Nº 2 • Jul/Sep 2017

Nuevas tecnologías en Insuficiencia Cardiaca

LA PRINCESA INNOVA

Boletín de Vigilancia Tecnológica

IP INSTITUTO DE INVESTIGACIÓN SANITARIA
SaludMadrid Hospital Universitario de La Princesa

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Presentación

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Queridos amigos:

Es para mí una satisfacción, como Coordinadora de la Unidad de Innovación del Hospital Universitaria de La Princesa, presentaros el segundo número del Boletín de Vigilancia Tecnológica ¿Cómo tratando de innovar desde un hospital no vamos a tener en cuenta la Insuficiencia Cardiaca, cuando es el primer motivo de ingreso médico?

La Insuficiencia Cardíaca es la patología médica que más frecuentemente condiciona un ingreso hospitalario. Es una patología muy prevalente, cuya incidencia aumenta con la edad, por lo que es esperable que siga aumentando en los próximos años. Es una patología crónica que incide en pacientes con múltiples comorbilidades y que requiere una atención integral por parte de un equipo multidisciplinar y una continuidad asistencial sólida entre AP y especializada.

El reto de detectar precozmente sus descompensaciones, evitando el ingreso hospitalario, dada las grandes repercusiones sociosanitarias que los múltiples ingresos que estos pacientes sufren, hace que en la actualidad sea un campo de investigación muy potente. La búsqueda de modelos de gestión, algoritmos diagnósticos que permitan diagnóstico precoz de las descompensaciones, de sistemas de monitorización de la evolución clínica y de respuesta a los tratamientos, la aplicación de las TICs como herramientas para el seguimiento son aspectos que justifican que **La Princesa Innova** dedique este boletín a esta patología.

Este número se compone de tres bloques:

La Princesa Innova se compone de dos bloques bien diferenciados:

1. Una sección de **patentes subclasificadas por categorías tecnológicas**. Para acceder al contenido completo de la patente hay que clicar sobre el campo **"Numero de solicitud" de cada patente (+)** que enlazará con documento publicado en la base de datos "esp@cenet®"
2. Una sección sobre **información de mercado o epidemiológica obtenida de GlobalData**.
3. Una sección de noticias sobre la **innovación del área sanitaria**. Para acceder a la noticia completa se puede clicar sobre el título.

Confiamos que esta iniciativa se convierta en una herramienta para impulsar la Innovación en La Princesa.

Publicación de la Unidad de Innovación del IIS del Hospital Universitario de La Princesa
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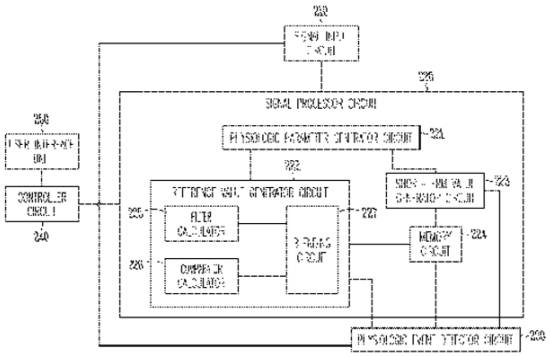
Este boletín se ha financiado gracias a la ayuda de PT13/0006/0016 concedida por ISCIII-Subdirección General de Evaluación y Fomento de la Investigación en el marco del PE de I+D+i 2013-2016 y cofinanciado con fondos FEDER.

Patentes

Categoría n. 1: TECNOLOGIAS DE MONITORIZACIÓN Y PREDICCION BASADAS EN ANÁLISIS DE DATOS

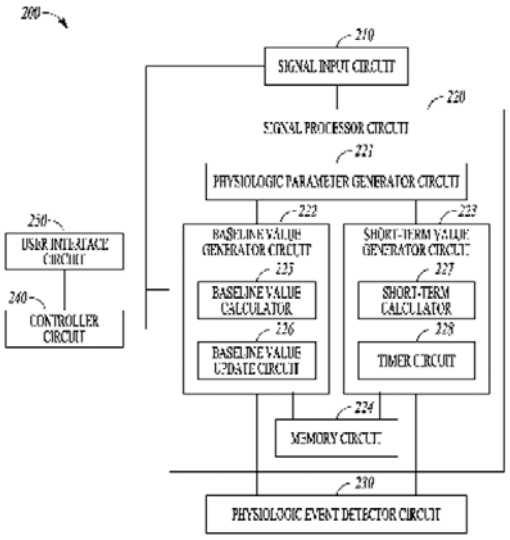
Prediction of worsening of heart failure using blended reference



Systems and methods for detecting cardiac conditions such as events indicative of worsening of heart failure (HF) are described. A system can receive a physiological signal from a patient, transform one or more first portions of the physiological signal into respective one or more baseline statistical values, transform one or more second portions of the physiological signal into one or more historical extreme values, and generate one or more reference values of a physiologic parameter using the baseline statistical values and the historical extreme values. The system can transform one or more third signal portions of the physiological signal into respective one or more short-term values, and produce a cardiac condition indicator using a combination of relative differences between the short-term values and the corresponding reference values. The system can output the cardiac condition indicator, or deliver therapy according to the cardiac condition indicator.

