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

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(54) **MOBILE TERMINAL AND COIL ANTENNA MODULE**

(58) **Field of Classification Search**
None
See application file for complete search history.

(71) Applicant: **LG ELECTRONICS INC.**, Seoul (KR)

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(73) Assignee: **LG ELECTRONICS INC.**, Seoul (KR)

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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 0 days.

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(65) **Prior Publication Data**

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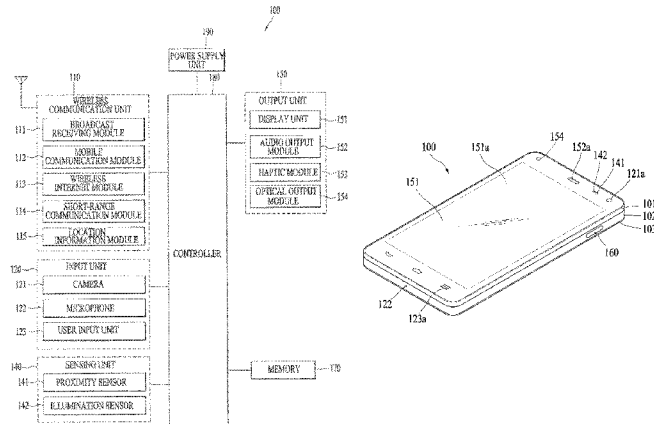
(57) **ABSTRACT**

(51) **Int. Cl.**
H04B 5/00 (2006.01)
H01Q 1/24 (2006.01)
(Continued)

There is disclosed a mobile terminal including a first case comprising a battery loading portion, a battery loaded in the battery loading portion, a second case coupled to the first case and configured to cover the battery, a coil antenna module arranged between the second case and the battery, and a controller electrically connected to the coil antenna module and configured to transmit and receive a signal or receive an electric power, wherein the coil antenna module includes an insulating sheet, a first coil arranged in a surface of the insulating sheet, a second coil arranged in the first coil, a third coil arranged in the second coil, and a magnetic sheet disposed on the surface of the insulating sheet, and ends of the first, second and third coils are arranged in the surface of the insulating sheet or dividedly arranged in both surfaces of the insulating sheet. The mobile terminal may realize the coil antenna module including a plurality of coils

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CPC **H01Q 1/243** (2013.01); **H01Q 7/06** (2013.01); **H01Q 9/04** (2013.01); **H04B 1/3888** (2013.01);
(Continued)

(Continued)



configured to perform diverse manners of wireless communication in a limited area.

20 Claims, 11 Drawing Sheets

- (51) **Int. Cl.**
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H01Q 9/04 (2006.01)
H04B 1/3888 (2015.01)
- (52) **U.S. Cl.**
 CPC *H04B 5/0031* (2013.01); *H04B 5/0037* (2013.01); *H04B 5/0081* (2013.01); *H04B 5/0087* (2013.01)

