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Miyamoto

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(54) **DETECTING APPARATUS, POWER RECEIVING APPARATUS, POWER TRANSMITTING APPARATUS, AND CONTACTLESS POWER SUPPLY SYSTEM**

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(51) **Int. Cl.**
G01N 27/72 (2006.01)
H01F 38/14 (2006.01)
H01F 5/00 (2006.01)

(52) **U.S. Cl.**
CPC **G01N 27/72** (2013.01); **H01F 5/003** (2013.01); **H01F 38/14** (2013.01)

(58) **Field of Classification Search**
CPC H02J 5/005; H02J 7/025; H02J 17/00; H01F 38/14; B60L 11/182; G01N 27/00; G01N 27/72; H04B 5/0037; H04B 5/0087
USPC 307/104
See application file for complete search history.

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(57) **ABSTRACT**

There is provided a detecting apparatus including one or a plurality of magnetic coupling elements that include a plurality of coils, a positioning unit disposed near at least one coil from among the plurality of coils included in the one or plurality of magnetic coupling elements, and a detector that measures an electrical parameter related to the one or plurality of magnetic coupling elements or to a circuit that at least includes the one or plurality of magnetic coupling elements, and determines from a change in the electrical parameter whether a foreign matter capable of generating heat due to magnetic flux is present.

15 Claims, 19 Drawing Sheets

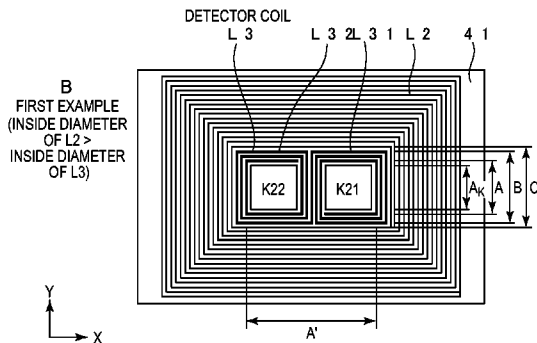
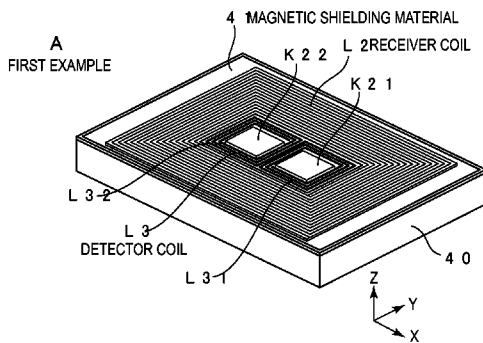