US201615335754 [+]

Predictions of worsening heart failure



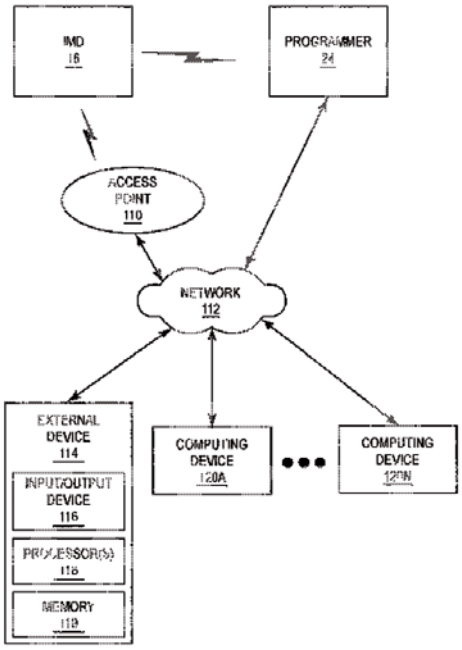
Systems and methods for detecting cardiac conditions such as events indicative of worsening heart failure are described. A system can include a sensor circuit to sense a physiological signal, transform one or more first signal portions of the physiological signal into one or more baseline values, and transform one or more second signal portions of the physiological signal into short-term values associated with respective timing information. The system can generate a cardiac condition indicator using a weighted combination of relative difference between the one or more short-term values and the one or more baseline values. The weighting can include one or more weight factors determined according to the timings of the one or more second signal portions. The system can output an indication of a progression over time of the cardiac condition indicator, or deliver therapy according to the cardiac condition indicator.

US201615281992 [+]

Patentes

Absolute intrathoracic impedance based scheme to stratify patients for risk of a heart failure event

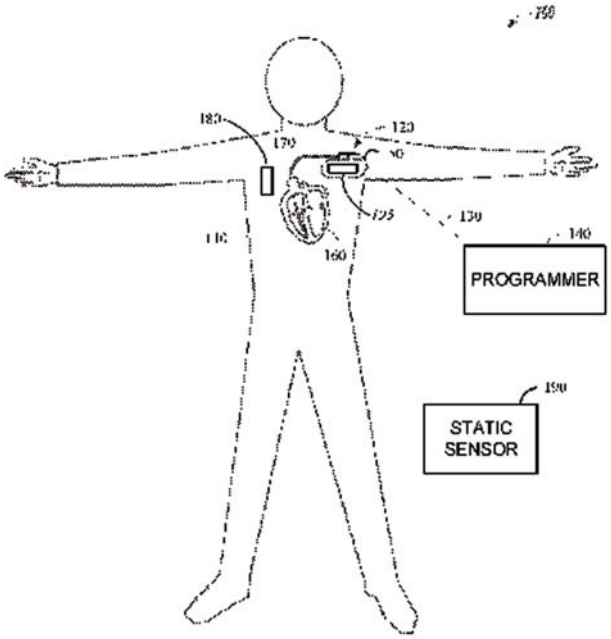
A health care system acquires data determines whether a patient is at risk of hypervolemia or hypovolemia. The method comprises (a) acquiring from a device memory a patient's absolute intrathoracic impedance data over a pre-specified time period, (b) determining a running average of the intrathoracic impedance data over the pre-specified time period, and (c) determining by the system whether the running average of the intrathoracic impedance data over the pre-specified time period exceeds one of a first and second range, the first range being a higher value boundary of intrathoracic electrical impedance and the second range being a lower value boundary of intrathoracic electrical impedance.



US201615222461 [+]

Detecting heart failure by monitoring the time seqence of physiological changes

Systems and methods for detecting heart failure by monitoring the time-sequence of physiological changes of a subject using a state machine circuit configured to receive information about physiological characteristics of the subject is described. The current state transitions between a first and a second state in response to a first transition trigger. The current state transitions between the second and first states in response to at least one of the expiration of a first timer or ceasing of the first transition trigger. The current state transitions between the second and third states in response to a second transition trigger. The current state transitions between the third and second states in response to at least one of expiration of a second timer or ceasing of the second transition trigger.



US201615216167 [+]

Patentes

Observational heart failure monitoring system

Method and systems provide for reliable, convenient, and cost-effective personalized assessment of hemodynamic status in the ambulatory heart failure patient. The method and apparatus use pulse contour analysis of data obtained through observation of the patient for determination of hemodynamic status, and for determination of day-to-day changes in hemodynamic status. Observational assessment of the patient includes monitoring during activities of daily living including sleeping, sitting and standing. These activities create changes in venous return that are used to evaluate cardiac function or changes in cardiac function. The method and system infer body position by using position and motion information obtained by the system. Changes in cardiac function over time or due to changes in body pose are evaluated for the assessment of hemodynamic status, with a focus on changes resulting from fluid overload.

