

Warren P. Heim, P.E.
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Summary

Mr. Heim started providing consulting services in 1976 in Washington, D.C. where his clients included The White House, federal agencies, and private clients for whom he evaluated new energy technologies. He now develops and evaluates sophisticated multidisciplinary medical devices, activities that started over 30 years ago. Mr. Heim also uses his expertise to provide expert witness services for intellectual property and other litigation. Over 20 U.S. medical device patents list him as an inventor including the fields of electrosurgery, drug delivery, and cardiology. He evaluates product technologies and product concepts, invents and develops products, assesses their intellectual property, and brings them into production. Mr. Heim has worked with most of the large U.S. medical device companies as well as startups. He provides system design and mechanical and electronic engineering and develops controlling and sensing algorithms. Experience includes mechanical engineering, electronic and control engineering, software engineering, chemistry, thermodynamics, heat transfer, materials science, and experimental design and analysis. Mr. Heim has had excellent working relationships with mechanical, electronic and software engineers, designers, and technicians, machine shops, vendors, industrial and human interface designers, and independent laboratories that conduct animal studies and conduct histology evaluations. Mr. Heim has worked with clinical advisor physician experts for over 20 years.

Professional Career

Team Medical, LLC 1996 - Present B Founder and CEO
Boulder, Colorado

Team Medical conducts research and development of advanced medical devices. Mr. Heim uses his mechanical, electronic, mathematical, and software skills to develop products and the manufacturing equipment used to make them

Surginetics LLC 2006 - 2007 - Executive Vice President and Chief Technical Officer
Boulder, Colorado

Surginetics was created to commercialize a set of technologies developed and patented by Team Medical, LLC. Surginetics sold its IP portfolio to a subsidiary of a multibillion dollar company.

The Larren Corporation 1988 - 1996 - Founder and President
Boulder, Colorado

The Larren Corporation became one of the United States' premier contract medical device product research and development companies. Larren provided the full range of electronic, mechanical, software, manufacturing, and quality assurance engineering needed to bring products from conception to production. Larren was successfully sold to Battelle and Mr. Heim continued developing medical devices with Team Medical, above.

Rela, Inc. 1987 - 1988 - Group Director
Boulder, Colorado

Mr. Heim set up and managed the medical device product development group at Rela, a multidisciplinary contract product development company.

Valleylab, Inc. (a unit of Pfizer, now Medtronic) 1982 - 1987 - Engineer & Engineering Manager
Boulder, Colorado

As an engineer and Engineering Manager at Valleylab, Mr. Heim worked in the Infusion Systems Division, which designed, manufactured, sold, and serviced precision medication delivery pumps and the disposables that they used. Mr. Heim managed Valleylab's largest engineering team and developed new products and improved the reliability and profitability of existing products.

Energy and Resource Consultants 1979 - 1982 - Founder and Principal
Boulder, Colorado

Energy and Resource Consultants provided technical and economic consulting services to private and public sector clients in fields including biomass fuels, small scale hydroelectric, synthetic fuels, renewable energy, and electricity use forecasting.

Energy and Environmental Analysis, Inc. 1976 - 1979 - Engineer & Project Director
Arlington, Virginia

Mr. Heim provided technical and economic consulting services to private and public sector clients including the Executive Office of the President of the United States with expertise on alternative fuels, fuels combustion, green energy, and energy demand forecasting.

Gulf Oil Company 1975 - 1976 - Project Engineer
Dupont, Washington

Mr. Heim was one of the engineers selected to lead Gulf Oil's (purchased by Chevron) move into alternative fuels. He improved and developed processes and equipment at a plant designed to convert coal into clean burning fuels.

Dartmouth College, Thayer School of Engineering 1973 - 1975
Hanover, New Hampshire

The National Science Foundation funded Mr. Heim's graduate studies examining heat transfer and energy conservation in residential buildings.

Education

1975 - Master of Engineering, Dartmouth College, Thayer School of Engineering

1974 - Bachelor of Engineering, Dartmouth College, Thayer School of Engineering

1973 - A.B. (Bachelor of Arts), Dartmouth College

Registered Professional Engineer No. 23242 (February 15, 1985), State of Colorado

Publications

Mr. Heim has produced hundreds of technical reports and design documents for medical devices. All of them are covered by confidentiality agreements. Many of the medical devices developed incorporated pressurized fluid flow and control. Following are synopses of some example projects and publicly available documents in the form of United States Patents for which Mr. Heim is an inventor.

