

United States Patent [19]
Gliner et al.

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[54] **EXTERNAL DEFIBRILLATOR CAPABLE OF DELIVERING PATIENT IMPEDANCE COMPENSATED BIPHASIC WAVEFORMS**

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[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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Related U.S. Application Data

[63] Continuation of application No. 08/803,094, Feb. 20, 1997, Pat. No. 5,735,879, which is a continuation of application No. 08/103,837, Aug. 6, 1993, abandoned.

[51] **Int. Cl.**⁷ **A61N 1/39**

[52] **U.S. Cl.** **607/7; 607/5; 607/74; 607/8**

[58] **Field of Search** **607/4-8, 74**

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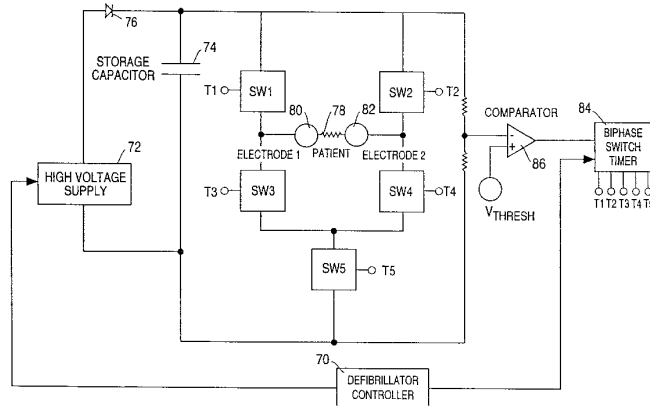
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[57] **ABSTRACT**

le;.5qThis invention provides an external defibrillator and defibrillation method that automatically compensates for patient-to-patient impedance differences in the delivery of electrotherapeutic pulses for defibrillation and cardioversion. In a preferred embodiment, the defibrillator has an energy source that may be discharged through electrodes on the patient to provide a biphasic voltage or current pulse. In one aspect of the invention, the first and second phase duration and initial first phase amplitude are predetermined values. In a second aspect of the invention, the duration of the first phase of the pulse may be extended if the amplitude of the first phase of the pulse fails to fall to a threshold value by the end of the predetermined first phase duration, as might occur with a high impedance patient. In a third aspect of the invention, the first phase ends when the first phase amplitude drops below a threshold value or when the first phase duration reaches a threshold time value, whichever comes first, as might occur with a low to average impedance patient. This method and apparatus of altering the delivered biphasic pulse thereby compensates for patient impedance differences by changing the nature of the delivered electrotherapeutic pulse, resulting in a smaller, more efficient and less expensive defibrillator.