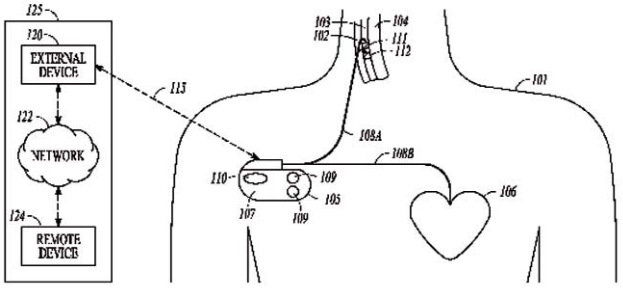
WO2016US65135 [+]

Methods and systems for determining risk of heart failure

Provided are methods, algorithms, nomograms, and computer/software systems that can be used to accurately determine the risk of developing heart failure within a specific time period in a subject not diagnosed or presenting with heart failure. Also provided are methods, algorithms, nomograms, computer/software systems for selecting a treatment for a subject and determining the efficacy of a treatment for reducing the risk of heart failure in a subject.

US2015199491 [+]

Heart failure event detection using minimum heart rate



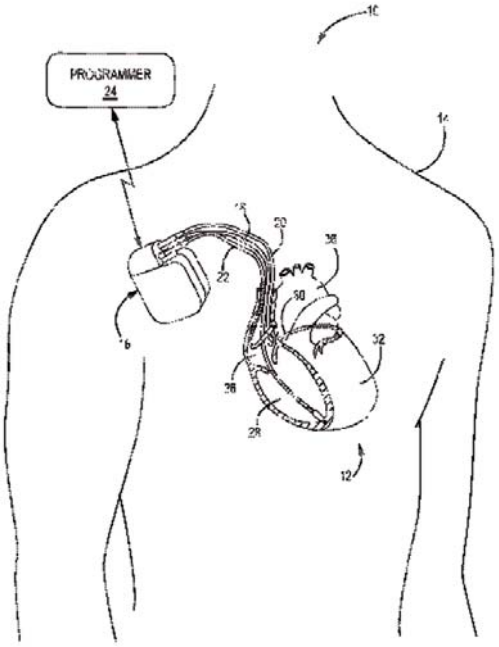
Systems, devices, or methods can be used to detect an event, or series of events, that can indicate worsening of congestive heart failure (CHF), or can be used to identify a subject at an elevated risk for developing CHF. A CHF event predictor can be provided using a characteristic minimum of subject cardiac intervals. In an example, the subject cardiac intervals can be obtained during a night-time period or during periods of reduced subject physical activity. A CHF event predictor can be determined using information about physiologic signals received from a subject, such as from a physiologic sensor associated with an ambulatory or implantable medical device.

US201615176915 [+]

Patentes

Using biomarker information for heart failure risk computation

Provided is a method, system and/or apparatus for determining prospective heart failure event risk. Acquired from a device memory are a heart failure patient's current and preceding risk assessment periods. Counting detected data observations in the current risk assessment period for a current risk assessment total amount and counting detected data observations in the preceding risk assessment period for a preceding risk assessment period total amount. Associating the current risk assessment and preceding risk assessment total amounts with a lookup table to acquire prospective risk of heart failure (HF) event for the preceding risk assessment period and the current risk assessment period. Employing weighted sums of the prospective risk of the HF event for the preceding risk assessment period and the current risk assessment period to calculate a weighted prospective risk of the HF event for a patient.

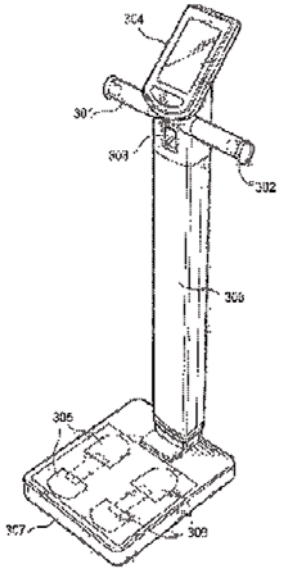


WO2016US65768 [+]

Categoría n. 2: TECNOLOGIAS PARA MONITORIZAR EFECTIVIDAD DEL TRATAMIENTO DE IC

Device for monitoring for effectiveness of heart failure therapy

A step-on device records the patient's EKG, Respiratory signal, PPG, and weight, giving health care personnel the ability to monitor patient health trends. The device sends the data to a central server via a smartphone or via WiFi. Health care personnel may view the data and trends on an online website or app.