FIG. 1

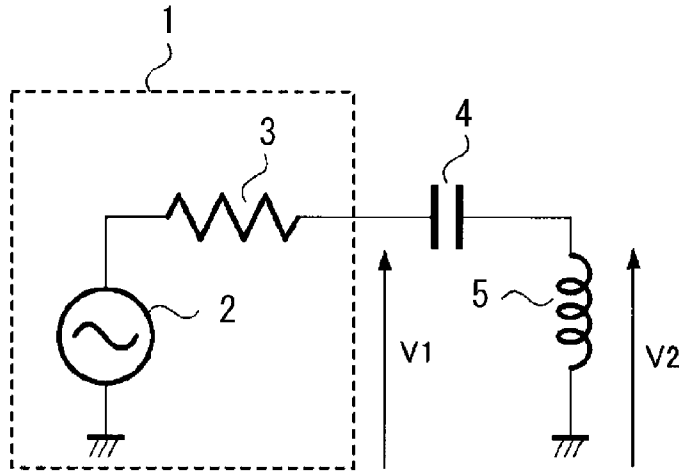


FIG. 2

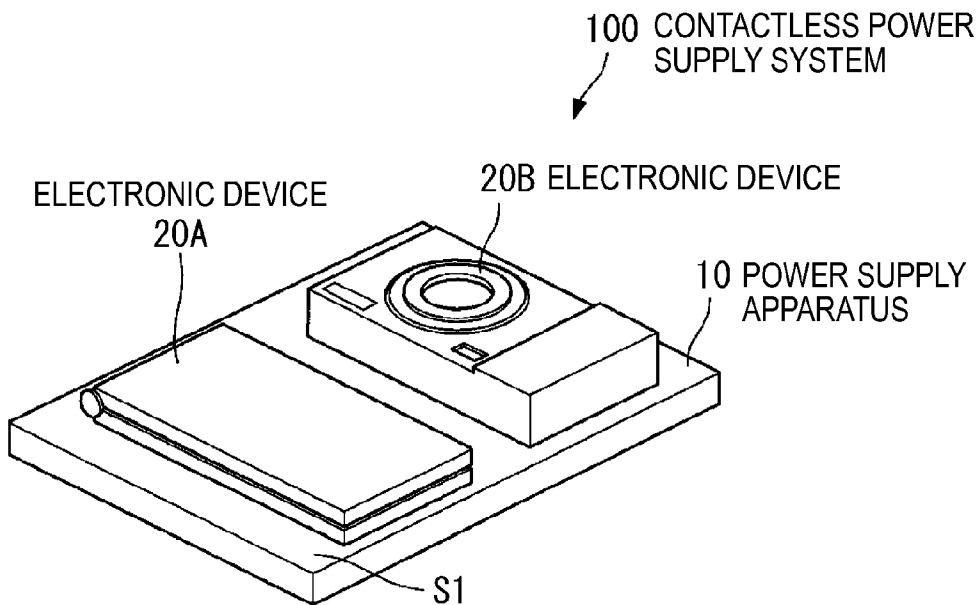


