the engaging projection to displace it. Thereafter, when the pressing action by the driving portion 20 is released, the portion supporting the locking projection restores by its own elastic force, so that engagement is accomplished.

Thus, in this embodiment, the engagement is a so-called "snap-fit" type.

Since the locking surface 3b (locking portion) provided in the engaging projection 3 is locked with a locking hole (portion to be locked) against a thrust direction (axial direction)

motion, and therefore, as long as the locking is maintained, the sealing member 2 is retained at the fixed position by the driving portion 20, although small play is permissible.

As will be understood from Figure 7(C), after the sealing member 2 and the driving portion 20 are engaged, a slidable member 300 is retracted in a direction indicated by an arrow b in interrelation with a closing operation of the front cover 15 for exchange of the bottle. By this, the toner bottle 1 is retracted, too, but the sealing member is locked with the main assembly side of the image forming apparatus, and therefore, the sealing member 2 is away from the toner bottle 1, thus opening the opening 1a to enable toner supply.

At the time, the driving shaft 1b fixed to the main body 1A of the toner bottle 1, is not completely disengaged from the sealing member 2 even in the state of the opening 1a being sealed by the sealing member and even in the state of the opening being opened, and the engaging portion (hole portion) of the sealing member is kept engaged with the driving shaft 1b (portion to be engaged). The driving shaft 1b has a non-circular cross-sectional configuration, such as rectangular or triangular shape to permit driving force transmission. Correspondingly, the hole (engaging portion) has a complementary configuration for slidable fitting.

When an unshown motor is driven in this state, the rotational driving force is transmitted to a driving force receiving surface (driving force receiving portion) of the engaging projection of the sealing member 2 from the main assembly driving portion 20 (the driving portion provided in the main assembly), and the driving force is transmitted from the sealing member 2 to the driving shaft 1b, which rotates the toner bottle 1 to feed and discharge the toner.

Thus, the sealing member 2 has a function of sealing the opening 1a, a function of receiving the rotational driving force from the main assembly side of the image forming apparatus, and a function of transmitting the rotational driving force to the toner bottle 1 side.

5 The toner bottle 1 is rotatably supported by bottle receiving roller 23 provided on a container receiving tray 50, and therefore, can be smoothly rotated by a small driving torque. The bottle receiving roller 23 is disposed at each of four positions forming a saddle with respect to the main body 1A of the bottle. The bottle receiving rollers 23 are rotatably supported on the toner supply device 400 of the main assembly 100 of the apparatus. By the rotation of the toner bottle 1, the toner accommodated in the toner bottle 1 is discharged through the opening 1a  
10 gradually, and the screw member 27 provided in the toner supply path 24 feeds the toner into the hopper 201a provided in the main assembly 100 of the apparatus, thus accomplishing the toner supply.

(Exchanging method for toner supply container)

A description will be made as to an exchanging method of the toner bottle.

15 With the image forming operation, the toner in the toner bottle 1 is consumed. When substantially all the toner therein is used up, the "no toner" is detected by a detecting means (unshown) provided in the main assembly 100 of the apparatus, and the event is notified to the user by a displaying means 100b (Figure 2) such as liquid crystal display.

In this embodiment, the toner bottle 1 is easily exchanged by the user, through the  
20 following steps.



First, the front cover 15 which is in the closed state is rotated about a hinge 18 to an open position indicated by broken lines in Figure 6. In interrelation with the action of opening the front cover 15, the main body 1A of the bottle which takes the position indicated in Figure 7(C) is moved in a direction indicated by an arrow a in Figure 7(A) which is opposite from the direction of arrow b, by opening and closing means for the toner supplying portion which will be described hereinafter. By this, the sealing member 2 which is at an open position (away from the main body 1A of the bottle to open the toner supply opening 1a) is press-fitted into the toner supply opening 1a, so that the toner supply opening 1a is plugged (Figure 7(B)). At this time, the sealing member still maintains engagement with the main assembly of the image forming apparatus. Thereafter, a releasing ring applies a releasing force to a releasing projection, by which the releasing projection is depressed together with the engaging projection, so that engagement is released. By retracting the main body 1A of the bottle in a longitudinal direction of the bottle, the releasing operation between the sealing member and the main assembly of the image forming apparatus is completed.

Then, the user draws the empty toner bottle 1 which has been released from the main assembly 100 of the apparatus out of the main assembly 100 of the apparatus in the direction of arrow b (Figure 7(C)) which is opposite from the direction of arrow a (Figure 7(A)).

