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**Berghegger**

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(54) **INDUCTIVE CONTACTLESS POWER TRANSMITTER**

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patent is extended or adjusted under 35  
U.S.C. 154(b) by 110 days.

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(51) **Int. Cl.**<sup>7</sup> ..... **H02M 3/335**

(52) **U.S. Cl.** ..... **363/21.03**

(58) **Field of Search** ..... 363/16, 131, 178,  
363/21.03; 307/150

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,959,433 A 9/1999 Rohde  
6,018,467 A 1/2000 Majid et al.

6,118,249 A 9/2000 Brockmann et al.  
6,160,374 A 12/2000 Hayes et al.  
6,490,176 B2 \* 12/2002 Holzer et al. .... 363/20  
2002/0141208 A1 \* 10/2002 Nanbu et al. .... 363/37

**FOREIGN PATENT DOCUMENTS**

DE 3544955 6/1986  
DE 4438387 5/1996  
DE 19633171 2/1998  
DE 19741279 3/1999  
JP 11283854 10/1999

\* cited by examiner

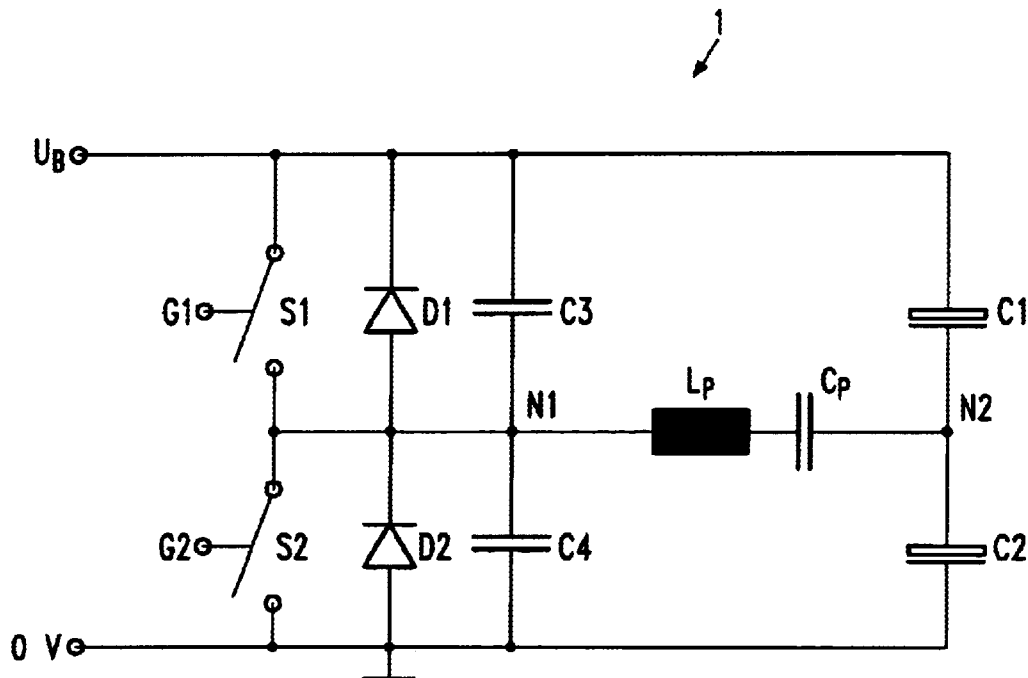
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(57) **ABSTRACT**

The present invention relates to an inductive contactless power transmitter having a primary side including a first inductor ( $L_p$ ) on the primary side and an oscillator for producing an alternating signal which is supplied to the inductor ( $L_p$ ) on the primary side, and having a secondary side which includes an inductor on the secondary side that can be coupled to the inductor ( $L_p$ ) on the primary side, a load ( $R_L$ ) which is variable in time, and a detection means (42) for determining a power demand of the load on the secondary side, the first oscillator being a voltage-controlled oscillator having a frequency that is adjustable in response to the power demand determined by the detection means (42).