FIG. 3

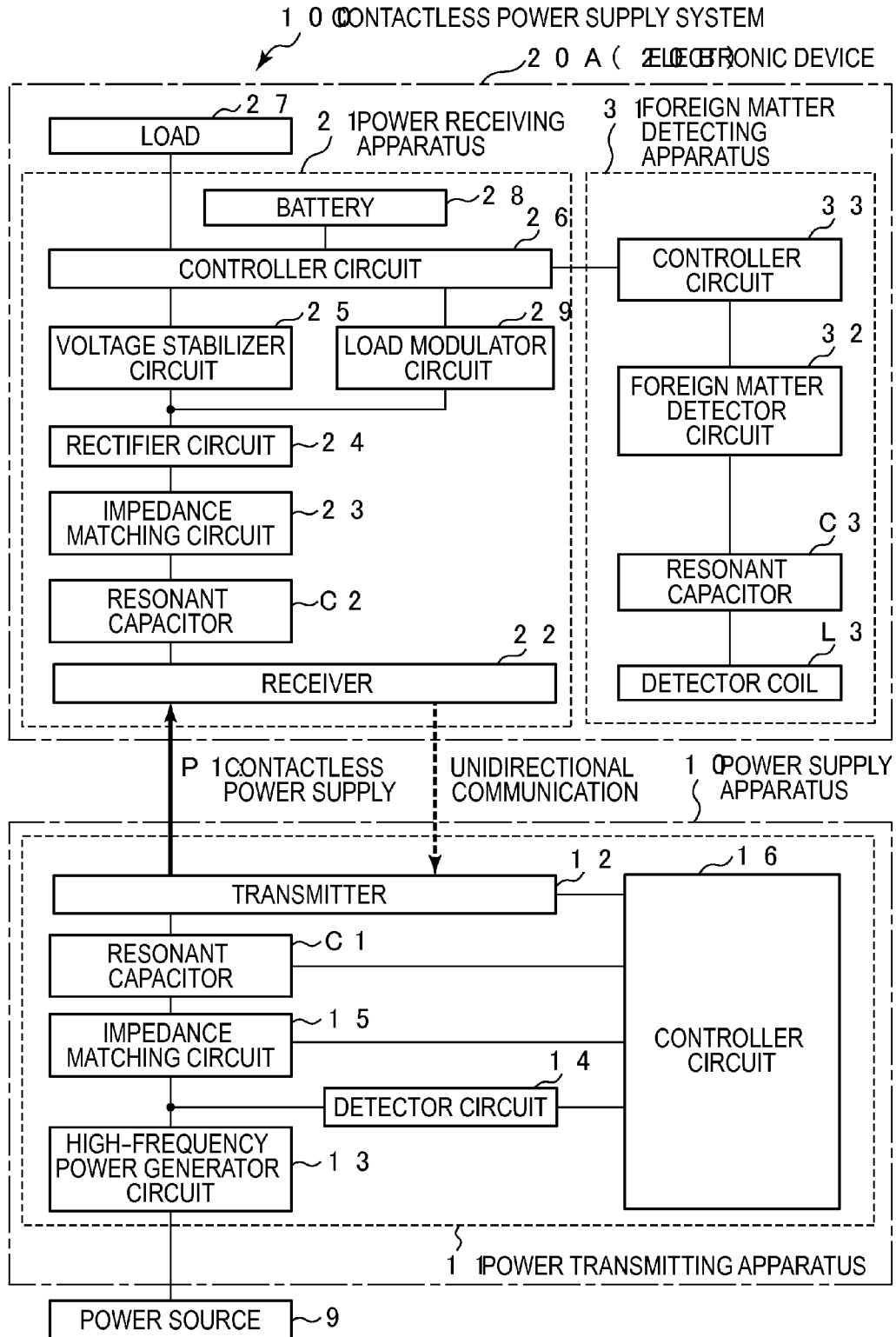


FIG. 4

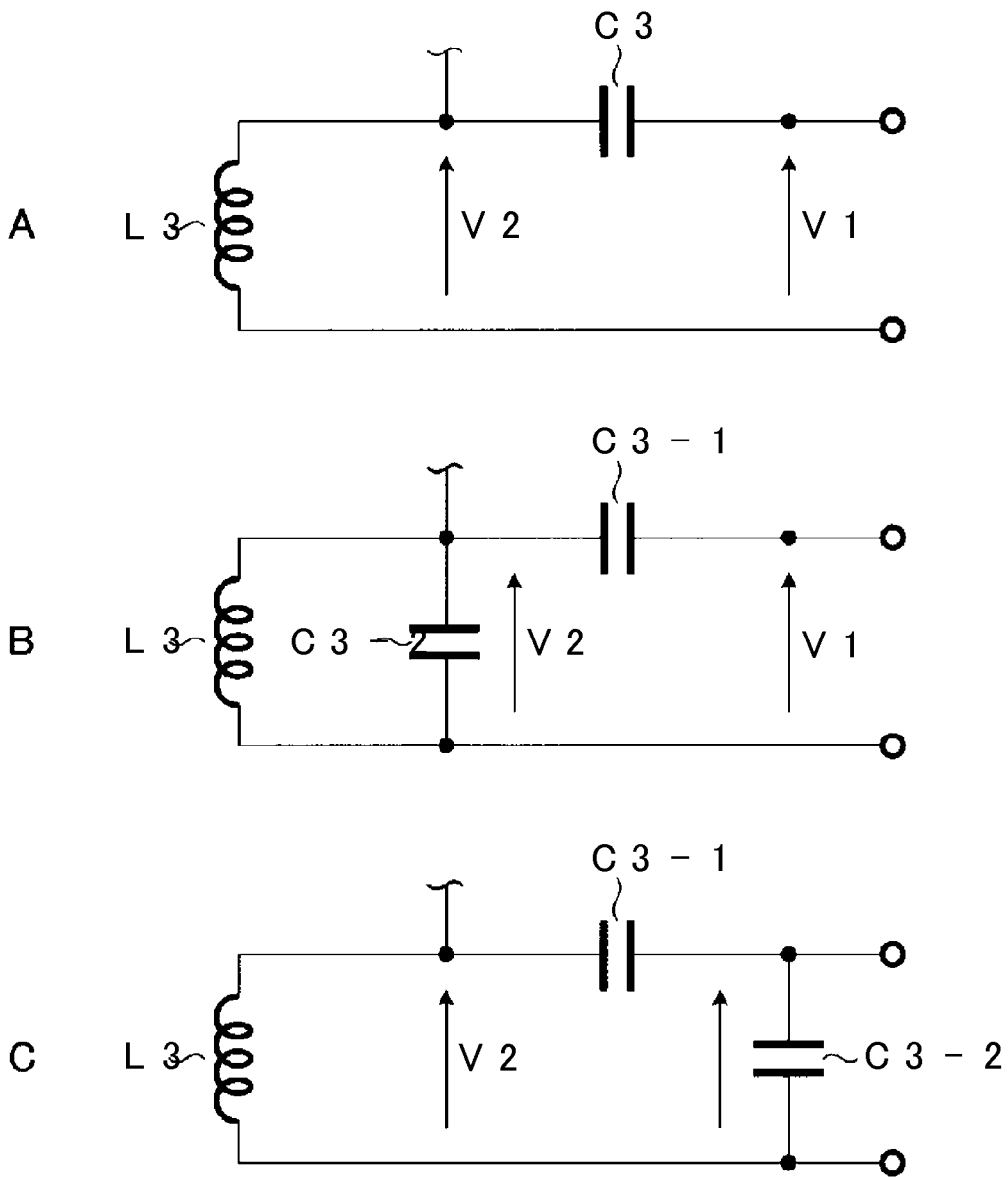