12 Claims, 7 Drawing Sheets



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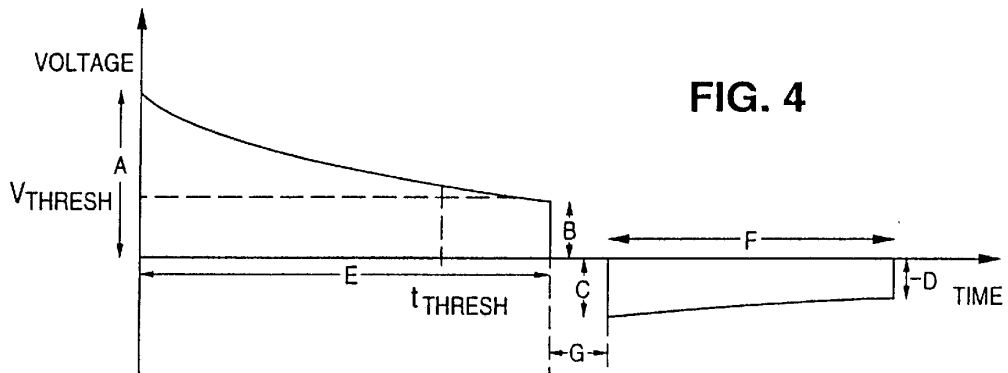
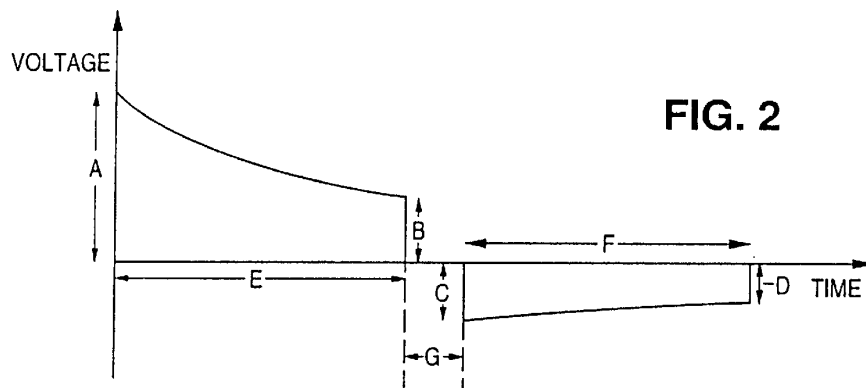
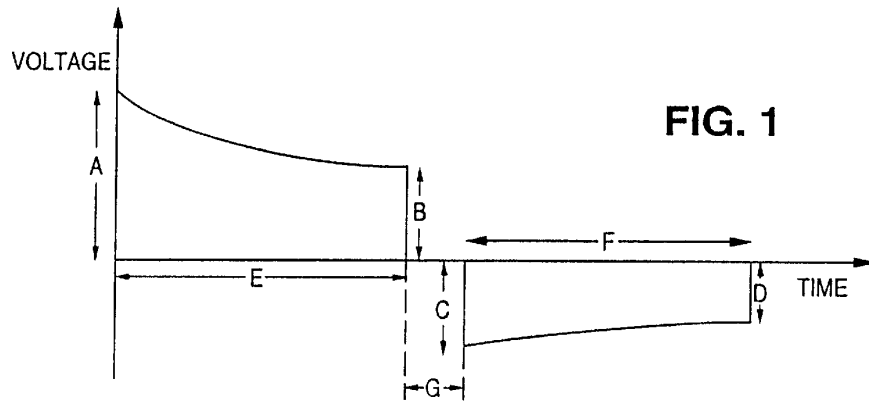
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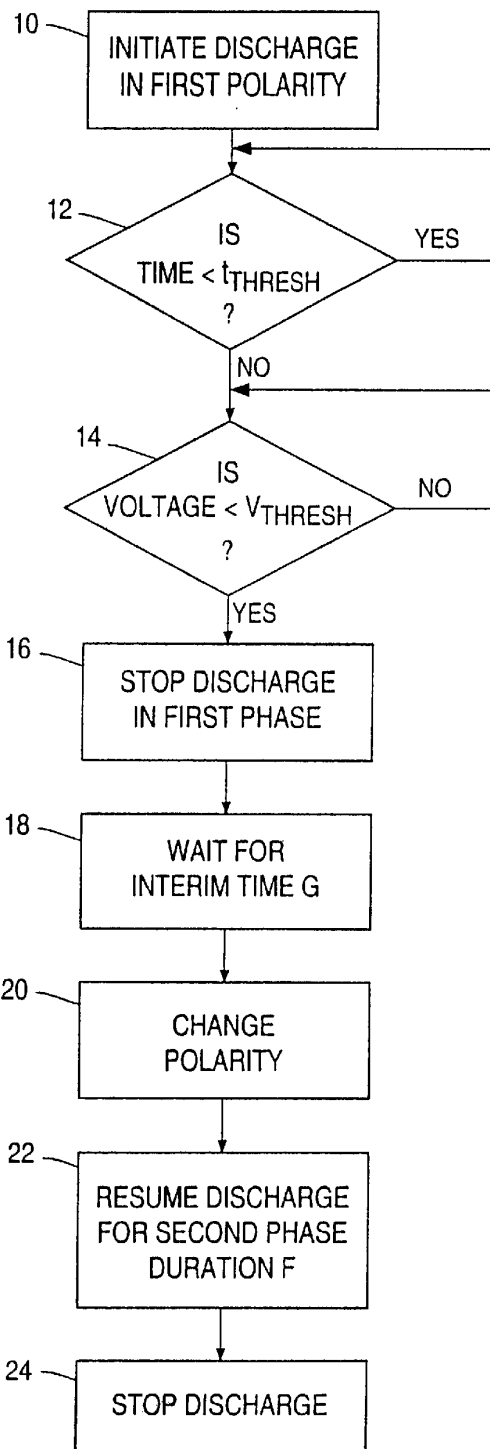


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