



US007825537B2

(12) **United States Patent**
Freer

(10) **Patent No.:** **US 7,825,537 B2**
(45) **Date of Patent:** **Nov. 2, 2010**

(54) **INDUCTIVE POWER TRANSFER SYSTEM AND METHOD**

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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 113 days.

(21) Appl. No.: **12/271,023**

(22) Filed: **Nov. 14, 2008**

(65) **Prior Publication Data**

US 2010/0123451 A1 May 20, 2010

(51) **Int. Cl.**

H05K 1/02 (2006.01)
H01F 21/04 (2006.01)
B60L 9/00 (2006.01)

(52) **U.S. Cl.** **307/42; 336/115; 701/22**

(58) **Field of Classification Search** **701/22; 180/2.1; 307/42; 191/10; 336/115, 116, 336/123**

See application file for complete search history.

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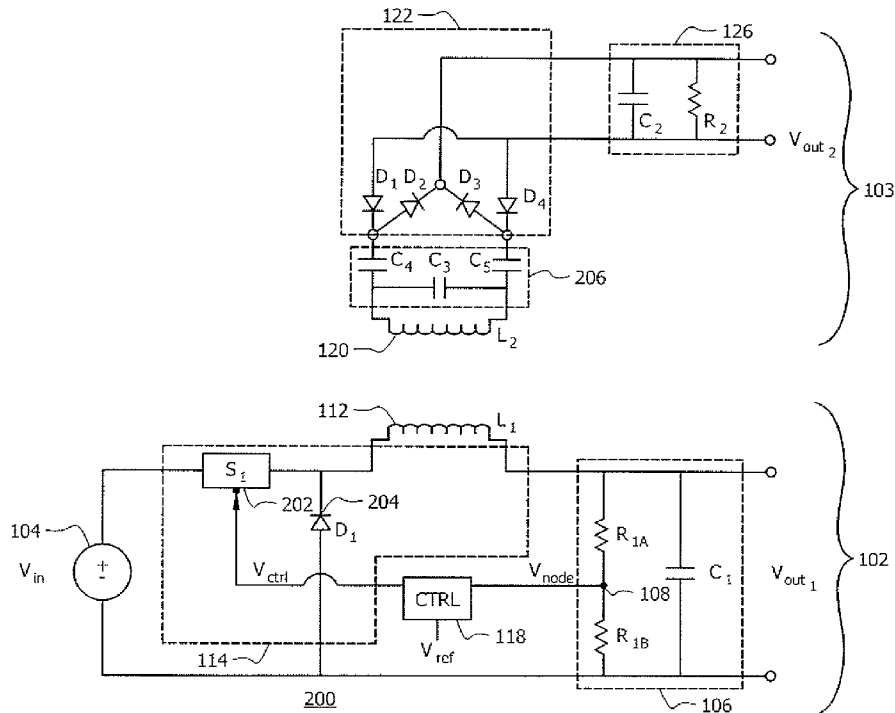
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(57) **ABSTRACT**

An inductive power transfer system includes a base unit comprising a first inductive element for providing input power to a second inductive element of a target unit providing output power, a positioning structure provided on at least one of the base unit and the target unit for removably positioning the second inductive element at a predetermined orientation and distance relative to the first inductive element, a switch element configured for selectively applying a time varying electric current to the first inductive element to produce a time varying magnetic field for inducing an electric current in the second inductive element, and a control circuit for monitoring one parameter indicative of an efficiency of power transfer and automatically selectively adjusting at least one characteristic of the time varying electric current responsive to the parameter to maximize an efficiency of power transfer from the base unit to the target unit.

