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(54) **METHODS AND APPARATUSES FOR TESTING CAPACITIVE TOUCH SCREEN FILMS**

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CPC ***G01N 27/02*** (2013.01); ***G06F 3/044*** (2013.01)

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USPC 324/658, 537, 686, 691, 750.02, 324/750.19, 756.01, 756.05, 760.01, 324/762.07; 345/174, 173, 177, 178; 29/825, 846, 593, 832; 361/280, 809; 702/104, 121, 65; 200/600; 327/517
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,885,205 B2 * 4/2005 Siew G01R 31/2806 324/754.16
6,977,646 B1 * 12/2005 Hauck G06F 3/0418 345/173
6,980,201 B1 * 12/2005 Dotson G06F 3/0383 178/18.01
8,253,425 B2 8/2012 Reynolds et al. 324/658
8,279,197 B2 10/2012 Murphy et al. 345/174
2002/0028456 A1 * 3/2002 Mansky B01J 19/0046 435/6.19
2008/0278453 A1 11/2008 Reynolds et al. 345/173
2012/0268413 A1 10/2012 Narasimhan et al. 345/174
2013/0057509 A1 * 3/2013 Cruz-Hernandez G06F 3/016 345/174
2013/0278539 A1 10/2013 Valentine et al. 345/174

FOREIGN PATENT DOCUMENTS

CN 202793443 3/2013
CN 103018594 4/2013
EP 1754976 9/2010
JP 05127807 A * 5/1993 ..... G06F 3/03

(Continued)

OTHER PUBLICATIONS

JP-05127807 A , Tajima Masaya et al., Touch coordinate input device, May 25, 1993, 20 pages, JP, Fujitsu Ltd.*

(Continued)

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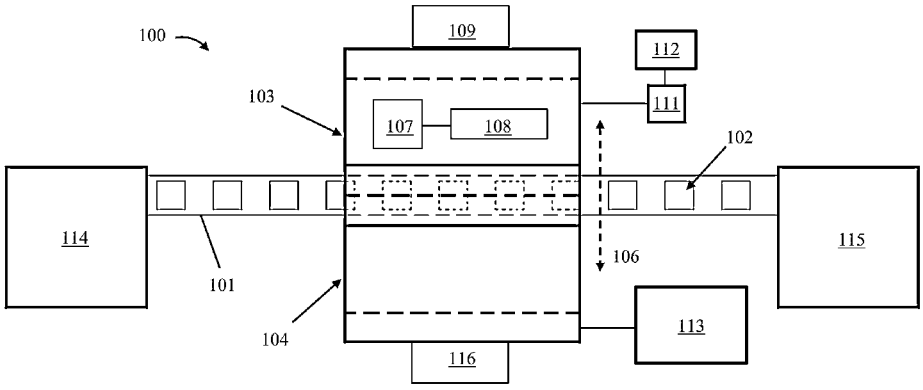
(57) **ABSTRACT**

Test fixtures for testing layers of touch screen material and methods for using the same. Some test fixtures include first and second test beds that are movable relative to each other, an impedance measurement circuit, an electrical connector, a clamping actuator, and a processor, where the test fixtures and/or test fixture components are configured to secure a layer of touch screen material and measure the electrical impedance of at least one feature of the layer. Some of the present methods include securing a layer of touch screen material between test beds, calculating an electrical impedance of at least one feature of the layer, and releasing the layer from the test beds.

20 Claims, 13 Drawing Sheets