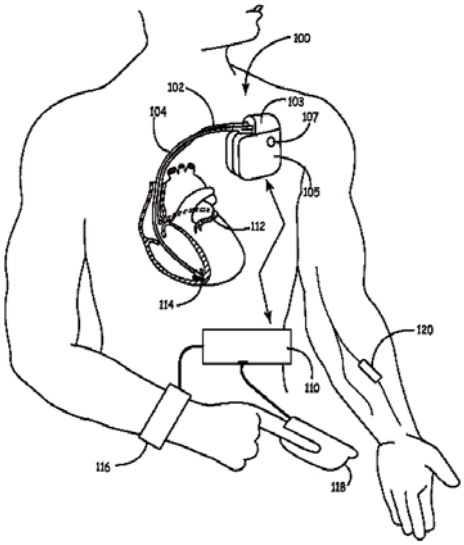


CA20152958282 [+]

Patentes

Systems and methods for monitoring effectiveness of congestive heart failure therapy

A method for monitoring a patient includes measuring a series of consecutive pulse transit times (PTT's) of the patient, and processing the resulting PTT signal to detect a presence or absence of central sleep apnea (CSA). The method further includes determining an effectiveness of congestive heart failure therapy, which is being provided to the patient, based on the detected presence or absence of CSA. A system incorporating the method includes an electrode of an implantable medical device, which is adapted to pick up the patient's ventricular depolarization signals, a sensor, which is adapted to pick up peripheral arterial pulse signals of the patient, and a signal processor, which is adapted to receive the two types of signals and to process the signals according to the method. The system may provide the therapy via cardiac resynchronization pacing and, upon detection of CSA, the system may adjust at least one pacing parameter.

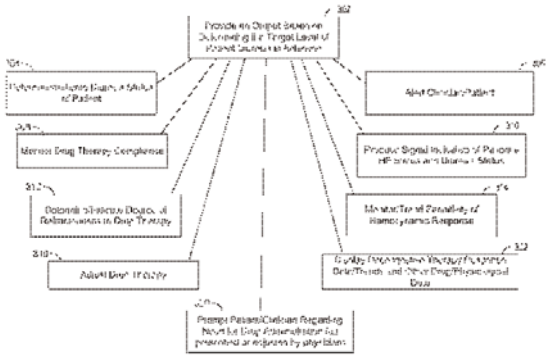


EP20080728240 [+]

Categoría n. 3: TECNOLOGIAS PARA MONITORIZAR EFECTIVIDAD DEL TRATAMIENTO DE IC

Decongestive therapy titration for heart failure patients using implantable sensor

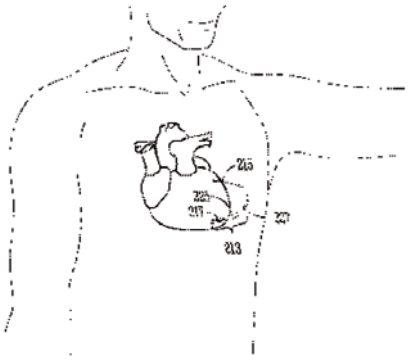
Assessing decongestive therapy delivered to a heart failure patient involves use of an implantable sensor configured to sense a physiologic parameter indicative of the patient's diuresis status and a processor coupled to the implantable sensor. The sensor may comprise a thoracic fluid sensor, a heart sounds sensor, a cardiac chamber or arterial pressure sensor, a respiration sensor, or a blood chemistry sensor, for example. The processor is configured to determine if a target level of patient diuresis has been achieved based on a relationship between the sensed physiologic parameter and a threshold developed for the patient, and to produce an output in response to determining that the target level of patient diuresis has been achieved. The processor may be disposed in an implantable housing, in a patient-external housing, or in a network server system.



US201715446794 [+]

Patentes

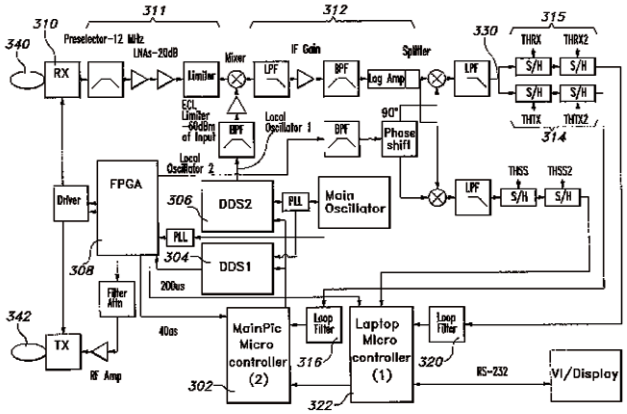
Differentiating decompensation detection based on co-morbidities in heart failure



This document discusses, among other things, a system comprising a sensor signal processor configured to receive a plurality of electrical sensor signals produced by a plurality of sensors and at least one sensor signal produced by an implantable sensor, a memory that includes information indicating a co-morbidity of a subject, a sensor signal selection circuit that selects a sensor signal to monitor from among the plurality of sensor signals, according to an indicated co-morbidity, a threshold adjustment circuit that adjusts a detection threshold of the selected sensor signal according to the indicated co-morbidity, and a decision circuit that applies the adjusted detection threshold to the selected sensor signal to determine whether an event associated with worsening heart failure (HF) occurred in the subject and outputs an indication of whether the event associated with worsening HF occurred to a user or process.

