

# EXHIBIT 1



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(54) **ELECTROPHOTOGRAPHIC IMAGE FORMING APPARATUS, DEVELOPING APPARATUS, AND COUPLING MEMBER**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

|             |              |
|-------------|--------------|
| 899,913 A   | 9/1908 Shaw  |
| 2,292,676 A | 8/1942 Thiry |

(Continued)

FOREIGN PATENT DOCUMENTS

|    |         |        |
|----|---------|--------|
| CN | 1205459 | 1/1999 |
| CN | 1346077 | 4/2002 |

(Continued)

OTHER PUBLICATIONS

Smith Corona 5H Series Personal Word Processors Service Manual,  
dated Sep. 1989.

(Continued)

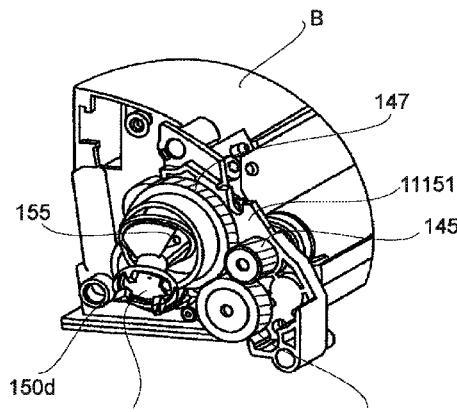
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(57) **ABSTRACT**

An image forming apparatus cartridge comprises a developer roller having an axis L1 and a coupling member having an axis L2. The coupling member includes (i) a first end portion operatively connected to the developer roller, (ii) a second end portion including at least one projection, and (iii) a connecting portion connecting the first end portion and the second end portion. The coupling member is movable between (i) a first position in which a tip of the at least one projection is a first distance away from the developer roller as measured in the direction of the axis L1 and (ii) a second position in which the tip of the at least one projection is a second distance away from the developer roller as measured in the direction of the axis L1, wherein the first distance is greater than the second distance.

**28 Claims, 75 Drawing Sheets**



**US 9,851,688 B2**

Page 2

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13/764,073, filed on Feb. 11, 2013, now Pat. No. 8,688,008, which is a division of application No. 12/053,982, filed on Mar. 24, 2008, now Pat. No. 8,437,669.

