

607	Class	ISSUE CLASSIFICATION
007	Subclass	

5749905



UTILITY SERIAL NUMBER 07/691755

PATENT DATE MAY 12 1998

PATENT NUMBER

SERIAL NUMBER	FILING DATE	CLASS	SUBCLASS	GROUP ART UNIT	EXAMINER
07/691755	08/02/96 RULE 60	607	007	3305	Schuetzle

APPLICANTS

WILLIAM LINER, BELLEVUE, WA; THOMAS D. Lyster, BOTHELL, WA;  
COLE, KIRKLAND, WA; DANIEL J. POWERS, BAINBRIDGE ISLAND, WA;  
MORGAN, BAINBRIDGE ISLAND, WA.

\*\*\*\*\*  
THIS APPLN IS A CON OF 08/103,857 08/06/93

A8N

\*\*\*\*\*  
none

**NOTE-DISCLAIMER**  
The term of this patent shall not extend beyond the expiration date of Pat. No. 5,601,612.

\*\*\*\*\* SMALL ENTITY \*\*\*\*\*

Foreign priority claimed 35 USC 119 conditions met	<input type="checkbox"/> yes <input checked="" type="checkbox"/> no	AS FILED	STATE OR COUNTRY	SHEETS DRWGS.	TOTAL CLAIMS	INDEP. CLAIMS	FILING FEE RECEIVED	ATTORNEY'S DOCKET NO.
Verified and Acknowledged	Examiner's Initials	WA	7	1	1	\$375.00	93-003US1C1	

ADDRESS

SHAY  
OCEAN INC  
DEPARTMENT SUITE 300  
FOURTH AVENUE  
WA 98121

**ISSUE FEE IN FILE**

TITLE

TELEGRAPHY METHOD AND APPARATUS utilizing Patient Dependent Electrical meters.

2-12-98

U.S. DEPT. OF COMM. / PAT. & TM - PTO-436L (Rev. 12-94)

PARTS OF APPLICATION FILED SEPARATELY		Applications Examiner 2/17	
NOTICE OF ALLOWANCE MAILED		Kennedy J. Schuetzle	
218.98		Assistant Examiner	
ISSUE FEE		WILLIAM E. KAMM PRIMARY EXAMINER ART UNIT 335	
Amount Due	Date Paid	Primary Examiner	
218.98	2/27/98	PREPARED FOR ISSUE	
Label Area		CLAIMS ALLOWED	
		Total Claims	Print Claim
		11	1
		DRAWING	
		Sheets Drwg.	Figs. Drwg.
		7	11
		Print Fig	
		6	
		ISSUE BATCH NUMBER	
		264	

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Form PTO-436A  
Rev. 8/92

IN FILE

ISSUE FEE IN FILE

08/691755

PATENT APPLICATION



08691755

Date  
Entered  
or  
Counted

CONTENTS

APPROVED FOR LICENSE ☒

INITIALS SEP 09 1995

Date  
Received  
or  
Mailed

1.	Application <i>Prints</i> papers.	
2.	<i>Pre Amtd. A</i>	<i>8-2-90</i>
3.	<i>Pre Amtd. B</i>	<i>8-2-90</i>
4.	<i>I.D.S.</i>	<i>10-2-96</i>
5.	<i>Key 3 mo</i>	<i>12-30-96<sup>AS</sup></i>
6.	<i>I.D.S.</i>	<i>4-7-97</i>
10/31	7. <i>Final Key 3 mo</i>	<i>11-3-97</i>
	8. <i>I.D.S.</i>	<i>11-10-97</i>
11/2/98	9. <i>Amtd &amp; ne</i>	<i>11-17-97</i>
	10. <i>Petition Granted</i>	<i>1-13-98</i>
11/29	11. <i>Advisory Op.</i>	<i>1-29-98</i>
	12. <i>Term. Discl.</i>	<i>1/29/98</i>
	13. <i>Below</i>	<i>2-8-98</i>
	14. <b>PTO GRANT MAY 12 1998</b>	
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## SEARCHED

