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Bae et al.

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(45) **Date of Patent:** **Jun. 12, 2018**

(54) **RECEIVING ANTENNA AND WIRELESS POWER RECEIVING DEVICE INCLUDING THE SAME**

(58) **Field of Classification Search**
CPC .. H01Q 7/06; H02J 50/20; H02J 50/27; H02J 7/025

(Continued)

(71) Applicant: **LG INNOTEK CO., LTD.**, Seoul (KR)

(72) Inventors: **Seok Bae**, Seoul (KR); **Donchul Choi**, Seoul (KR); **Soon Young Hyun**, Seoul (KR)

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(73) Assignee: **LG INNOTEK CO., LTD.**, Seoul (KR)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 206 days.

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§ 371 (c)(1),

(2) Date: **Dec. 28, 2015**

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Primary Examiner — M'Baye Diao

(74) *Attorney, Agent, or Firm* — Ked & Associates, LLP

(30) **Foreign Application Priority Data**

Jun. 27, 2013 (KR) 10-2013-0074620

(57) **ABSTRACT**

(51) **Int. Cl.**
H02J 7/00 (2006.01)
H01F 27/42 (2006.01)

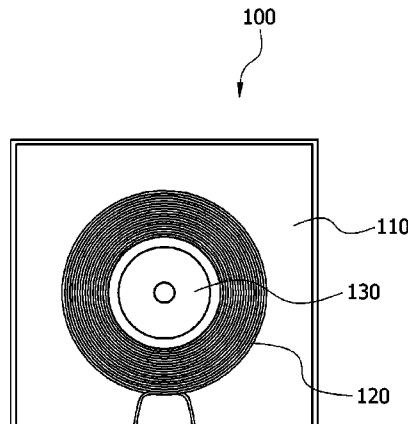
(Continued)

A receiving antenna of a wireless power receiving device wirelessly charging electric power according to an embodiment of the present invention includes a substrate, a soft magnetic layer stacked on the substrate, and a receiving coil configured to receive electromagnetic energy emitted from a wireless power transmission device, wound in parallel with a plane of the soft magnetic layer, and formed inside of the soft magnetic layer, and an insulating layer is formed between the soft magnetic layer and the receiving coil.

(52) **U.S. Cl.**
CPC **H02J 50/70** (2016.02); **H01Q 7/06** (2013.01); **H02J 7/025** (2013.01); **H02J 50/10** (2016.02);

(Continued)

19 Claims, 7 Drawing Sheets



- (51) **Int. Cl.**
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307/104 |
| <i>H02J 7/02</i> | (2016.01) | | | | |
| <i>H02J 50/20</i> | (2016.01) | 2013/0169399 A1* | 7/2013 | Yoo | H01F 17/0013
336/180 |
| <i>H02J 50/27</i> | (2016.01) | | | | |
| <i>H04B 5/00</i> | (2006.01) | | | | |

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- (52) **U.S. Cl.**
- CPC *H02J 50/20* (2016.02); *H02J 50/27* (2016.02); *H04B 5/0037* (2013.01)

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- (58) **Field of Classification Search**
- USPC 320/108; 307/104
- See application file for complete search history.