US201615384535 [+]

Communicating with an implanted wireless sensor



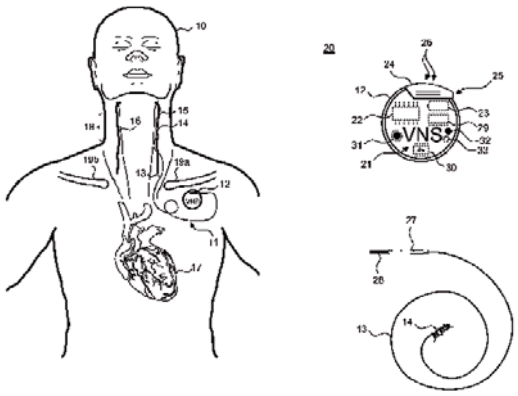
The present invention determines the resonant frequency of a sensor by adjusting the phase and frequency of an energizing signal until the frequency of the energizing signal matches the resonant frequency of the sensor. The system energizes the sensor with a low duty cycle, gated burst of RF energy having a predetermined frequency or set of frequencies and a predetermined amplitude. The energizing signal is coupled to the sensor via magnetic coupling and induces a current in the sensor which oscillates at the resonant frequency of the sensor. The system receives the ring down response of the sensor via magnetic coupling and determines the resonant frequency of the sensor, which is used to calculate the measured physical parameter. The system uses a pair of phase locked loops to adjust the phase and the frequency of the energizing signal.

US2009224773 [+]

Patentes

Categoría n. 4: TRATAMIENTO DE INSUFICIENCIA CON NEUROESTIMULACIÓN

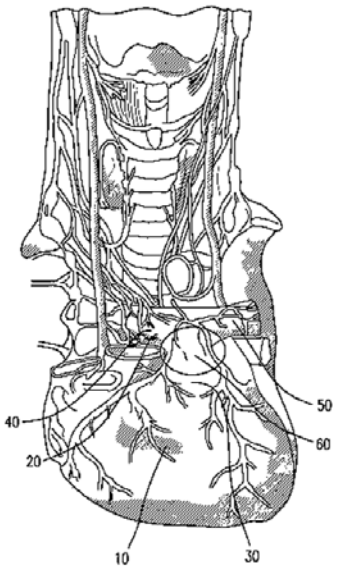
Implantable neurostimulator-implemented method for enhancing heart failure patient awakening through vagus nerve stimulation



An implantable neurostimulator-implemented method for managing tachyarrhythmias upon a patient's awakening from sleep through vagus nerve stimulation is provided. An implantable neurostimulator, including a pulse generator, is configured to deliver electrical therapeutic stimulation in a manner that results in creation and propagation (in both afferent and efferent directions) of action potentials within neuronal fibers comprising the cervical vagus nerve of a patient. Operating modes of the pulse generator are stored. An enhanced dose of the electrical therapeutic stimulation is parametrically defined and tuned to prevent initiation of or disrupt tachyarrhythmia upon the patient's awakening from a sleep state through at least one of continuously-cycling, intermittent and periodic ON-OFF cycles of electrical pulses. Other operating modes, including a maintenance dose and a restorative dose are defined. The patient's physiological state is monitored via at least one sensor to detect that patient's awakening, which activates the delivery of the enhanced dose.

US201715410316 [+]

Methods and systems for treating acute heart failure by neuromodulation



Methods of treating acute heart failure in a patient in need thereof. Methods include inserting a therapy delivery device into a pulmonary artery of the patient and applying a therapy signal to autonomic cardiopulmonary fibers surrounding the pulmonary artery. The therapy signal affects heart contractility more than heart rate. Specifically, the application of the therapy signal increases heart contractility and treats the acute heart failure in the patient. The therapy signal can include electrical or chemical modulation.

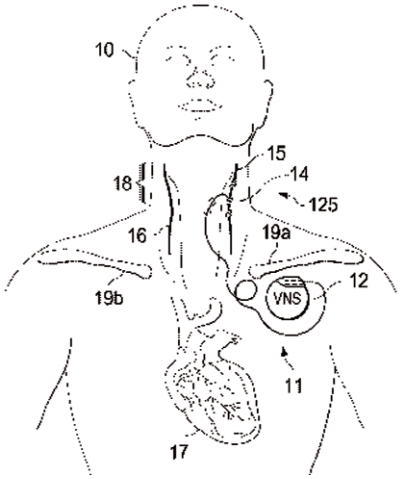
US201615334121 [+]

Patentes

Monitoring of intrinsic heart rate recovery to improve stimulation therapy for heart failure patients

Systems and methods are provided for delivering neurostimulation therapies to patients. The patient's intrinsic heart rate recovery may be used to determine efficacy of therapy and to adjust stimulation parameters.