**14 Claims, 4 Drawing Sheets**



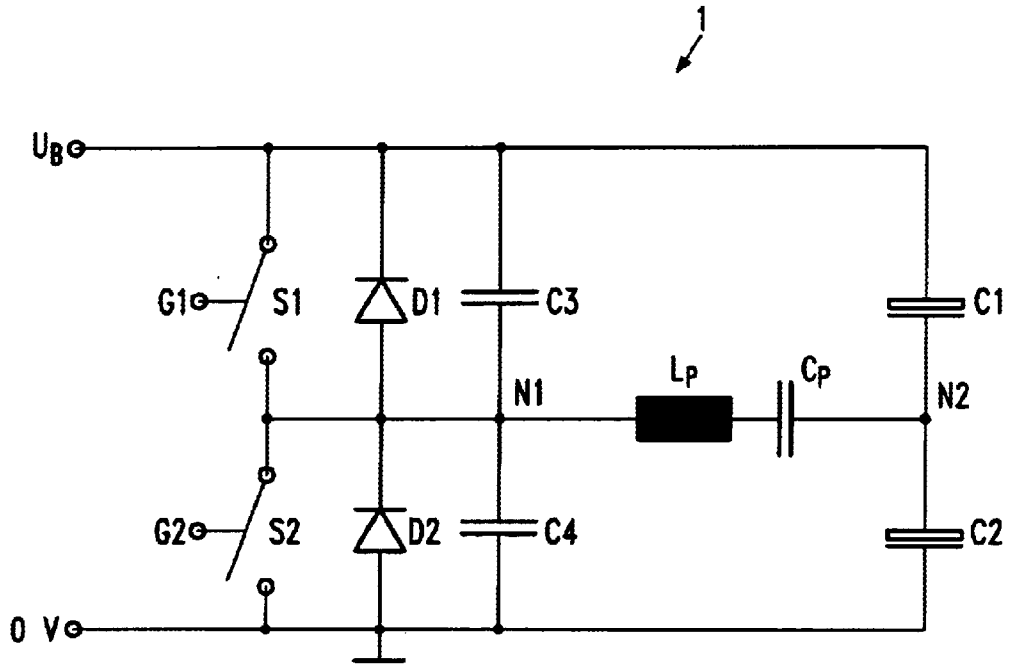


Fig. 1a

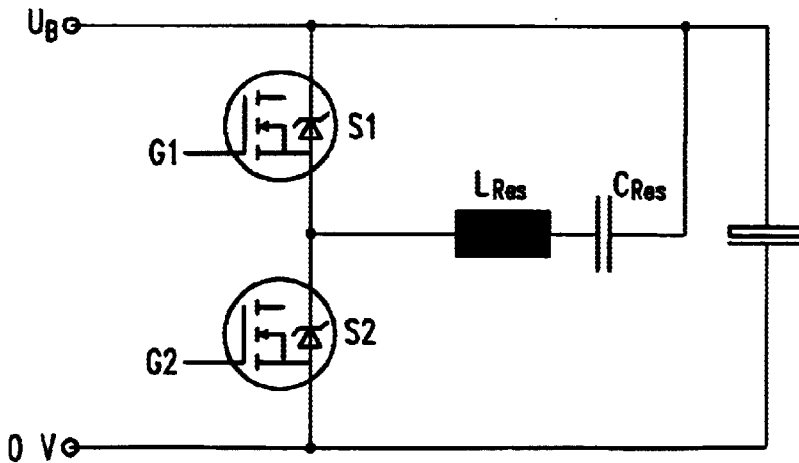


Fig. 1b

