



US009057210B2

(12) **United States Patent**  
**Dumas et al.**

(10) **Patent No.:** **US 9,057,210 B2**  
(45) **Date of Patent:** **Jun. 16, 2015**

(54) **WIRELESS ACCESS CONTROL SYSTEM AND RELATED METHODS**

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 106 days.

(21) Appl. No.: **13/734,671**

(22) Filed: **Jan. 4, 2013**

(65) **Prior Publication Data**

US 2013/0176107 A1 Jul. 11, 2013

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 13/415,365, filed on Mar. 8, 2012.

(60) Provisional application No. 61/453,737, filed on Mar. 17, 2011.

(51) **Int. Cl.**  
**G05B 23/00** (2006.01)  
**B60R 25/00** (2013.01)

(Continued)

(52) **U.S. Cl.**  
CPC ..... **E05B 47/00** (2013.01); **G07C 9/00309** (2013.01); **G07C 9/00103** (2013.01);

(Continued)

(58) **Field of Classification Search**  
CPC ..... G07C 2009/00793; G07C 2209/04; G07C 2209/64; G07C 9/00571; G07C 9/00174; G07C 2209/08; G07C 2209/62; G07C 9/00309; G07C 2009/00365; G07C 2009/64; G07C 9/0057; G07C 2009/00507; G07C 9/00103; G07C 9/00087; G07C 9/00182; G07C 9/00563; G07C 2209/63;

G07C 9/00904; G07C 9/0018; G07C 2009/00785; G07C 2009/00825; G07C 2009/00865; G07C 9/00023; G07C 9/00111; G07C 2209/00365; G07B 15/063; G07B 15/00; H04W 12/00; H04W 12/06; B65D 90/023; B65D 90/024; E04H 7/30; H01H 85/10; B62H 5/14; B62H 5/20; E05B 15/101; E05B 47/0002; E05B 47/00; H04L 63/0428; H04L 63/0492  
USPC ..... 340/5.61, 10.3, 10.33, 10.34, 5.1, 5.72, 340/539.21, 539.23, 5.27, 5.64, 5.71, 5.2, 340/426.28, 539.11, 542, 825.31, 572.9; 455/343, 404.1, 414.1, 556.1; 70/279.1, 224, 278.2, 277, 9, 21, 70/278.1; 726/17, 19

See application file for complete search history.

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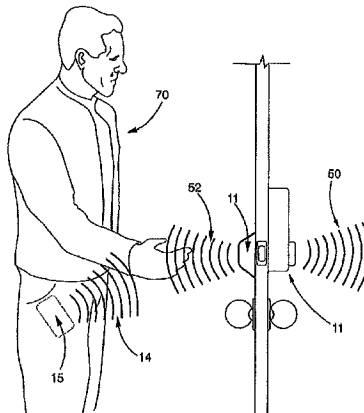
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(57) **ABSTRACT**

A wireless access control system includes a remote access device and an electronic lock. The electronic lock communicates with the remote access device. The electronic lock controls the ability to lock and unlock a door in which the electronic lock is disposed. The electronic lock determines when the remote access device is at a distance less than or equal to a predetermined distance from the lock to enable the lock to be unlocked.

**45 Claims, 15 Drawing Sheets**



- |      |                   |   |  |              |     |         |                                 |
|------|-------------------|---|--|--------------|-----|---------|---------------------------------|
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| (52) | <b>U.S. Cl.</b>   |   |  |              |     |         |                                 |
|      | CPC ..            | <b>G07C9/00571</b> (2013.01); <b>G07C 2009/00793</b>                    |  |              |     |         |                                 |
|      |                   | (2013.01); <b>G07C 2209/04</b> (2013.01); <b>G07C 2209/64</b> (2013.01) |  |              |     |         |                                 |