28 Claims, 4 Drawing Sheets



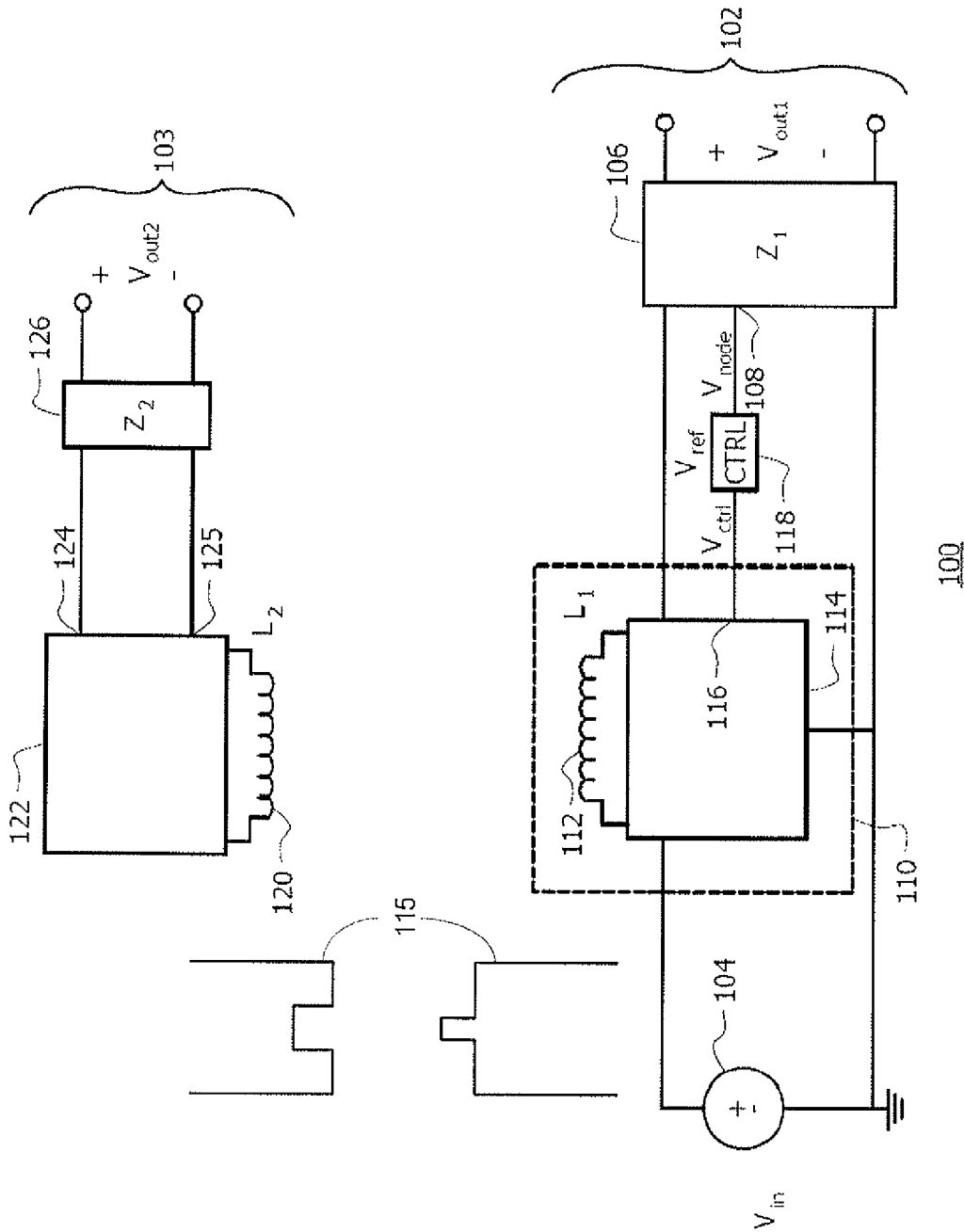


FIG. 1

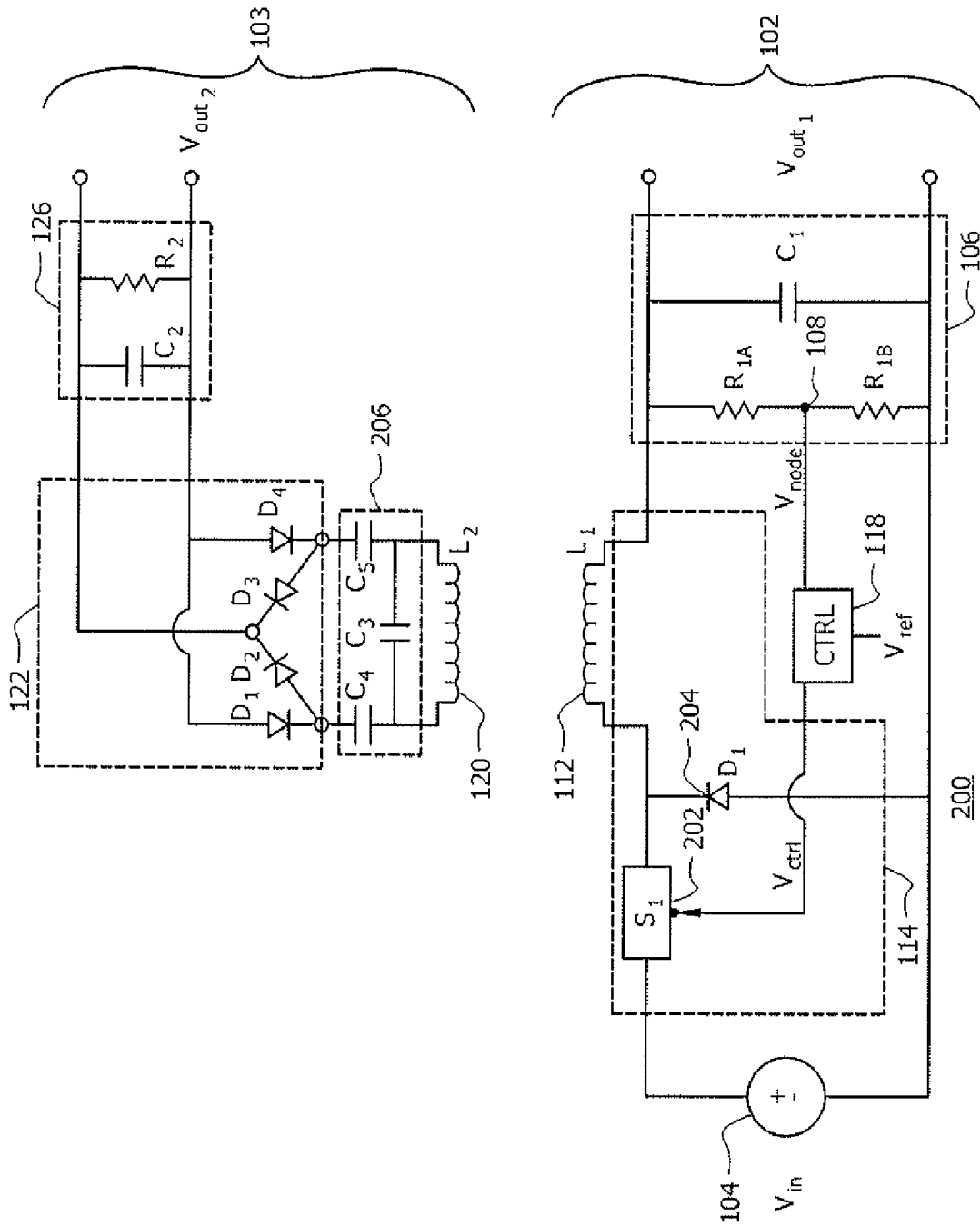