WO2016US17275 [+]



Categoría n. 5: NUEVOS DISPOSITIVOS DE TRATAMIENTO DE LA INSUFICIENCIA CARDIACA

Retrievable devices for treating heart failure

The present teachings provide devices to change the pressure in a chamber of a heart and methods of making and using thereof. One aspect of the present teachings provides a device comprising a distal portion, a middle portion, and a proximal portion. The distal portion and proximal portion of the device are configured to be deployed inside the left and right atrium respectively with a minimum contact with the septal tissue. The middle portion of the device is configured to secure the device across an aperture on the atrial septum. The device further includes at least one retrieval portion with a plurality of struts. The distal end of the struts is connected with a proximal end of the proximal portions. The proximal end of the struts come together at a location near the axial center of the device. The radial expansion of the proximal portion will lead to the radially outward movement of the struts. And a radially inward movement of the struts will cause the proximal portion of the device to collapse radially. The device includes a delivery profile and a deployment profile.

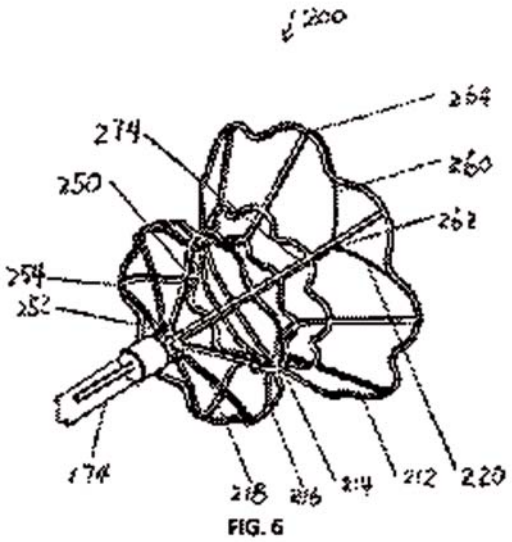


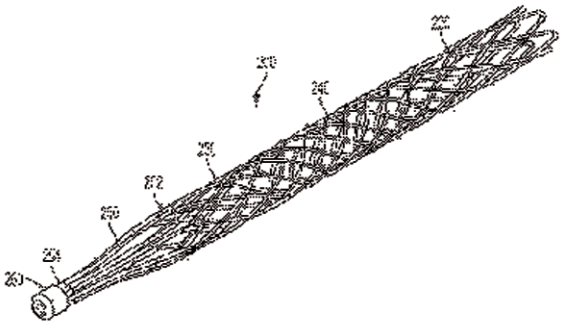
FIG. 6

US201615346711 [+]

Patentes

Devices and methods for treating heart failure

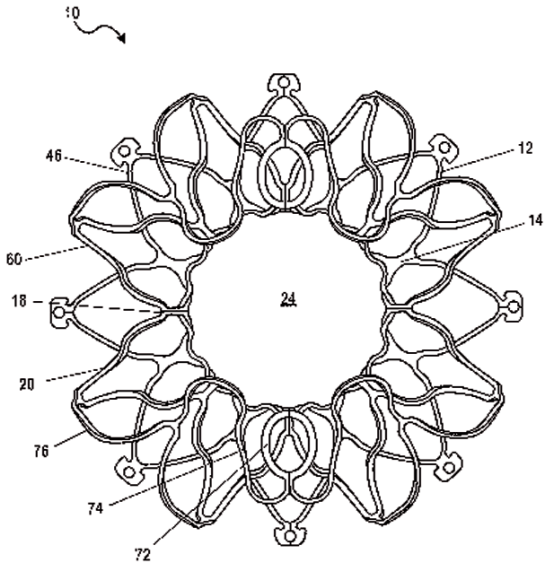
The present teachings provide a device and methods of making and using thereof. Specifically, one aspect of the present teachings provides a self-expandable device with a braided structure comprising a shunt, a distal retention flange, and a proximal retention flange. Upon the device being deployed at a treatment location, the distal retention flange or the proximal retention flange transitions to have a diameter that is greater than the diameter of the shunt portion. And the shunt portion has a braid angle θ. Another aspect of the present teachings provide that the ratio of flange/shunt diameter equals or greater than 1/sin θ. Yet another aspect of the present teachings provides an axial constraining mechanism to reinforce the shunt portion.



US201514645416 [+]

Devices and methods for treating heart failure

A device for implanting into an atrial septum of a patient. In some embodiments, the device has a core region to be disposed in an opening in the atrial septum; a distal retention region adapted to engage tissue on a left atrial side of the septal wall; a proximal retention region adapted to engage tissue on a right atrial side of the septal wall; and a retrieval region comprising a plurality of retrieval members, each retrieval member comprising a connector at a proximal end, the connector being adapted to connect to a delivery system. The device has a delivery configuration and a deployed configuration, the core region, distal retention region and proximal retention region each having a smaller diameter in the delivery configuration than in the deployed configuration, the retrieval member connectors being disposed proximal to and radially outward from the opening in the deployed configuration.



