



US009510894B2

(12) **United States Patent**  
**Clark et al.**

(10) **Patent No.:** **US 9,510,894 B2**  
(45) **Date of Patent:** **Dec. 6, 2016**

(54) **IRRIGATED ABLATION CATHETER HAVING IRRIGATION PORTS WITH REDUCED HYDRAULIC RESISTANCE**

(58) **Field of Classification Search**  
CPC ..... A61B 18/14; A61B 18/1492; A61B 2018/00029; A61B 2018/1472; A61B 2018/00357; A61B 2018/00577; A61B 2218/002  
USPC ..... 607/99, 105, 115; 604/21; 606/41  
See application file for complete search history.

(71) Applicant: **Biosense Webster (Israel), Ltd.**,  
Yokneam (IL)

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(72) Inventors: **Jeffrey L. Clark**, Castaic, CA (US);  
**Jeffrey Tola**, Los Angeles, CA (US)

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(73) Assignee: **BIOSENSE WEBSTER (ISRAEL) LTD.**, Yokneam (IL)

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 190 days.

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(21) Appl. No.: **13/789,574**

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(22) Filed: **Mar. 7, 2013**

(Continued)

(65) **Prior Publication Data**  
US 2014/0058386 A1 Feb. 27, 2014

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**Related U.S. Application Data**

*Primary Examiner* — Joseph Stoklosa  
*Assistant Examiner* — Thomas Giuliani  
(74) *Attorney, Agent, or Firm* — Lewis Roca Rothgerber Christie LLP

(63) Continuation-in-part of application No. 12/769,592, filed on Apr. 28, 2010, and a continuation-in-part of application No. 12/770,582, filed on Apr. 29, 2010.

(57) **ABSTRACT**

(51) **Int. Cl.**  
**A61B 18/14** (2006.01)  
**A61B 18/00** (2006.01)

An irrigated ablation catheter includes a tip electrode with a thin shell and a plug to provide a plenum chamber. The tip electrode has an inlet of a predetermined size and noncircular shape, and outlets in the form of fluid ports formed in the thin shell wall. The plurality of the fluid ports is predetermined, as is their diameter. Each fluid port has a tapered configuration, for example, a frustoconical configuration, with a smaller inlet diameter and a larger outlet diameter.

(52) **U.S. Cl.**  
CPC ..... **A61B 18/14** (2013.01); **A61B 18/1492** (2013.01); **A61B 2018/00029** (2013.01); **A61B 2034/2051** (2016.02); **A61B 2218/002** (2013.01)

**14 Claims, 22 Drawing Sheets**

