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**Koshida**

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(54) **BELT UNIT, IMAGE FORMING APPARATUS AND BELT MEMBER EXCHANGING METHOD**

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See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

5,630,194 A \* 5/1997 Fujita ..... G03G 15/167  
399/121  
2009/0110435 A1 4/2009 Spence et al.  
2010/0329738 A1 12/2010 Shirai

**FOREIGN PATENT DOCUMENTS**

JP 2001-337577 A 12/2001  
JP 2004-029308 A 1/2004  
JP 2004-144877 A 5/2004  
JP 2010-204250 A 9/2010  
JP 2011-013305 A 1/2011

**OTHER PUBLICATIONS**

U.S. Appl. No. 14/138,423, filed Dec. 23, 2013, Kohei Koshida.  
Chinese Office Action dated Sep. 6, 2015, in related Chinese Patent Application No. 201310726162.9 (with English translation).

\* cited by examiner

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(57) **ABSTRACT**

A belt unit for use with an image forming apparatus includes a belt member, a belt supporting unit, and a cleaning unit. The cleaning unit includes attached portions engaged with attaching portions of the belt supporting unit to mount the cleaning unit in an attached position, a connecting portion connectable with a connected portion on the belt supporting unit, and a contact portion that contacts a horizontal surface when the cleaning unit is placed on the horizontal surface. When the belt supporting unit is in a standing state in which one of its side units is directed downward and a direction of rotation axis of supporting rollers is directed in a vertical direction, the cleaning unit is placed on the horizontal surface and the connected portion, and the connecting portion are connected, the cleaning unit maintains the belt supporting unit in the standing state.

**10 Claims, 24 Drawing Sheets**