**(56) References Cited****U.S. PATENT DOCUMENTS**

|               |         |                     |              |         |                  |
|---------------|---------|---------------------|--------------|---------|------------------|
| 2,300,514 A   | 11/1942 | Mallman             | 5,991,571 A  | 11/1999 | Yamada et al.    |
| 3,406,534 A   | 10/1968 | Chapper             | 5,993,101 A  | 11/1999 | Kohno et al.     |
| 3,490,841 A   | 1/1970  | Celry, Jr. et al.   | 6,011,942 A  | 1/2000  | Taniguchi et al. |
| 3,815,380 A   | 6/1974  | Esmay               | 6,029,027 A  | 2/2000  | Yokomori et al.  |
| 3,818,380 A   | 6/1974  | Tyre                | 6,029,031 A  | 2/2000  | Yokomori et al.  |
| 3,922,883 A   | 12/1975 | Bevacqua            | 6,032,002 A  | 2/2000  | Yokomori et al.  |
| 4,065,941 A * | 1/1978  | Aoki .....          | 6,032,008 A  | 2/2000  | Kolodziej        |
|               |         | F16D 3/207          | 6,058,280 A  | 5/2000  | Kumar et al.     |
|               |         | 464/115             | 6,061,535 A  | 5/2000  | Yokomori et al.  |
|               |         |                     | 6,064,843 A  | 5/2000  | Isobe et al.     |
|               |         |                     | 6,070,028 A  | 5/2000  | Odagawa et al.   |
|               |         |                     | 6,072,968 A  | 6/2000  | Nomura et al.    |
|               |         |                     | 6,072,969 A  | 6/2000  | Yokomori et al.  |
|               |         |                     | 6,115,569 A  | 9/2000  | Akutsu           |
|               |         |                     | 6,118,962 A  | 9/2000  | Casper et al.    |
|               |         |                     | 6,128,452 A  | 10/2000 | Miyabe et al.    |
|               |         |                     | 6,137,970 A  | 10/2000 | Sasago           |
|               |         |                     | 6,152,826 A  | 11/2000 | Profeta et al.   |
|               |         |                     | 6,154,623 A  | 11/2000 | Suzuki et al.    |
|               |         |                     | 6,157,799 A  | 12/2000 | Asakura et al.   |
|               |         |                     | 6,167,219 A  | 12/2000 | Miyamoto et al.  |
| 4,106,611 A   | 8/1978  | Suzuki et al.       | 6,173,140 B1 | 1/2001  | Suzuki et al.    |
| 4,167,321 A   | 9/1979  | Miyashita et al.    | 6,173,145 B1 | 1/2001  | Chadani et al.   |
| 4,320,429 A   | 3/1982  | Knerich et al.      | 6,175,705 B1 | 1/2001  | Harada et al.    |
| 4,433,767 A   | 2/1984  | Thor                | 6,198,891 B1 | 3/2001  | Ishida et al.    |
| 4,439,257 A   | 3/1984  | Sato et al.         | 6,215,969 B1 | 4/2001  | Nomura et al.    |
| 4,451,117 A   | 5/1984  | Goode               | 6,240,266 B1 | 5/2001  | Watanabe et al.  |
| 4,457,738 A   | 7/1984  | Gross et al.        | 6,249,663 B1 | 6/2001  | Aizawa et al.    |
| 4,607,734 A   | 8/1986  | Watashi et al.      | 6,256,467 B1 | 7/2001  | Yokomori et al.  |
| 4,692,127 A   | 9/1987  | Wagner              | 6,282,390 B1 | 8/2001  | Miyabe et al.    |
| 4,835,565 A   | 4/1989  | Nagatsuna et al.    | 6,301,458 B1 | 10/2001 | Mori et al.      |
| 4,829,335 A   | 5/1989  | Kanemitsu et al.    | 6,317,572 B1 | 11/2001 | Miyabe et al.    |
| 4,833,502 A   | 5/1989  | Azuma               | 6,336,012 B1 | 1/2002  | Noda et al.      |
| 4,839,690 A   | 6/1989  | Onoda et al.        | 6,336,017 B1 | 1/2002  | Miyamoto et al.  |
| 4,873,549 A   | 10/1989 | Tada et al.         | 6,336,018 B1 | 1/2002  | Kawai et al.     |
| 5,019,867 A   | 5/1991  | Yamakawa et al.     | 6,343,192 B1 | 1/2002  | Miyabe et al.    |
| 5,023,660 A   | 6/1991  | Ebata et al.        | 6,349,191 B1 | 2/2002  | Willis           |
| 5,036,369 A   | 7/1991  | Toda et al.         | 6,351,620 B1 | 2/2002  | Miyabe et al.    |
