

(12) **United States Patent**
Kubo

(10) **Patent No.:** **US 9,411,308 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **IMAGE FORMING APPARATUS**
(71) Applicant: **Sharp Kabushiki Kaisha**, Osaka (JP)
(72) Inventor: **Takashi Kubo**, Osaka (JP)
(73) Assignee: **Sharp Kabushiki Kaisha**, Osaka (JP)
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

2003/0115783 A1 6/2003 Woosley
2005/0244203 A1 11/2005 Kamiyama
2007/0019981 A1 1/2007 Kawamata
2008/0044213 A1 2/2008 Kato et al.
2008/0226325 A1 9/2008 Yamanaka et al.
2009/0297233 A1 12/2009 Kameda
2011/0176823 A1 7/2011 Kameda

(Continued)

FOREIGN PATENT DOCUMENTS

JP 08-036348 A 2/1996
JP 08036348 A * 2/1996 G03G 21/20

(Continued)

(21) Appl. No.: **14/525,660**
(22) Filed: **Oct. 28, 2014**

OTHER PUBLICATIONS

(65) **Prior Publication Data**
US 2015/0043938 A1 Feb. 12, 2015

Co-pending U.S. Appl. No. 13/543,987, filed Jul. 9, 2012 (current claims provided).

Related U.S. Application Data

(63) Continuation of application No. 13/543,987, filed on Jul. 9, 2012, now Pat. No. 8,903,265.

Primary Examiner — David Gray

Assistant Examiner — Sevan A Aydin

(30) **Foreign Application Priority Data**

Aug. 26, 2011 (JP) 2011-184586

(74) *Attorney, Agent, or Firm* — Renner, Otto, Boisselle & Sklar, LLP

(51) **Int. Cl.**
G03G 15/20 (2006.01)
G03G 21/20 (2006.01)
(52) **U.S. Cl.**
CPC **G03G 21/206** (2013.01); **G03G 15/2028** (2013.01)

(57) **ABSTRACT**

The fixing apparatus is configured to include a fixing roller, a paper separation claw, a drive source that switches between a state in which the paper separation claw is in contact with the fixing roller and a state in which the paper separation claw is separated from the fixing roller, and a paper transport guide that is disposed on the downstream side of the fixing roller, the drive source including a heat generating element, and to further include a main ventilation channel that channels cooling air to a fixed paper sheet passing over the paper transport guide and a sub ventilation channel that is branched from the main ventilation channel and channels a portion of the cooling air to the heat generating element.

(58) **Field of Classification Search**
CPC G03G 15/2017
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

3,861,796 A 1/1975 Tanaka et al.
5,227,852 A 7/1993 Smith et al.
5,669,055 A 9/1997 Thayer et al.
2002/0164172 A1 11/2002 Tsubaki et al.

20 Claims, 8 Drawing Sheets