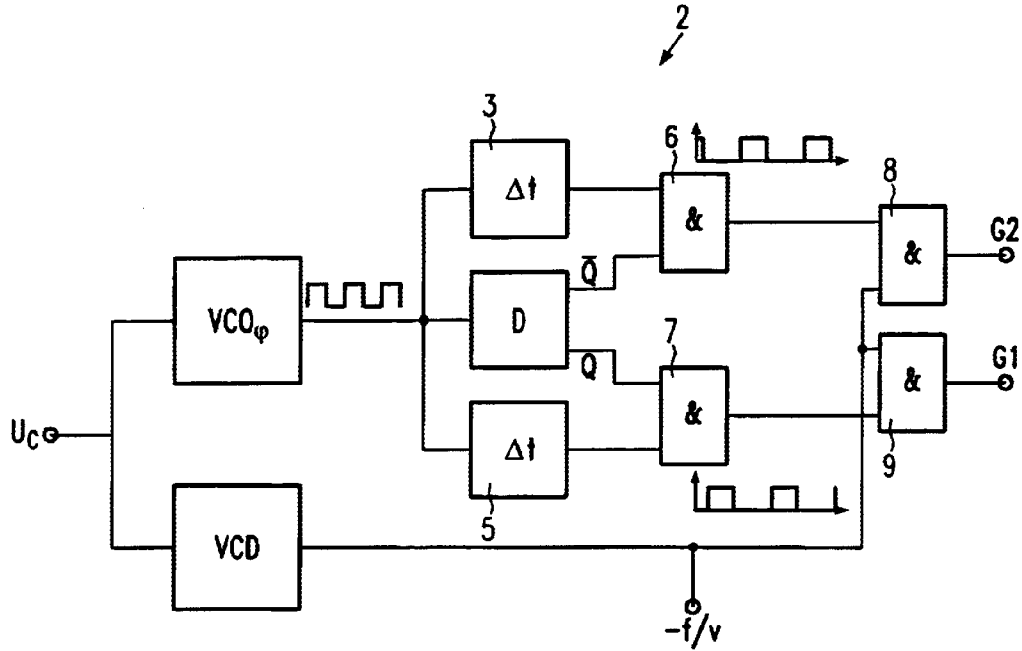


Fig.2

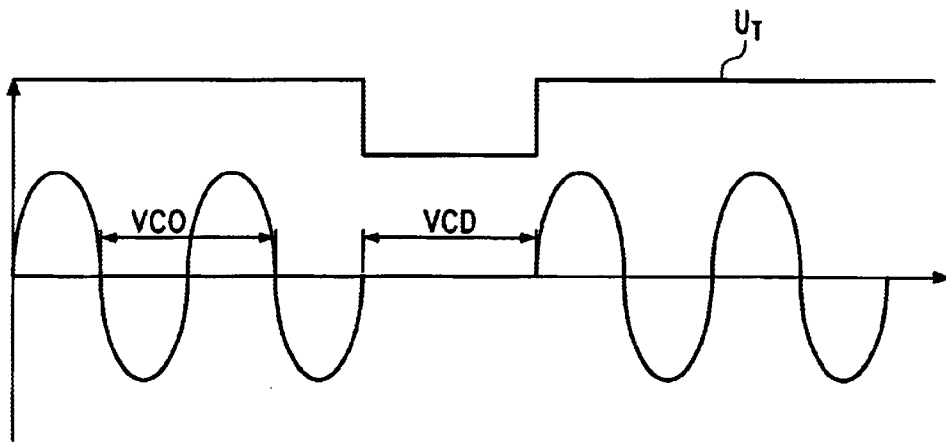


Fig.3

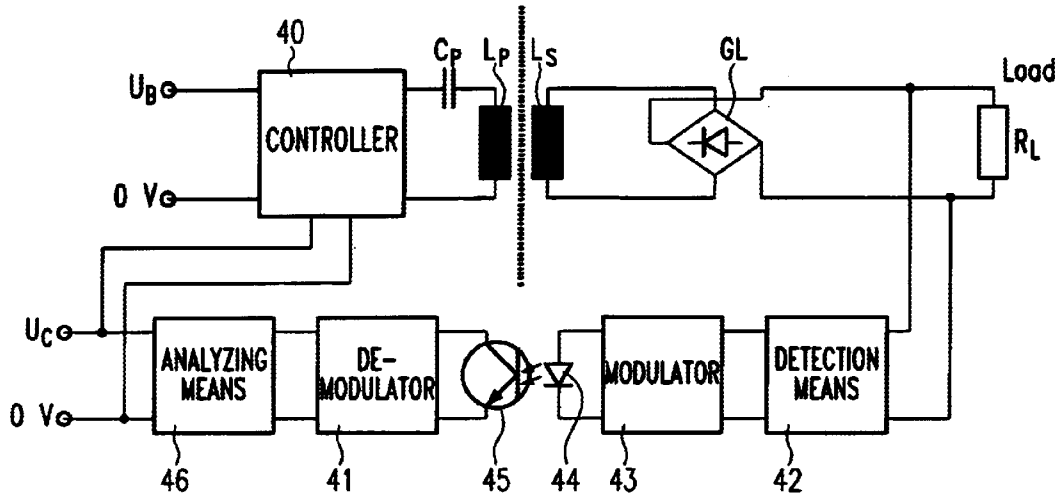


Fig.4

INDUCTIVE FEEDBACK