CA20152955389 [+]

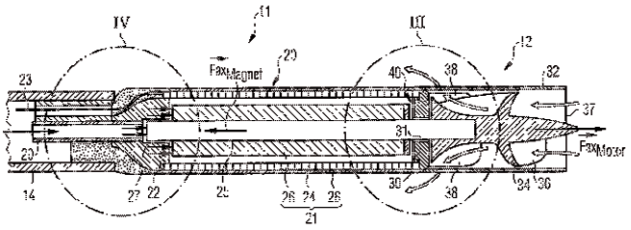
Patentes

Heart failure recovery device and method of treatment

A heart failure recovery device includes a fluid pump having an inlet and an outlet in fluid communication with a pump reservoir, and a pumping element disposed within the pump reservoir, the pumping element including a protrusion that in an active state is configured to rotate and move fluid away from the inlet and towards the outlet. A receiver coil can be electrically coupled to the fluid pump and is configured to subcutaneously absorb electromagnetic energy for powering the fluid pump. In certain embodiments, an implantable port provides fluid access to the pump reservoir for cleaning and maintaining the fluid pump. In other embodiments, a valve closes fluid access to at least one of the inlet and the outlet during periods when the device is not being used for treatment.

WO2015US66256 [+]

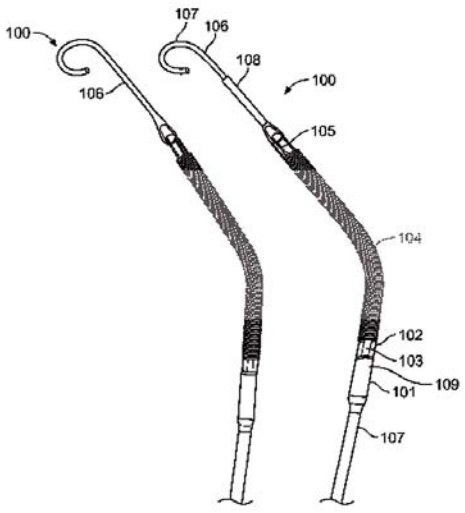
Intravascular blood pump



An intravascular blood pump having a drive section (11), a catheter (14) fastened to the drive section proximally and a pump section (12) fastened to the drive section distally possesses an electric motor (21) whose motor shaft (25) is mounted in the drive section (11) with two radial sliding bearings (27, 31) and an axial sliding bearing (40). During operation, purge fluid is conveyed through the bearing gap of the axial sliding bearing (40) and further through the radial sliding bearing (31) at the distal end of the drive section (11). The purge fluid is highly viscous, for example 20% glucose solution.

US201615375477 [+]

Cannula assembly

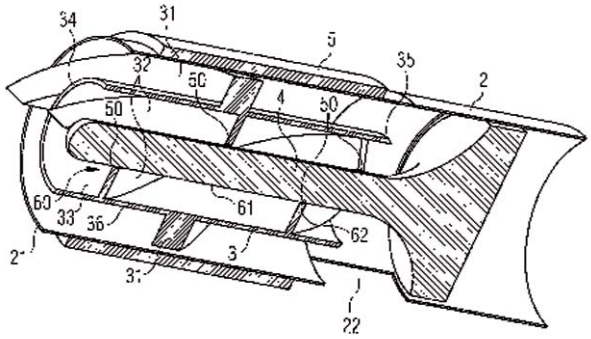


Cannula assemblies and methods of manufacturing cannula assemblies are provided. The cannula assembly includes a cannula and a pigtail extension coupled to the cannula. The pigtail extension includes a proximal section having a first stiffness and a distal section having a second stiffness, the first stiffness greater than the second stiffness. The proximal section of the pigtail extension is positioned between the cannula and at least a portion of the distal section.

CA2947985 [+]

Patentes

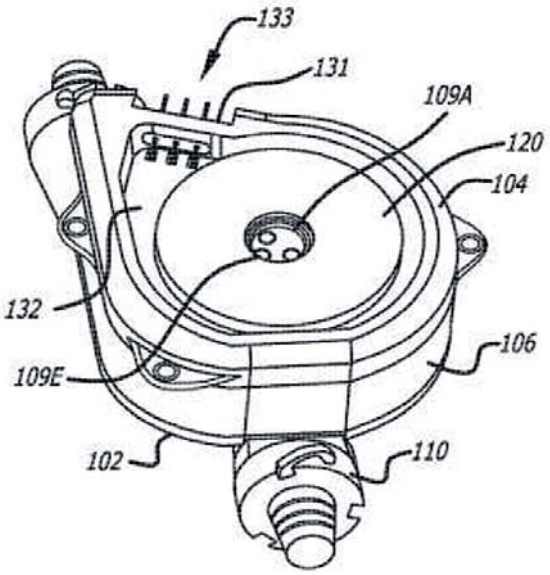
Blood pump



A blood pump (1) comprises a pump casing (2) having a blood flow inlet (21) and a blood flow outlet (22), and an impeller (3) arranged in said pump casing (2) and rotatably supported in the pump casing (2) by a bearing (60) so as to be rotatable about an axis of rotation. The impeller (3) has blades (31, 32) for conveying blood from the blood flow inlet (21) to the blood flow outlet (22). The bearing (60) comprises at least one stationary bearing portion (4) coupled to the pump casing (2) and having a stationary bearing surface (61) that faces radially outwards. The bearing (60) further comprises a rotating bearing surface (62) interacting with the stationary bearing surface (61) to form the bearing (60), wherein the rotating bearing surface (61) faces radially inwards and is formed on an exposed radially inner edge (50) of the blades (32). The blades (32) are designed to draw blood deposit on the stationary bearing surface (61) in a radially outward direction.