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FIG. 1

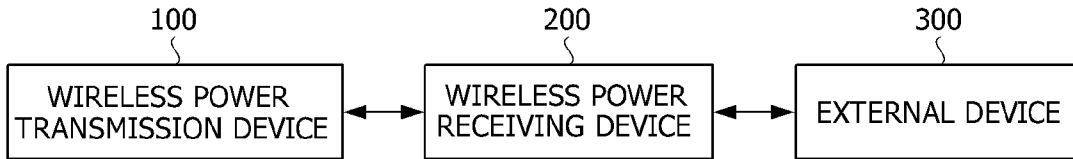


FIG. 2

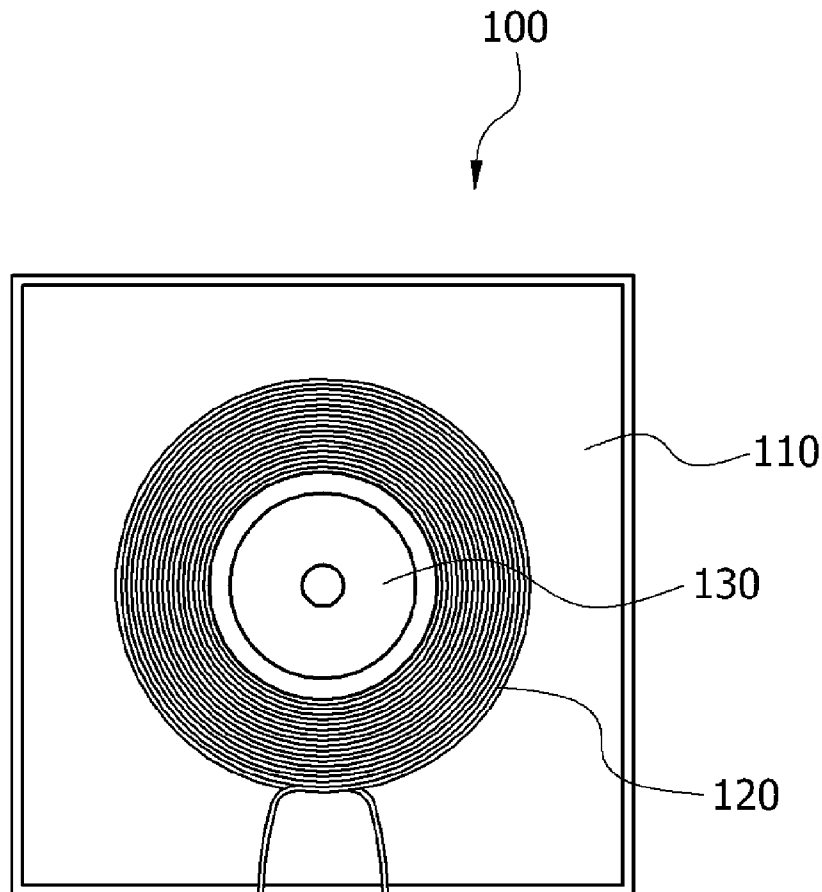


FIG. 3

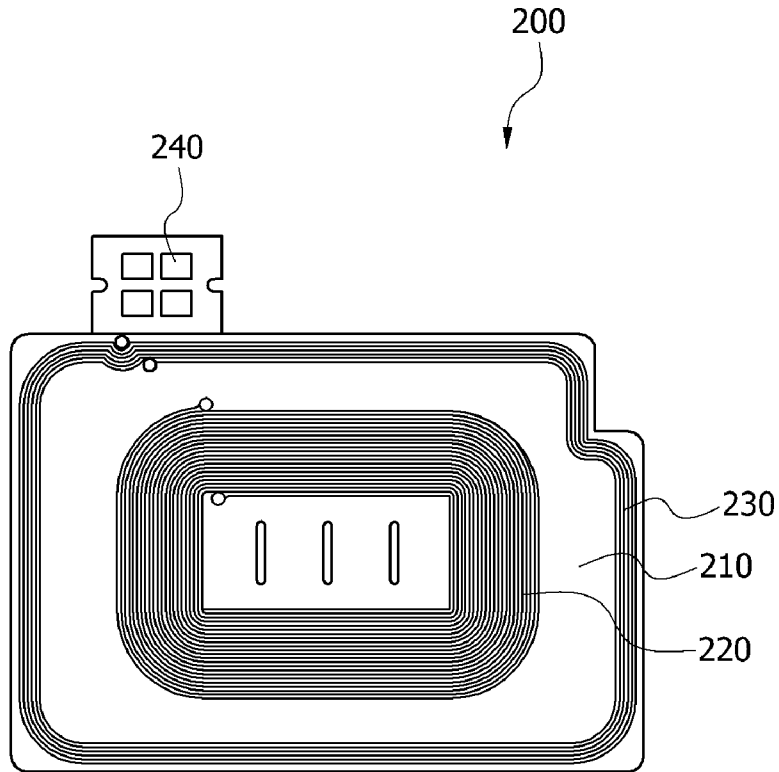