| 5,106,224 A   | 4/1992  | van Gelderen        | 6,366,748 B1 | 4/2002  | Takeuchi et al.  |
| 5,128,715 A   | 7/1992  | Furyama et al.      | 6,385,416 B1 | 5/2002  | Horikawa et al.  |
| 5,132,728 A   | 7/1992  | Suzaki et al.       | 6,397,029 B1 | 5/2002  | Portig           |
| 5,168,319 A   | 12/1992 | Kimura et al.       | 6,400,914 B1 | 6/2002  | Noda et al.      |
| 5,177,854 A   | 1/1993  | Herbert, Jr. et al. | 6,415,121 B1 | 7/2002  | Suzuki et al.    |
| 5,210,574 A   | 5/1993  | Kita                | 6,418,296 B1 | 7/2002  | Aizawa et al.    |
| 5,235,383 A   | 8/1993  | Tada et al.         | 6,452,826 B1 | 9/2002  | Kim et al.       |
| 5,247,847 A   | 9/1993  | Gu                  | 6,473,580 B1 | 10/2002 | Inomata          |
| 5,277,659 A   | 1/1994  | Cornay              | 6,490,426 B1 | 12/2002 | Zaman            |
| 5,290,203 A   | 3/1994  | Krude               | 6,501,926 B1 | 12/2002 | Watanabe et al.  |
| 5,331,373 A   | 7/1994  | Nomura et al.       | 6,517,439 B1 | 2/2003  | Sears            |
| 5,452,056 A   | 9/1995  | Nomura et al.       | 6,519,431 B1 | 2/2003  | Toba et al.      |
| 5,463,446 A   | 10/1995 | Watanabe et al.     | 6,542,706 B2 | 4/2003  | Toba et al.      |
| 5,562,357 A   | 10/1996 | Sandell             | 6,546,220 B1 | 4/2003  | Asakura et al.   |
| 5,579,085 A   | 11/1996 | Miyabe et al.       | 6,549,736 B2 | 4/2003  | Miyabe et al.    |
| 5,583,618 A   | 12/1996 | Takeuchi et al.     | 6,549,738 B2 | 4/2003  | Otani et al.     |
| 5,583,630 A   | 12/1996 | Kimura et al.       | 6,556,799 B2 | 4/2003  | Saito            |
| 5,585,889 A   | 12/1996 | Shishido et al.     | 6,572,480 B1 | 6/2003  | Huang            |
| 5,640,650 A   | 6/1997  | Watanabe et al.     | 6,574,446 B2 | 6/2003  | Kitayama         |
| 5,738,586 A   | 4/1998  | Arriaga             | 6,577,831 B1 | 6/2003  | Kojima et al.    |
| 5,740,500 A   | 4/1998  | Hashimoto           | 6,603,939 B1 | 8/2003  | Toba et al.      |
| 5,749,028 A   | 5/1998  | Damji et al.        | 6,608,980 B2 | 8/2003  | Murayama et al.  |
| 5,809,380 A   | 9/1998  | Katakabe et al.     | 6,654,580 B2 | 11/2003 | Yamaguchi et al. |
| 5,839,028 A   | 11/1998 | Nomura et al.       | 6,678,488 B2 | 1/2004  | Toba et al.      |
| 5,845,175 A   | 12/1998 | Kumar et al.        | 6,699,550 B2 | 3/2004  | Suzuki et al.    |
| 5,848,334 A   | 12/1998 | Kamola              | 6,704,522 B2 | 3/2004  | Sasago et al.    |
| 5,855,519 A   | 1/1999  | Kadota              | 6,714,746 B2 | 3/2004  | Morioka          |
| 5,878,309 A   | 3/1999  | Nomura et al.       | 6,714,752 B2 | 3/2004  | Ueno et al.      |
| 5,878,310 A   | 3/1999  | Noda et al.         | 6,725,004 B2 | 4/2004  | Ahn et al.       |
| 5,878,492 A   | 3/1999  | Gleasman et al.     | 6,768,890 B2 | 7/2004  | Cho et al.       |
| 5,903,803 A   | 5/1999  | Kawai et al.        | 6,795,666 B2 | 9/2004  | Miyabe et al.    |
| 5,907,750 A   | 5/1999  | Yamada et al.       | 6,823,153 B2 | 11/2004 | Ueno et al.      |
| 5,920,753 A   | 7/1999  | Sasaki et al.       | 6,823,160 B2 | 11/2004 | Okabe            |
| 5,926,666 A   | 7/1999  | Miura et al.        | 6,829,455 B2 | 12/2004 | Yasumoto et al.  |
| 5,926,672 A   | 7/1999  | Nishibata et al.    | 6,834,175 B2 | 12/2004 | Murayama et al.  |
| 5,930,562 A   | 7/1999  | Noda et al.         | 6,836,629 B2 | 12/2004 | Miyabe et al.    |
| 5,943,529 A   | 8/1999  | Miyabe et al.       | 6,954,600 B2 | 2/2005  | Persson et al.   |
| 5,946,531 A   | 8/1999  | Miura et al.        | 6,968,144 B2 | 3/2005  | Skladman et al.  |
| 5,950,047 A   | 9/1999  | Miyabe et al.       | 6,898,391 B2 | 5/2005  | Numagami et al.  |
| 5,953,562 A   | 9/1999  | Kawaguchi et al.    |              |         |                  |