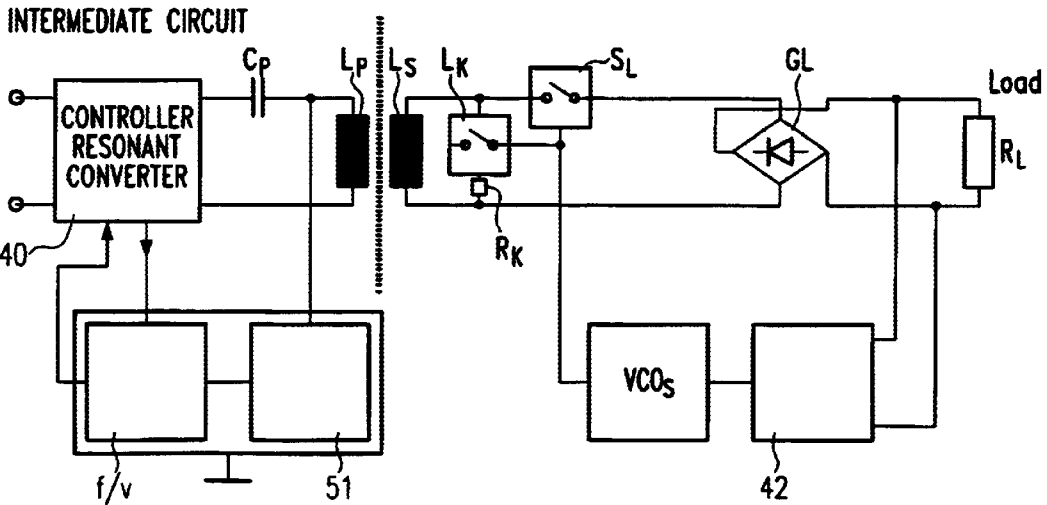


Fig.5

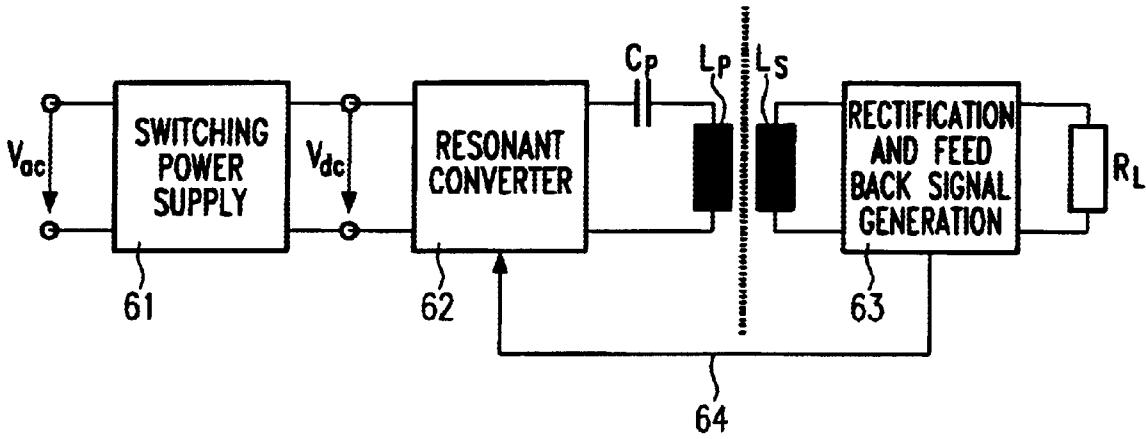


Fig.6  
(prior art)

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