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United States Patent [19]

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Fain et al.

[45] Date of Patent: **Jul. 27, 1993**

[54] **METHOD AND APPARATUS FOR IMPEDANCE BASED AUTOMATIC PULSE DURATION ADJUSTMENT FOR DEFIBRILLATION SHOCK DELIVERY**

OTHER PUBLICATIONS

[75] Inventors: **Eric Fain; Benjamin Pless**, both of Menlo Park, Calif.; **Michael Hardage**, Kingwood, Tex.

“Transthoracic Ventricular Defibrillation in the 100 kg Calf with Symmetrical One-Cycle Bidirectional Rectangular Wave Stimuli” (Schuder, et al) IEEE Transactions on Biomedical Engineering, vol. BME-30, No. 7, Jul. 1983.

[73] Assignee: **Ventritex, Inc.**, Sunnyvale, Calif.

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[21] Appl. No.: **746,430**

[22] Filed: **Aug. 16, 1991**

[57] ABSTRACT

[51] Int. Cl.⁵ **A61N 1/39**

[52] U.S. Cl. **607/7**

[58] Field of Search **128/419 D**

An antitachycardia device, either implanted or external, which delivers a fixed pulse width truncated exponential waveform defibrillation shock and automatically adjusts the pulse duration based upon the impedance measured or calculated following a delivered shock. The apparatus operates by measuring or calculating the high voltage system impedance, selecting a pulse width for that impedance value and using a pulse width derived from the selected pulse width for the next defibrillation shock.

[56] References Cited

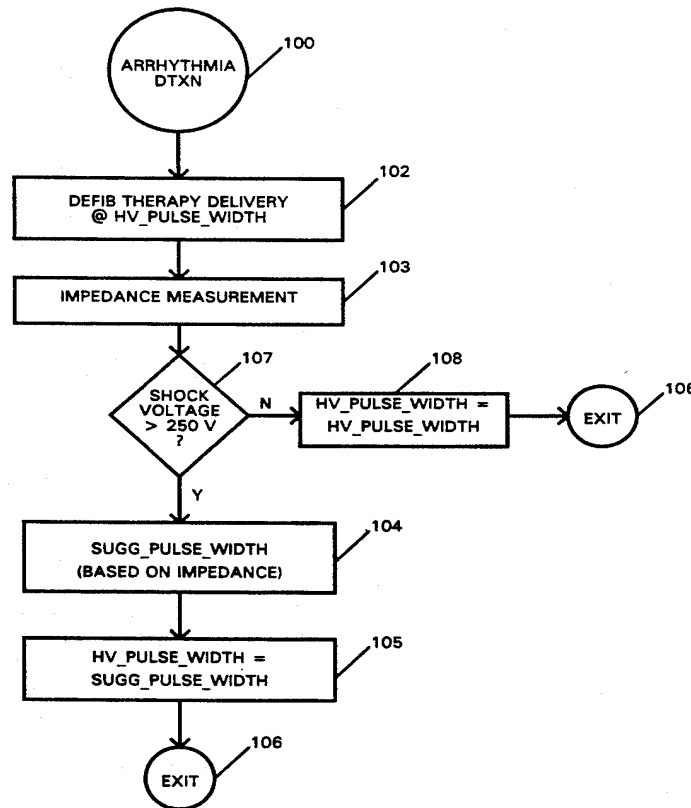
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22 Claims, 6 Drawing Sheets