**US 9,851,688 B2**

Page 3

| (56)                  | References Cited |                         |                  |         |                                       |  |
|-----------------------|------------------|-------------------------|------------------|---------|---------------------------------------|--|
| U.S. PATENT DOCUMENTS |                  |                         |                  |         |                                       |  |
| 6,931,226 B2          | 8/2005           | Chadani et al.          | 2001/0041080 A1  | 11/2001 | Higeta et al.                         |  |
| 6,934,485 B2          | 8/2005           | Miyabe et al.           | 2002/0018666 A1  | 2/2002  | Noda et al.                           |  |
| 6,937,832 B2          | 8/2005           | Sato et al.             | 2002/0025191 A1  | 2/2002  | Kitayama                              |  |
| 6,950,621 B2          | 9/2005           | Himes                   | 2002/0034398 A1  | 3/2002  | Higeta et al.                         |  |
| 6,954,601 B2          | 10/2005          | Numagami et al.         | 2002/0044794 A1  | 4/2002  | Nishiuwakoto et al.                   |  |
| 6,963,706 B2          | 11/2005          | Morioka et al.          | 2002/0057928 A1  | 5/2002  | Yasumoto et al.                       |  |
| 6,968,146 B1          | 11/2005          | Fujita et al.           | 2002/005932 A1   | 5/2002  | Aizawa et al.                         |  |
| 6,970,668 B2          | 11/2005          | Ueno et al.             | 2002/0110385 A1  | 8/2002  | Terada et al.                         |  |
| 6,978,099 B2          | 12/2005          | Ueno et al.             | 2002/0110388 A1  | 8/2002  | Yokomori et al.                       |  |
| 6,980,758 B2          | 12/2005          | Murayama et al.         | 2003/0049051 A1  | 3/2003  | Takahashi et al.                      |  |
| 7,003,247 B2          | 2/2006           | Koishi et al.           | 2003/0059233 A1  | 3/2003  | Jang et al.                           |  |
| 7,016,626 B2          | 3/2006           | Yokomori et al.         | 2003/0123904 A1  | 7/2003  | Maeshima et al.                       |  |
| 7,020,410 B2          | 3/2006           | Zogg et al.             | 2003/0138270 A1  | 7/2003  | Matsuoka                              |  |
| 7,024,131 B2          | 4/2006           | Komatsu et al.          | 2003/0156848 A1  | 8/2003  | Kawai et al.                          |  |
| 7,062,200 B2          | 6/2006           | Ueno et al.             | 2003/0235429 A1  | 12/2003 | Sato et al.                           |  |
| 7,079,783 B2          | 7/2006           | Yokoi                   | 2004/0086300 A1  | 5/2004  | Kawai et al.                          |  |
| 7,079,787 B2          | 7/2006           | Ogino et al.            | 2004/0114977 A1  | 6/2004  | Bloemen et al.                        |  |
| 7,092,658 B2          | 8/2006           | Yasumoto et al.         | 2004/0136746 A1  | 7/2004  | Komatsu et al.                        |  |
| 7,121,205 B2          | 10/2006          | Ono et al.              | 2004/0179862 A1  | 9/2004  | Ono et al.                            |  |
| 7,127,192 B2          | 10/2006          | Batori et al.           | 2004/0190937 A1  | 9/2004  | Mercer et al.                         |  |
| 7,136,604 B2          | 11/2006          | Chadani et al.          | 2005/0031374 A1  | 2/2005  | Nagashima et al.                      |  |
| 7,139,502 B2          | 11/2006          | Koishi et al.           | 2005/0105936 A1  | 5/2005  | Morioka et al.                        |  |