FIG. 2

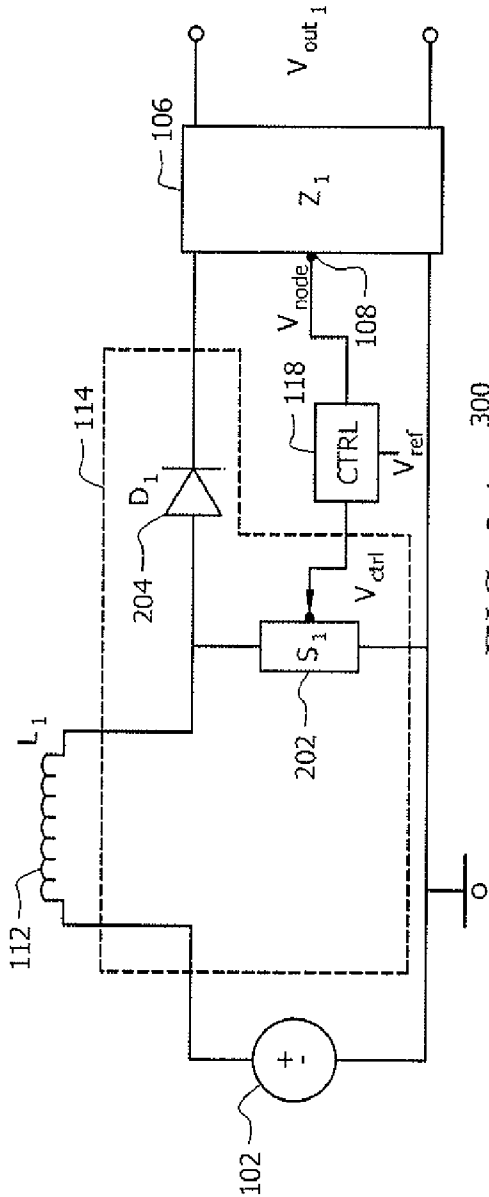


FIG. 3A 300

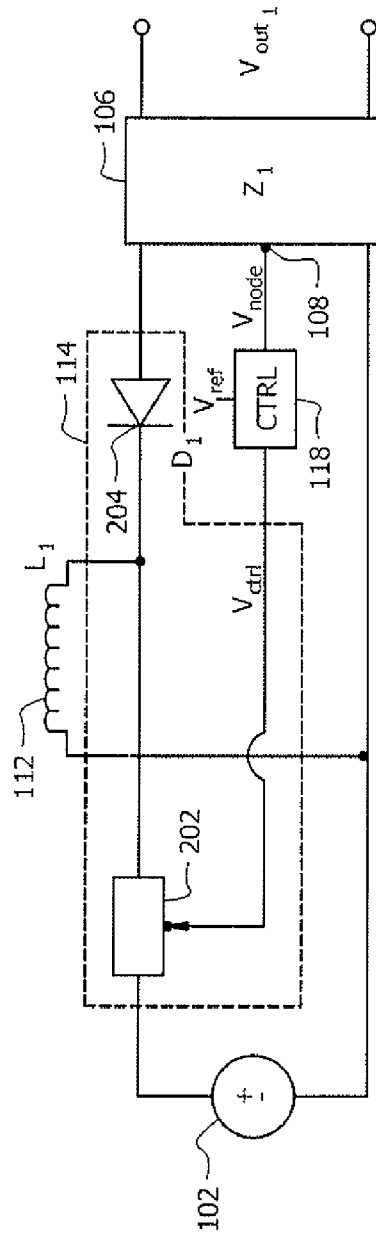