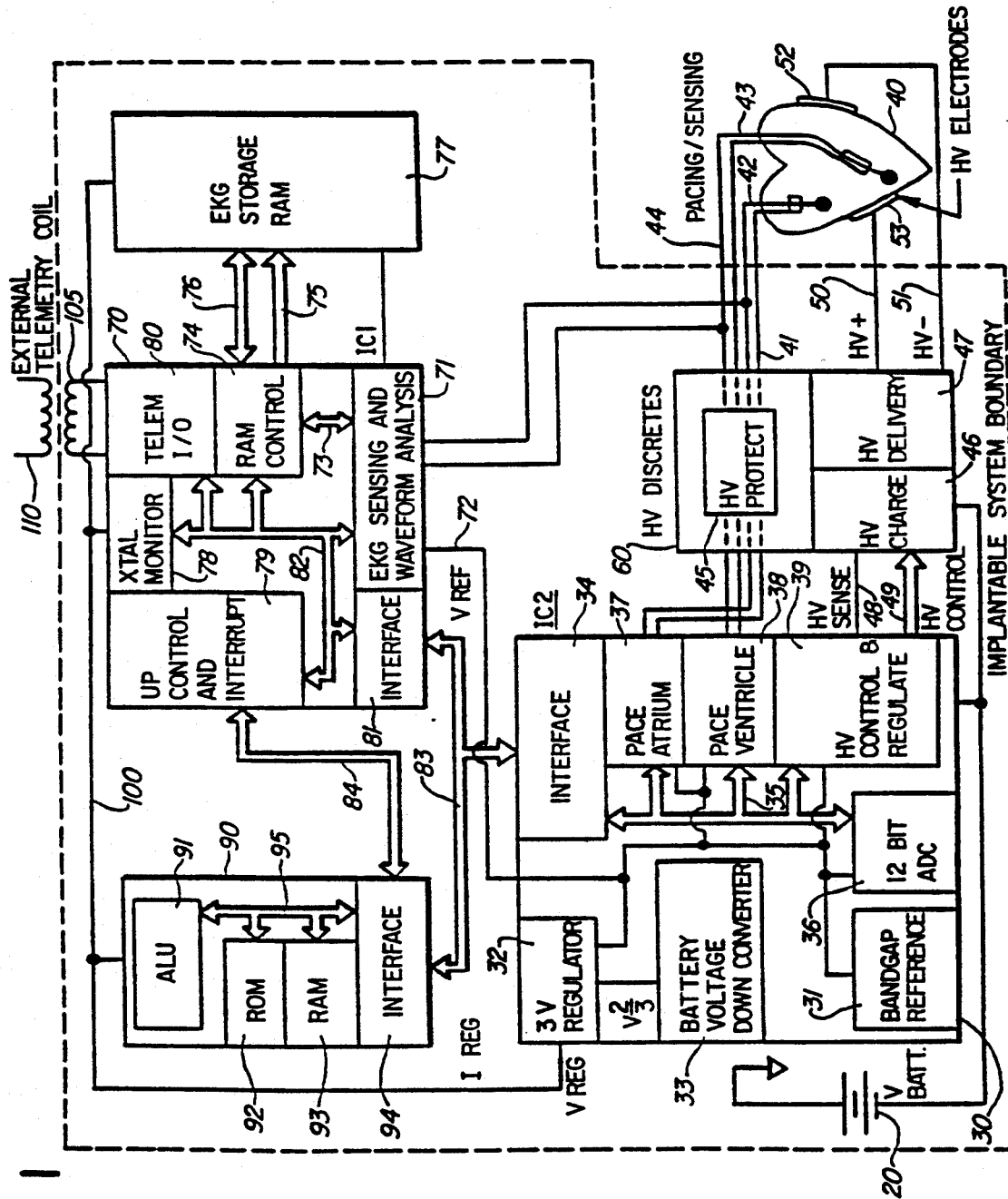


FIG. 1

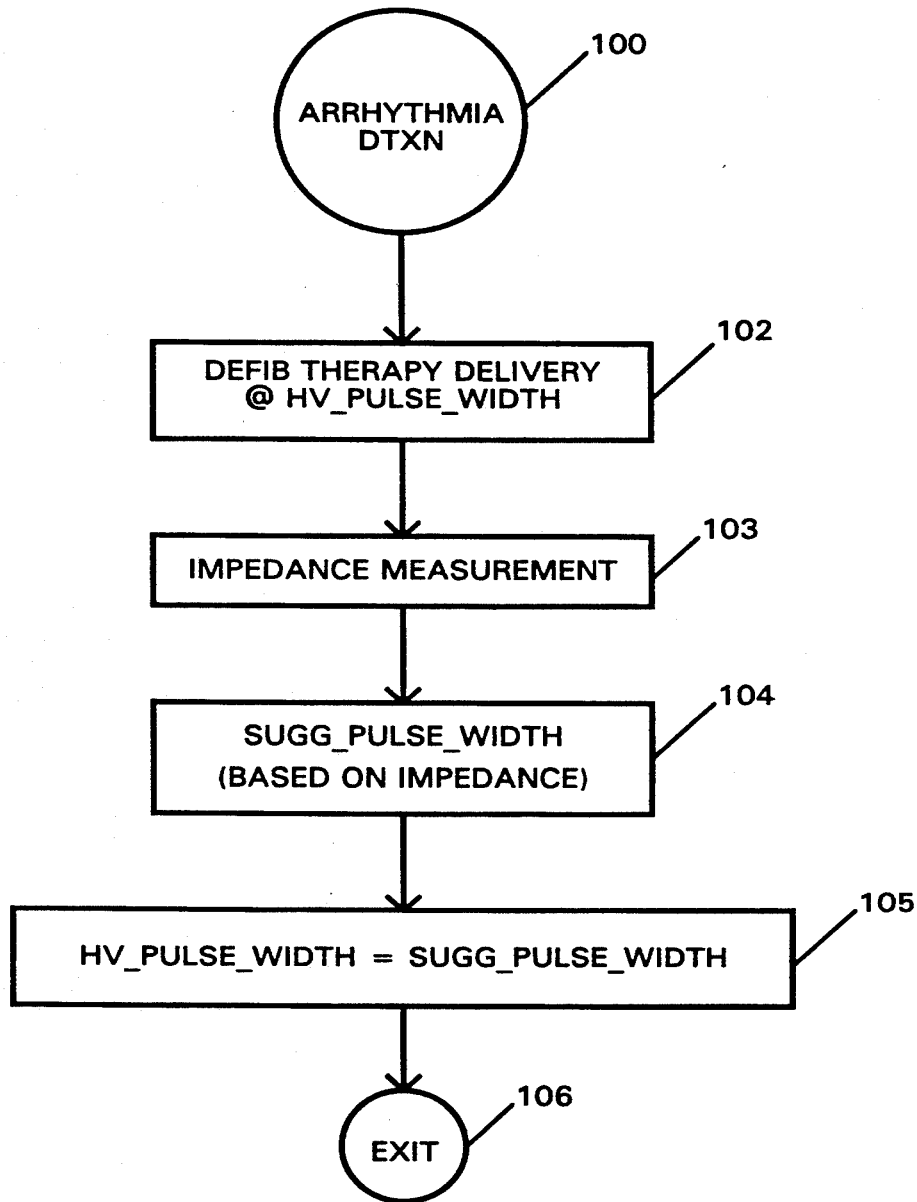


Figure 2

Measured Impedance (ohms)	Monophasic Waveform Suggested Pulse Width (msec)	Biphasic Waveform Suggested Pulse Width (msec)
< 19	3.0	3.0/3.0
20-26	4.0	4.0/4.0
