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(54) **APPARATUS AND METHOD FOR
INDUCTIVE HEATING**

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(58) **Field of Search** 219/625, 626, 219/661, 663, 627, 662, 665, 666; 363/17, 132, 97, 98, 19, 21, 23, 25, 131

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,147,910 A	4/1979	Kiuchi et al.
4,241,250 A	12/1980	Steigerwald
4,356,371 A	10/1982	Kiuchi et al.
4,749,836 A	6/1988	Matsuo et al.
4,864,479 A	9/1989	Steigerwald et al.
4,866,592 A	9/1989	Fujii et al.
5,354,971 A	10/1994	Chen
5,587,650 A	12/1996	Massie
5,715,155 A	2/1998	Shahani et al.
5,747,972 A	5/1998	Baretich et al.
5,751,561 A	5/1998	Ho et al.

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(57) **ABSTRACT**

An induction heating method and device comprise an inductive heat source (120) having a controller (130), a resonant converter (125) and an induction coil (80). The controller (130) generates a variable frequency variable duty cycle control voltage in response to a power setting. The variable duty cycle of the control voltage decreases in response to an increase in the variable frequency of the control voltage. In response to the control voltage, the resonant power converter (125) generates an output between a first node (126) and a second node (128). Coupled between the first and second nodes (126, 128), the induction coil (80) varies the amount of heat it produces in response to the output power.

16 Claims, 7 Drawing Sheets