| 7,147,457 B2          | 12/2006          | Iten                    | 2005/0111881 A1  | 5/2005  | Arimitsu et al.                       |  |
| 7,149,457 B2          | 12/2006          | Miyabe et al.           | 2005/0111882 A1  | 5/2005  | Sudo et al.                           |  |
| 7,155,141 B2          | 12/2006          | Sato et al.             | 2005/0117934 A1  | 6/2005  | Murayama et al.                       |  |
| 7,158,735 B2          | 1/2007           | Murayama et al.         | 2005/0143179 A1  | 6/2005  | Delaney et al.                        |  |
| 7,158,736 B2          | 1/2007           | Sato et al.             | 2005/0191092 A1  | 9/2005  | Toso et al.                           |  |
| 7,164,875 B2          | 1/2007           | Miyabe et al.           | 2005/0220481 A1  | 10/2005 | Yamaguchi et al.                      |  |
| 7,174,122 B2          | 2/2007           | Fujita et al.           | 2005/0244858 A1  | 11/2005 | Numagami et al.                       |  |
| 7,184,690 B2          | 2/2007           | Ueno et al.             | 2005/0281586 A1  | 12/2005 | Ohashi et al.                         |  |
| 7,200,349 B2          | 4/2007           | Sato et al.             | 2005/0286931 A1  | 12/2005 | Kim et al.                            |  |
| 7,209,682 B2          | 4/2007           | Numagami et al.         | 2006/0002735 A1  | 1/2006  | Tamaru et al.                         |  |
| 7,212,768 B2          | 5/2007           | Numagami et al.         | 2006/0008289 A1  | 1/2006  | Sato et al.                           |  |
| 7,212,773 B2          | 5/2007           | Sudo et al.             | 2006/0029435 A1  | 2/2006  | Kasai et al.                          |  |
| 7,224,925 B2          | 5/2007           | Sato et al.             | 2006/0034637 A1  | 2/2006  | Kim et al.                            |  |
| 7,236,722 B2          | 6/2007           | Portig                  | 2006/0035637 A1  | 2/2006  | Kim et al.                            |  |
| 7,242,890 B2          | 7/2007           | Yokota                  | 2006/0093398 A1  | 5/2006  | Hayakawa                              |  |
| 7,242,893 B2          | 7/2007           | Murakami et al.         | 2006/0140672 A1  | 6/2006  | Taguchi                               |  |
| 7,248,810 B2          | 7/2007           | Miyabe et al.           | 2006/0146371 A1  | 7/2006  | Hoashi et al.                         |  |
| 7,289,752 B2          | 10/2007          | Yamazaki et al.         | 2006/0182465 A1  | 8/2006  | Funamoto et al.                       |  |
| 7,315,710 B2          | 1/2008           | Ueno et al.             | 2006/0228127 A1  | 10/2006 | Miyabe et al.                         |  |
| 7,349,657 B2          | 3/2008           | Sato et al.             | 2006/0240896 A1  | 10/2006 | Ohashi et al.                         |  |
| 7,366,443 B2          | 4/2008           | Ohashi et al.           | 2006/0257164 A1  | 11/2006 | Hoshi et al.                          |  |
| 7,366,445 B2          | 4/2008           | Hoashi et al.           | 2006/0269318 A1  | 11/2006 | Ueno et al.                           |  |
| 7,366,452 B2          | 4/2008           | Fujita et al.           | 2007/0042826 A1  | 2/2007  | Furusawa                              |  |
| 7,403,733 B2          | 7/2008           | Watanabe et al.         | 2007/0059038 A1  | 3/2007  | Shiraki                               |  |
| 7,421,235 B2          | 9/2008           | Choi                    | 2007/0065183 A1  | 3/2007  | Tomita                                |  |
| 7,424,247 B2          | 9/2008           | Iwasaki                 | 2007/0104510 A1  | 5/2007  | Kawai et al.                          |  |