The user then inserts a new toner bottle 1 into the main assembly 100 of the apparatus in the direction of arrow a, and then closes the front cover 15. In interrelation with the front cover 15 closing action, the sealing member 2 locked with the main assembly of the image forming apparatus is moved away from the main body of the container by the toner supplying portion

opening and closing means, so that the toner supply opening 1a is unsealed (Figure 7(C)). The foregoing is the exchanging process of the toner supply container.

(Toner bottle)

Referring to Figure 8 and Figure 9, the toner bottle will be described.

5           The toner bottle 1 is generally cylindrical, and one end thereof is provided substantially at a center with an opening 1a by a projected portion. The diameter of the opening 1a is smaller than the diameter of the cylindrical portion 1A which is the main body of the bottle. The opening 1a is plugged with a sealing member 2 for sealing the opening 1a, and as will be understood from the description in conjunction with Figures 7(A) – (C), the opening 1a is unsealed and resealed  
10 automatically by the sliding motion of the sealing member 2 relative to the toner bottle 1 in the longitudinal direction (arrow b) of the toner bottle 1.

At the free end portion of the sealing member 2, there is formed a cylindrical portion having an engaging projection 3 and a releasing force receiving portion 4 for disengaging from the driving portion 20 provided in the main assembly of the apparatus, and such a portion of the  
15 cylindrical portion which supports the engaging projection and the releasing projection is elastically deformable (in order to enhance or assist the elastic deformation, slits are formed at lateral sides of the region so as to extend to the free end of the cylindrical portion, as will be described hereinafter).

The engaging projection 3 is engaged with the driving portion 20 and functions to  
20 transmit the rotation to the toner bottle 1. The structures of the engaging projection 3 and the releasing force will be described in detail hereinafter.

The internal structure of the toner bottle 1 will be described.

As described in the foregoing, the toner bottle 1 is generally cylindrical in shape and is disposed generally horizontally in the main assembly 100 of the apparatus. It is rotated by the main assembly 100 of the apparatus. An inside of the toner bottle 1 has a projection 1c in the  
5 form of a rib which extends helically. When the toner bottle 1 rotates, the toner is fed in the axial direction along the helical projection 1c, and the toner is discharged through the opening 1a formed at an end of the toner bottle 1.

The internal structure of the toner bottle 1 according to the present invention is not limiting, and the configuration of the structure may be any as long as the toner can be discharged  
10 by rotation of the toner bottle 1. The main body of the toner bottle is not limited to that described in the foregoing. For example, it may have a rotation screw or the like for feeding the toner, and the rotation screw is driven by a rotational driving force received by the sealing member from the image forming apparatus, while the main body is fixed (not rotatable) on the main assembly of the image forming apparatus.

15 A feature of this embodiment is in the structure of the drive transmitting portion for connection with the main assembly 100 of the apparatus, and therefore, the internal structure of the toner bottle 1 may be any, and the bottle may have a helical projection 1c on the inner surface of the bottle.

For example, the internal structure of the bottle may be modified as shown in Figure 10.  
20 In this modified example, there is provided in the main body of the bottle a baffle member 40 generally in the form of a plate. The surface of the baffle member 40 has, on a surface, a

plurality of inclined projections 40a which are inclined with respect to the direction of the axis of the toner bottle 1. One end of the inclined projection 40a extends to a neighborhood of the opening 1a. The toner is finally discharged from the inclined projection 40a through the opening 1a. By the rotation of the toner bottle 1, the toner is scooped by the baffle member 40 and then falls sliding on the surface of the baffle member 40. Because of the inclination of the inclined projection 40a, the toner is advanced toward the front side of the toner bottle 1. By repeating this operation, the toner in the toner bottle is gradually fed to the opening 1a while being stirred, and is discharged therethrough.

The driving type of this invention is not limited to the rotational driving type such as the type of this embodiment or modification. The toner bottle may be vibrated, swung or may be moved in another fashion to supply the toner. In other words, the driving may be rotation, swinging, vibration or another motion as long as the toner is discharged from the bottle as the toner bottle is moved by the main assembly 100 of the apparatus.

In the above-described modified example, the baffle member 40 in the form of the plate is a separate member from the toner bottle 1, and the rotational driving force is transmitted to the baffle member 40 through the sealing member 2 to indirectly rotate the toner bottle 1.

In this manner, the present invention is applicable when the toner bottle 1 is directly or indirectly driven through a sealing member 2.

In Figures 8 and 9, the main body 1A of the bottle is provided with the opening 1a at the one longitudinal end surface thereof, and a driving shaft 1b (portion to be engaged) is projected out of the opening 1a, the driving shaft 1b being integral with the main body 1A of the bottle and