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FIG. 1a

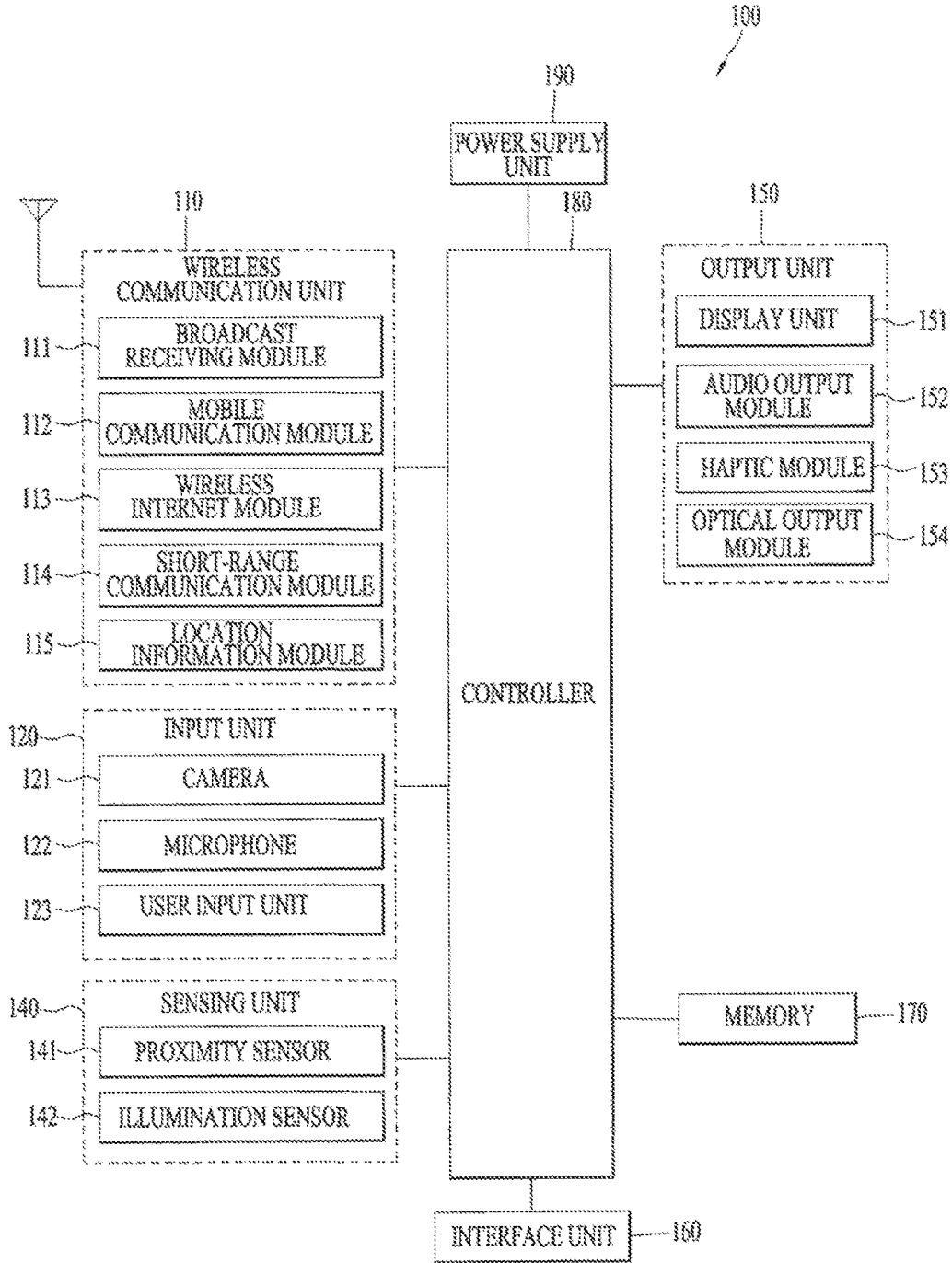


FIG. 1b

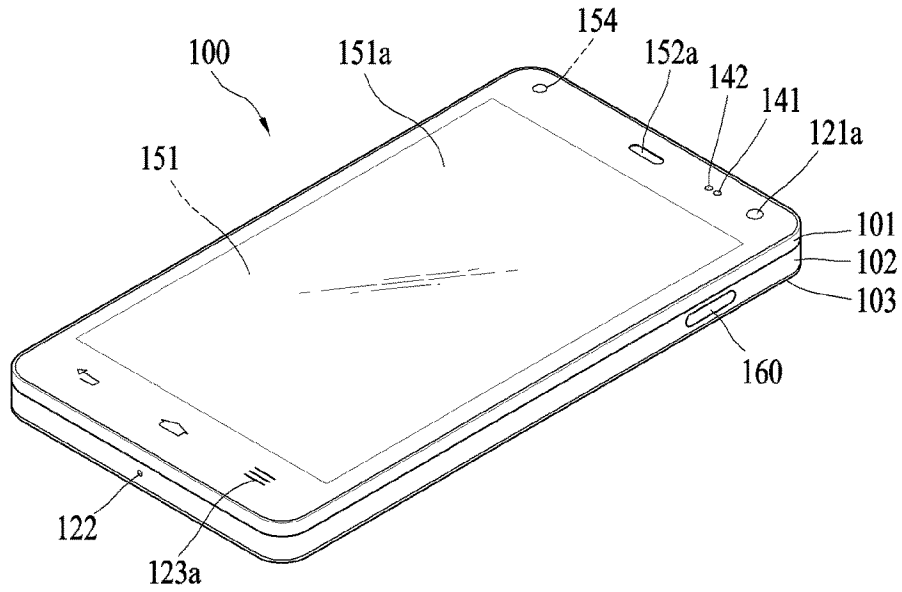


