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[54] **HYPERTHERMIA APPARATUS**

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[58] **Field of Search** 128/784–786, 128/788, 804, 422, 401, 798, 799

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,140,130 2/1979 Storm, III 128/804
4,285,346 8/1981 Armitage 128/804
4,676,258 6/1987 Inokuchi et al. 128/804
4,846,196 7/1989 Wiksell et al. 128/784

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[57] **ABSTRACT**

A hyperthermia apparatus for effecting the thermotherapy by heating a cancer locally including two outside-body electrodes to be arranged on an outer surface of a patient's body, an inside-body electrode to be inserted into a cavity of the patient's body, a high frequency power supply circuit for generating a high frequency power, and a switch connected between the high frequency power supply circuit and the electrodes for selectively supplying the high frequency power to two electrodes so that the cancer can be locally heated to a desired high temperature. At each electrode there are provided balloons through which temperature controlled liquid mediums are circulated to prevent portions of the body near the electrodes from being heated to undesired high temperatures. The liquid mediums circulated through the balloons are electrically isolated from each other completely.

11 Claims, 10 Drawing Sheets