| 7,433,622 B2          | 10/2008          | Chadani et al.          | 2007/0110478 A1  | 5/2007  | Numagami et al.                       |  |
| 7,433,628 B2          | 10/2008          | Kwon et al.             | 2007/0122188 A1  | 5/2007  | Igarashi                              |  |
| 7,491,161 B2          | 2/2009           | Taguchi                 | 2007/0196131 A1  | 8/2007  | Sato                                  |  |
| 7,509,075 B2          | 3/2009           | Hayakawa                | 2007/0237545 A1  | 10/2007 | Cho et al.                            |  |
| 7,526,228 B2          | 4/2009           | Shiraki                 | 2007/0264048 A1  | 11/2007 | Kuroda                                |  |
| 7,529,507 B2          | 5/2009           | Ohashi et al.           | 2008/0025757 A1  | 1/2008  | Sato et al.                           |  |
| 7,537,410 B2          | 5/2009           | Parisi et al.           | 2008/0102966 A1  | 5/2008  | Gleasman                              |  |
| 7,603,059 B2          | 10/2009          | Marumoto                | 2008/0117482 A1  | 5/2008  | Kusumi                                |  |
| 7,623,811 B2          | 11/2009          | Sato                    | 2008/0152338 A1  | 6/2008  | Kudo                                  |  |
| 7,630,667 B2          | 12/2009          | Huang et al.            | 2008/0152388 A1  | 6/2008  | Ueno et al.                           |  |
| 7,651,436 B2          | 1/2010           | Sugitani                | 2008/0159773 A1  | 7/2008  | Murayama et al.                       |  |
| 7,672,611 B2          | 3/2010           | Nakaya                  | 2008/0199212 A1  | 8/2008  | Tsui et al.                           |  |
| 7,684,729 B2          | 3/2010           | Goda                    | 2008/0240796 A1  | 10/2008 | Morioka et al.                        |  |
| 7,720,405 B2          | 5/2010           | Okabe                   | 2008/0260428 A1  | 10/2008 | Ueno et al.                           |  |
| 7,756,443 B2          | 7/2010           | Okabe et al.            | 2009/0196655 A1  | 8/2009  | Takigawa et al.                       |  |
| 7,817,938 B2          | 10/2010          | Igarashi                | 2009/0290903 A1  | 11/2009 | Horikawa et al.                       |  |
| 7,869,735 B2          | 1/2011           | Hattori                 | 2009/0317131 A1* | 12/2009 | Morioka ..... G03G 21/1853<br>399/117 |  |
| 7,899,364 B2          | 3/2011           | Chadani et al.          | 2009/0317135 A1* | 12/2009 | Miyabe ..... G03G 21/186<br>399/119   |  |
| 7,942,426 B2          | 5/2011           | Peters                  | 2010/0054778 A1* | 3/2010  | Adachi ..... G03G 15/0818<br>399/53   |  |
| 7,979,008 B2          | 7/2011           | Kim et al.              | 2010/0054823 A1* | 3/2010  | Takasaki ..... F16D 1/10              |  |
| 8,417,154 B2 *        | 4/2013           | Nieda ..... G03G 15/757 |                  |         |                                       |  |
|                       |                  | 399/167                 |                  |         |                                       |  |
| 8,676,090 B1          | 3/2014           | Ueno et al.             |                  |         |                                       |  |
| 8,682,215 B1          | 3/2014           | Ueno et al.             |                  |         |                                       |  |
| 8,688,008 B2          | 4/2014           | Norioka et al.          |                  |         |                                       |  |