FIG. 4

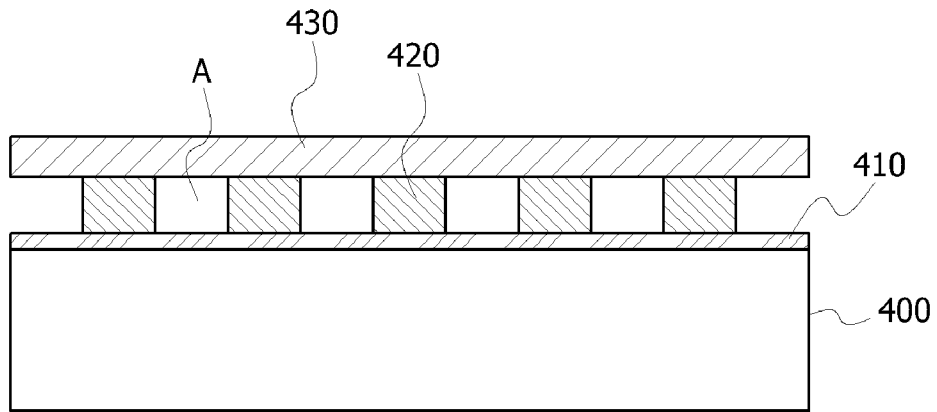


FIG. 5

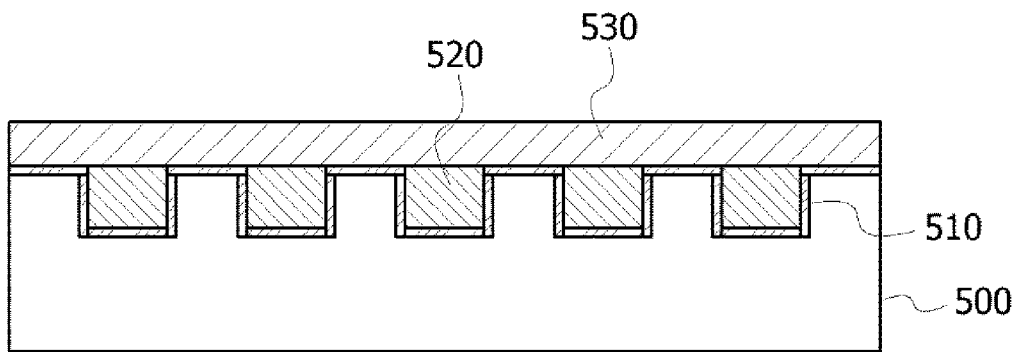
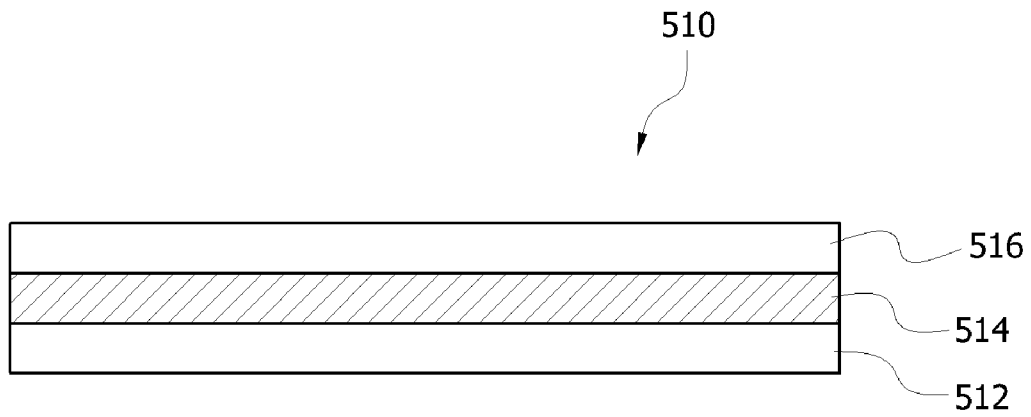


FIG. 6



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