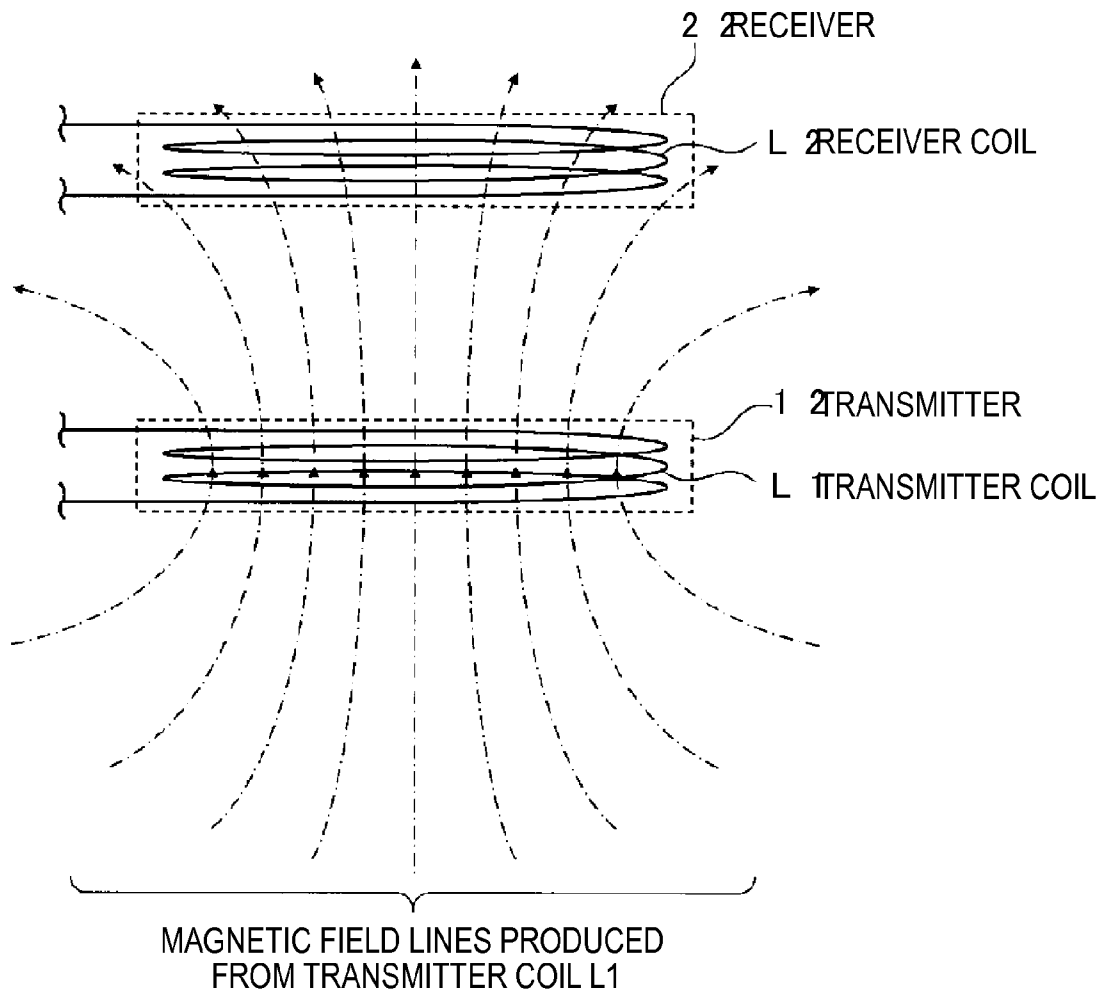


FIG. 5



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