**US 9,851,688 B2**

Page 4

| (56)             | <b>References Cited</b>  | JP | 2004246058     | 9/2004  |
|------------------|--------------------------|----|----------------|---|
|                  | U.S. PATENT DOCUMENTS    | JP | 2004251401     | 9/2004  |
| 2014/0099144 A1* | 4/2014 Ueno .....        | JP | 2005076734     | 3/2005  |
|                  | G03G 15/757              | JP | 2005164684     | 6/2005  |
|                  | 399/111                  | JP | 2005-299788 A  | 10/2005   |
|                  |                          | JP | 3728104        | 10/2005   |
|                  |                          | JP | 2005296235     | 10/2005   |
|                  |                          | JP | 3728104        | 12/2005   |
|                  | FOREIGN PATENT DOCUMENTS | JP | 2006039364     | 2/2006  |
| CN               | 1158583                  | JP | 2006-072160    | 3/2006  |
| CN               | 1696839                  | JP | 2006-72160     | 3/2006  |
| CN               | 1851282                  | JP | 2006084935     | 3/2006  |
| EP               | 0511203                  | JP | 2006106681     | 4/2006  |
| EP               | 1 178 370                | JP | 2006133436     | 5/2006  |
| EP               | 1199610 A2 *             | JP | 2006139230     | 6/2006  |
| EP               | 1199610                  | JP | 2006163232     | 6/2006  |
| EP               | 1 628 165                | JP | 2006163232 A * | 6/2006  |
| EP               | 1791034                  | JP | 2007032794     | 2/2007  |
| GB               | 2141520                  | JP | 2007-052185    | 3/2007  |
| JP               | 57-153844                | JP | 2007069868     | 3/2007  |
| JP               | S59228281                | JP | 2007121774     | 5/2007  |
| JP               | 60-249729                | JP | 2007-128403    | 8/2007  |
| JP               | S60249729                | JP | 2007-240007    | 9/2007  |
| JP               | 61-092967                | JP | 2007-256497 A  | 10/2007   |
| JP               | 1-164818                 | JP | 2007-303615 A  | 11/2007   |
| JP               | 03-125166 A              | JP | 2009-104101    | 5/2009  |
| JP               | H03125166                | JP | 2009300516     | 12/2009   |
| JP               | 03117249 U               | KR | 10-0617433 B1  | 8/2006  |
| JP               | 4-119363                 | KR | 20090044054    | 5/2009  |
| JP               | H04-119363               | RU | 2 289 835 C2   | 8/2004  |
| JP               | 4-240870                 | RU | 2 289 835 C2   | 2/2006  |
| JP               | H04240870                | SU | 817658 A       | 3/1981  |
| JP               | 05017656 U               | WO | 2006014821     | 2/2006  |
| JP               | U05-019658               | WO | 2008/078836 A1 | 7/2008  |
|                  |                          |    |                |   |
|                  |                          |    |                | <b>OTHER PUBLICATIONS</b>   |
|                  |                          |    |                | John W. Weigl, "Electrophotography", 16 Angew. Chem. Int. Ed. Engl., 374-392 (Jun. 1977).   |
|                  |                          |    |                | Kawamoto, "Vibration Induced in Driving Mechanism of Photoconductor Drum in Color Laser Printer", 48 Jour. of Image Sci. and Teck, 306-311 (Jul./Aug. 2004).  |
|                  |                          |    |                | Knight et al., "Robust Control for Carriage Drum Printer", Control Applications, Proceedings of the Third IEEE International Conference on Control and Applications, 971-976 (Aug. 1994).                                     |
|                  |                          |    |                | Pai et al., "Physics of Electrophotography", 65 Reviews of Mod. Physics, 163-211 (Jan. 1993).   |
|                  |                          |    |                | English translation of Japanese Patent Laid-Open No. 4-119363 (laid-open date Apr. 20, 1992).   |
|                  |                          |    |                | English translation of Japanese Patent Laid-Open No. 2003-162137 (laid-open date Jun. 6, 2003).   |
|                  |                          |    |                | Office Action in Russian Patent Application No. 2015142660, dated Feb. 17, 2017 (with English translation).   |
|                  |                          |    |                | Co-pending U.S. Appl. Nos. 15/376,974; 15/376,997; 15/377,028; 15/377,057; 15/377,079; 15/377,106; 15/377,135; 15/377,476; 15/377,337; 15/377,362; 15/377,447; 15/455,615; 15/455,624 15/455,740; 15/455,820; and 15/455,423. |
|                  |                          |    |                | English Translation of Jan. 17, 2011 Office Action in Korean Patent Application No. 10-2009-7015430.  |
|                  |                          |    |                | Office Action in Korean Patent Application No. 10-2009-7015474, dated Jan. 17, 2011, with English translation.  |
|                  |                          |    |                | Office Action in Korean Patent Application No. 10-2009-7022191, dated Feb. 17, 2011.  |
|                  |                          |    |                | Office Action in Chinese Patent Application No. 200780047584.6, dated Nov. 1, 2010, with English translation.   |
|                  |                          |    |                | Office Action in Korean Patent Application No. 10-2009-7015430, dated Jan. 17, 2011.  |
|                  |                          |    |                | Office Action in Korean Patent Application No. 10-2009-7022510, dated Aug. 8, 2011.   |
|                  |                          |    |                | Notice of Allowance in Korean Application No. 10-2009-7022191, dated Sep. 29, 2011.   |
|                  |                          |    |                | Office Action in Japanese Patent Application No. 2007-330304, dated Nov. 22, 2011, with English translation.  |

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