United States Patents

<u>Patent Number and Issue Date</u>	<u>Patent Title and Abstract Excerpt</u>
8562603 October 22, 2013	<u>Method for conducting electrosurgery with increased crest factor</u> A method for conducting electrosurgery using increased crest factors employs an electrosurgical instrument having at least one conductive element that is surrounded by an insulation layer except at...
8357155 January 22, 2013	<u>Multielectrode electrosurgical blade</u> An electrosurgical instrument blade includes a body having more than two electrodes with at least two electrodes having alternating current power supplied to them provide a bipolar alternating...
8357154 January 22, 2013	<u>Multielectrode electrosurgical instrument</u> An improved electrosurgical instrument includes a body having more than two electrodes with at least two electrodes having alternating current power supplied to them provide a bipolar alternating...
7935113 May 3, 2011	<u>Electrosurgical blade</u> An electrosurgical blade includes a conductive element that is surrounded by an insulation layer except at a conductor edge portion of the conductive element. The conductor edge portion and...
7935112 May 3, 2011	<u>Electrosurgical instrument</u> An electrosurgical instrument is disclosed for simplifying making incisions and other treatments using electrosurgery. The electrosurgical instrument comprises a body having at least one conductive...

7896875
March 1, 2011
Battery powered electrosurgical system
An battery-powered electrosurgical instrument includes a blade having a conductor edge portion and insulation layer with geometric shapes and composition that concentrate electrosurgical energy and...

7867226
January 11, 2011
Electrosurgical needle electrode
An electrosurgical needle includes a body having at least one conductive element in the form of a needle that is surrounded by an insulation layer except at a conductor tip portion of the...

7867225
January 11, 2011
Electrosurgical instrument with needle electrode
An electrosurgical instrument includes a conductive element in the form of a needle that is surrounded by an insulation layer except at a conductor tip portion of the conductive element.

7806825
October 5, 2010
Diagnostic signal processing method and system
A signal processing utility is disclosed involving time-to-frequency domain transforms for applications including medical diagnostic signal processing. Such transforms can be used to define a...

7491173
February 17, 2009
Method and system for obtaining dimension related information for a flow channel
A method and system for determination of dimension related information such as volumetric flow rate(s) of a fluid flowing through a channel. In one implementation, the method and system analyzes...

7377919
May 27, 2008
Electrosurgical instrument
An improved insulating layer for electrosurgical instruments and its use for electrosurgical instruments for reducing smoke generation at a surgical site is disclosed. The insulating layer may...

7175621
February 13, 2007
Electrosurgical mode conversion system
A surgical system that applies electrical energy to obtain predetermined surgical effects while improving the control of the application of the energy that is supplied by electrosurgical...

6692489
February 17, 2004
Electrosurgical mode conversion system
A surgical system that applies electrical energy to obtain predetermined surgical effects while improving the control of the application of the energy that is supplied by electrosurgical...

6533781
Electrosurgical instrument

March 18, 2003 An improved electrosurgical instrument and method is disclosed for reducing smoke generation at a surgical site. The electrosurgical instrument comprises a metal body having an outer insulating...

6287305
September 11, 2001 Electrosurgical instrument
An improved electrosurgical instrument and method is disclosed for reducing smoke generation at a surgical site. The electrosurgical instrument comprises a metal body having an outer insulating...

6241723
June 5, 2001 Electrosurgical system
An electrosurgical system is disclosed that applies electrical energy to obtain a predetermined surgical effect, while also reducing eschar deposits on a working surface of an electrosurgical...

6074387
June 13, 2000 Electrosurgical system for reducing/removing eschar accumulations on electrosurgical instruments
An electrosurgical system is disclosed that applies electrical energy to obtain a predetermined surgical effect, while also reducing eschar deposits on a working surface of an electrosurgical...

5897534
April 27, 1999 Body fluids and solids drainage system
A medical system for facilitating the removal of body matter including solids, liquids and gases from a body cavity. The system includes mechanical energy applied to the interior surface of a...

5807341
September 15, 1998 Medical catheter dressing device
A medical apparatus and method for managing one or more conveyance tubes used to inject or remove fluids, solids or semi-solids from a patient's body without the need for sutures. The device...

5707402
January 13, 1998 Directed energy surgical method and assembly
An improved directed energy surgical method and assembly is disclosed. The method and assembly contemplate the application of a directed energy stream to tissue and the application of a liquid mist...

5658133
August 19, 1997 Pump chamber back pressure dissipation apparatus and method
A medical infusion pump (10) for delivering liquids to a patient includes an elastomeric pump chamber (140) contractable between a refill position and a discharge position. An inlet valve (122) is...

5630710 Ambulatory infusion pump

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