Class	Sub.	Date	Exmr.
607	4 5 6 7 8 2 39 40 42 43-46 48 50 58 62 74	12-18-96	<i>28</i>
607	4-8 2 39 40 42-46 48 50 58 62 74	10-28-97	<i>28</i>
607	4-8 2 39 40 42-46 48 50 58 62 74	2-12-98	<i>28</i>

## SEARCH NOTES

	Date	Exmr.
<i>search update of parent case search</i>	12-18-96	<i>28</i>
<i>search update of 12-18-96 update</i>	10-28-97	<i>28</i>
<i>search update of 10-28-97 update</i>	2-12-98	<i>28</i>

## INTERFERENCE SEARCHED

Class	Sub.	Date	Exmr.
607	4-8 2 39 40 42-46 48 50 58 62 74	2-12-98	<i>28</i>

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POSITION	ID NO.	DATE
CLASSIFIER	45	9-8-96
EXAMINER	46/4	9-18-96
TYPIST	357	09/20/96
VERIFIER	851	9-27
CORPS CORR.		
SPEC. HAND		
FILE MAINT.		
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### INDEX OF CLAIMS

Claim	Date
Final Original	12-20-96 1-27-97 2-12-98
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Claim	Date
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SYMBOLS  
 ✓ ..... Rejected  
 - ..... Allowed  
 - (Through numeral) Canceled  
 + ..... Restricted  
 N ..... Non-elected  
 I ..... Interference  
 A ..... Appeal  
 O ..... Objected



US005749905A

# United States Patent [19]

Gliner et al.

[11] Patent Number: **5,749,905**  
 [45] Date of Patent: **\*May 12, 1998**

- [54] **ELECTROTHERAPY METHOD UTILIZING PATIENT DEPENDENT ELECTRICAL PARAMETERS**
- [75] Inventors: **Bradford E. Gliner, Bellevue; Thomas D. Lyster, Bothell; Clinton S. Cole, Kirkland; Daniel J. Powers; Carlton B. Morgan, both of Bainbridge Island, all of Wash.**
- [73] Assignee: **Heartstream, Inc., Seattle, Wash.**
- [\*] Notice: The term of this patent shall not extend beyond the expiration date of Pat. No. 5,601,612.

2083363 3/1982 United Kingdom .  
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 94/22530 10/1994 WIPO .  
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Winkle et al., "Improved low energy defibrillation efficacy in man using a biphasic truncated exponential waveform" JACC9(2):142A (1987).

(List continued on next page.)

Primary Examiner—William E. Kamm  
 Assistant Examiner—Kennedy J. Schaetzle  
 Attorney, Agent, or Firm—James R. Shay; Cecily Anne Snyder

- [21] Appl. No.: **691,755**  
 [22] Filed: **Aug. 2, 1996**

## Related U.S. Application Data

- [63] Continuation of Ser. No. 103,837, Aug. 6, 1993, abandoned.  
 [51] Int. Cl.<sup>6</sup> ..... **A61N 1/39**  
 [52] U.S. Cl. .... **607/7; 607/14**  
 [58] Field of Search ..... **607/4, 5, 6, 7, 607/8, 2, 39, 40, 42, 43-46, 48, 50, 58, 62, 74**

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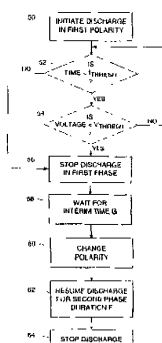
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 0353341 2/1990 European Pat. Off. .  
 0437104 7/1991 European Pat. Off. .  
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 0507504 10/1992 European Pat. Off. .  
 2070435 9/1981 United Kingdom .

## ABSTRACT

This 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.

11 Claims, 7 Drawing Sheets





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