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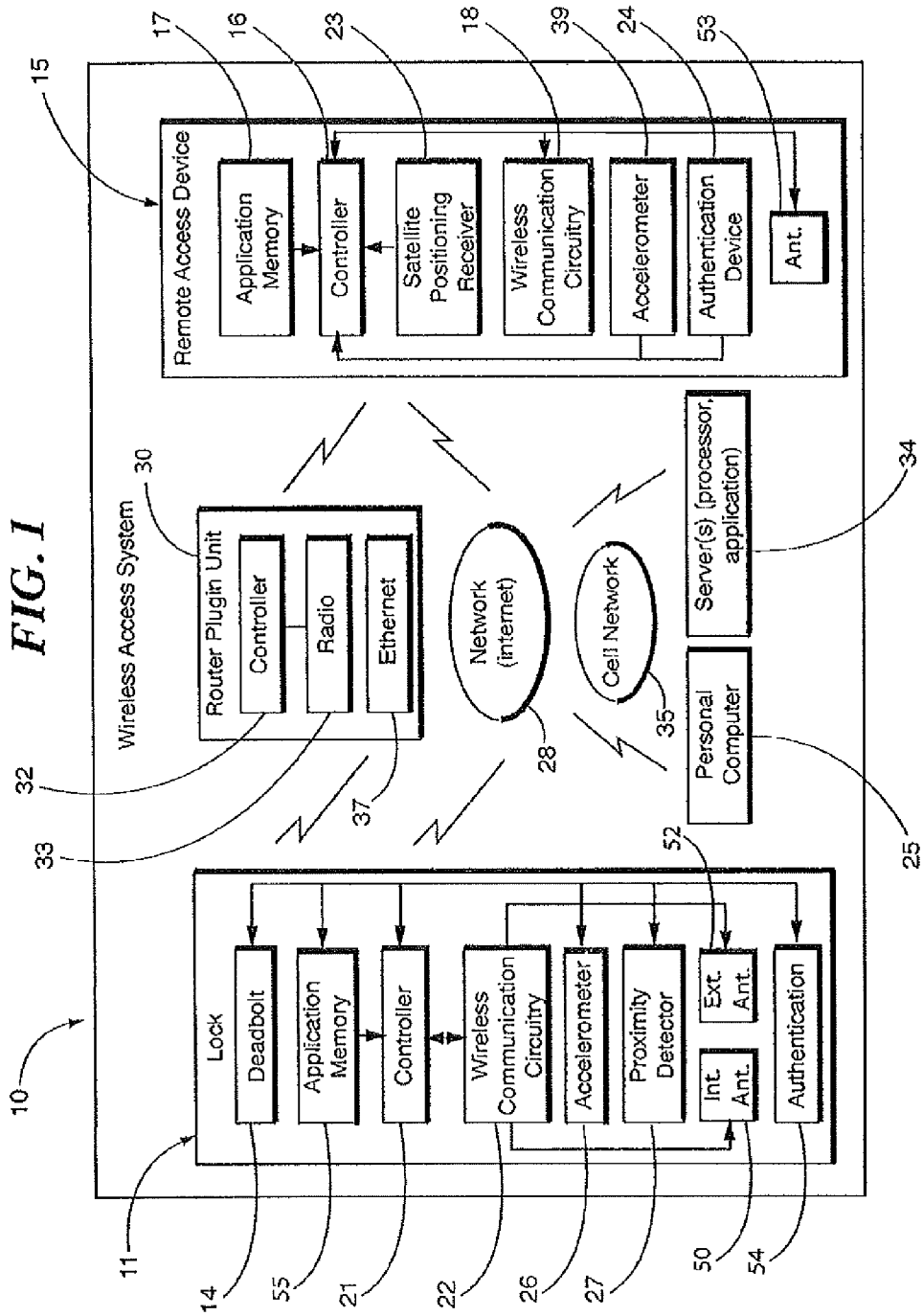
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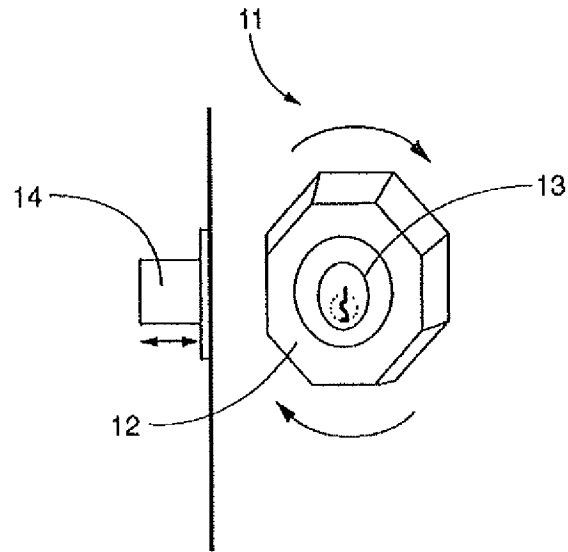
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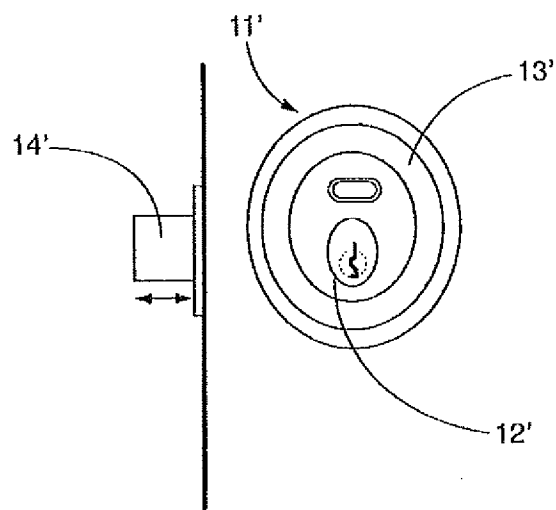
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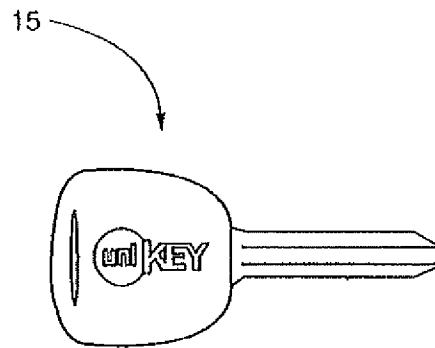
*FIG. 2a*



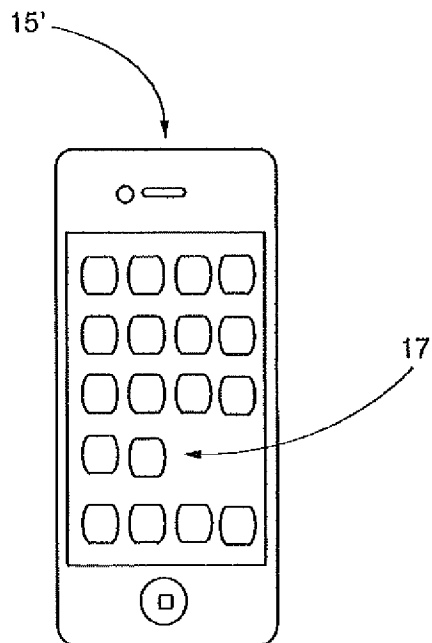
*FIG. 2b*



*FIG. 3a*



*FIG. 3b*



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