27-32	5.0	5.0/5.0
33-38	6.0	6.0/6.0
39-44	7.0	7.0/7.0
45-51	8.0	8.0/8.0
52-57	9.0	9.0/9.0
58-63	10.0	10.0/10.0
64-69	11.0	11.0/11.0
> 70	12.0	12.0/12.0

Figure 3

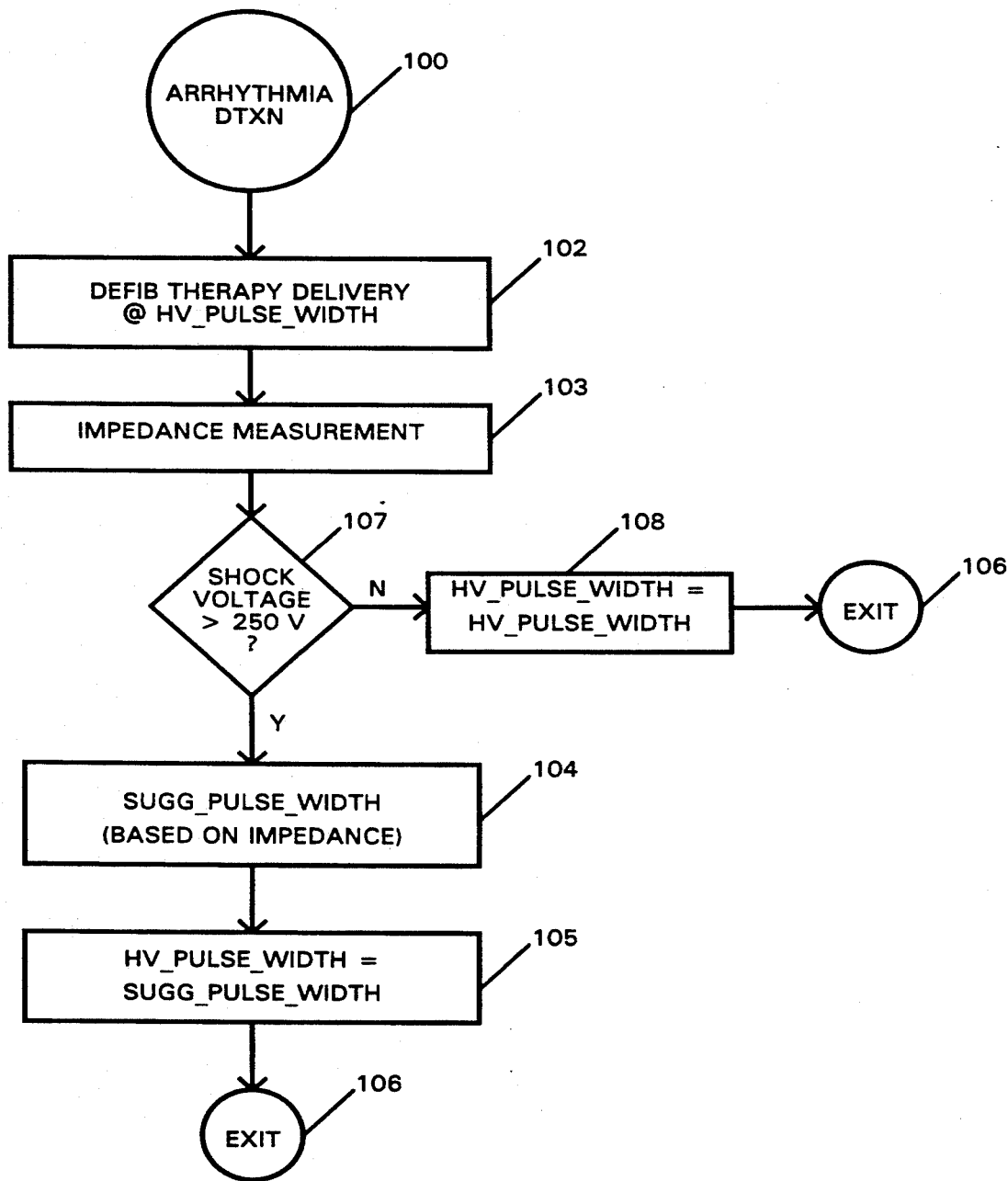


Figure 4

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