FIG. 3B 350

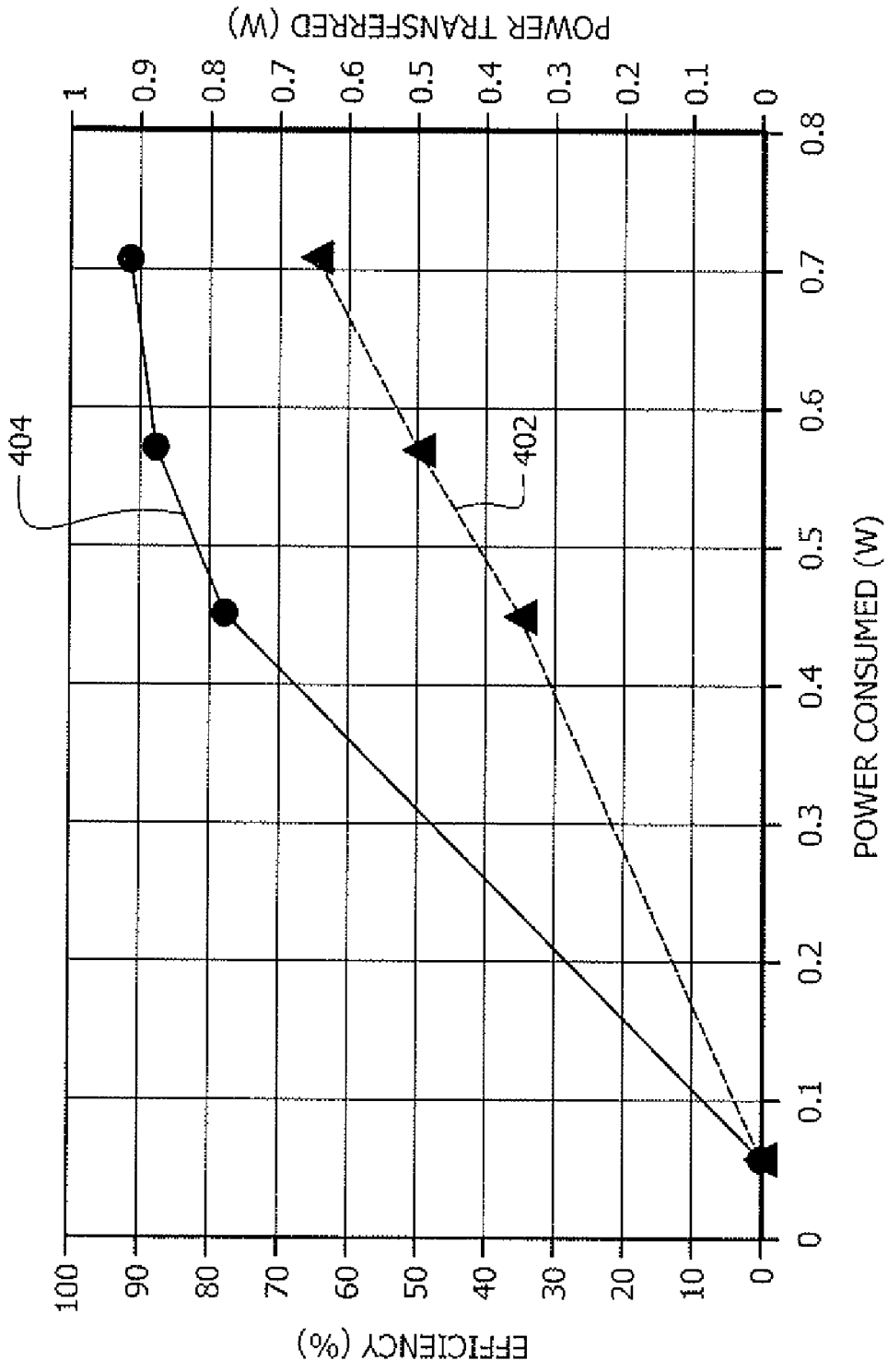


FIG. 4

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