FIG. 1c

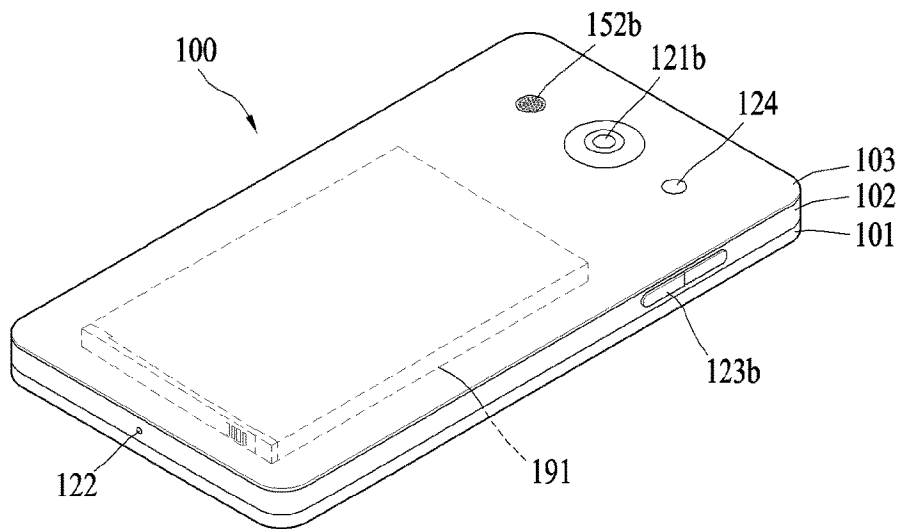
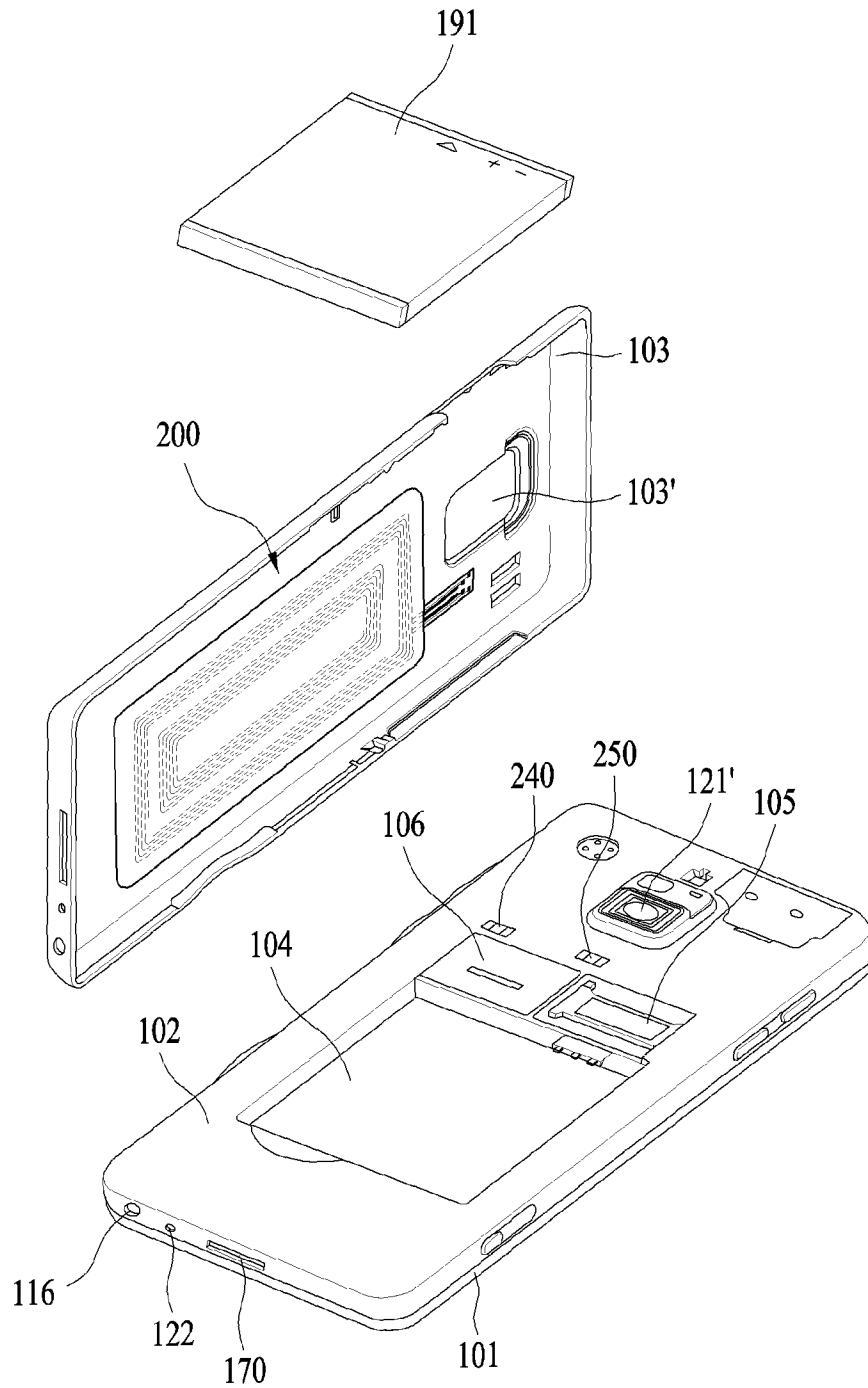


FIG. 2



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