WO2016EP68576 [+]

Rotary blood pump



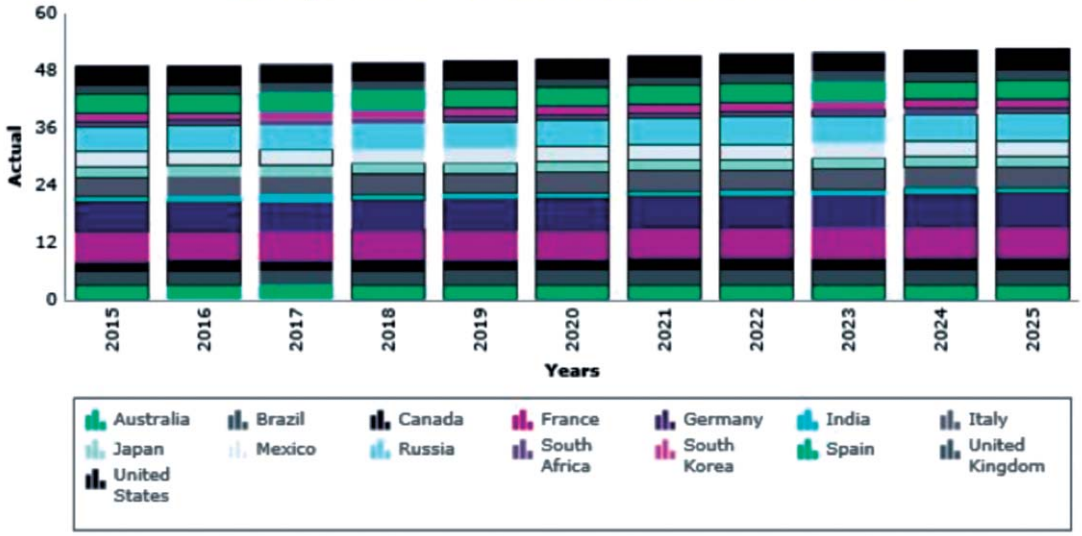
The present invention provides a rotary blood pump with both an attractive magnetic axial bearing and a hydrodynamic bearing. In one embodiment according to the present invention, a rotary pump includes an impeller assembly supported within a pump housing assembly by a magnetic axial bearing and a hydrodynamic bearing. The magnetic axial bearing includes at least two magnets oriented to attract each other. One magnet is positioned in the spindle of the pump housing while the other is disposed within the rotor assembly, proximate to the spindle. In this respect, the two magnets create an attractive axial force that at least partially maintains the relative axial position of the rotor assembly. The hydrodynamic bearing is formed between sloping surfaces that form tight clearances below the rotor assembly.

US201615335369 [+]

Información epidemiológica y de mercado

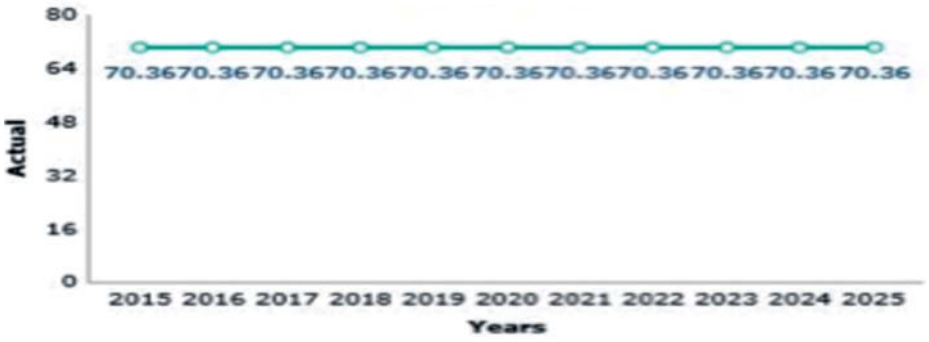
La siguientes gráficas se han generado mediante la licencia a la base de datos GlobalData.

Cardiovascular (Chronic Heart Failure), all countries, prevalence (%), therapeutics, >=45 years, diagnosed, 2015-2025



Cardiovascular (Chronic Heart Failure), Spain, therapeutics, >=45 years, diagnosed, prevalence (%), 2015-2025

Cardiovascular (Chronic Heart Failure), Spain, therapeutics, >=45 years, cases treated with drug therapy (%), 2015-2025



Información epidemiológica y de mercado

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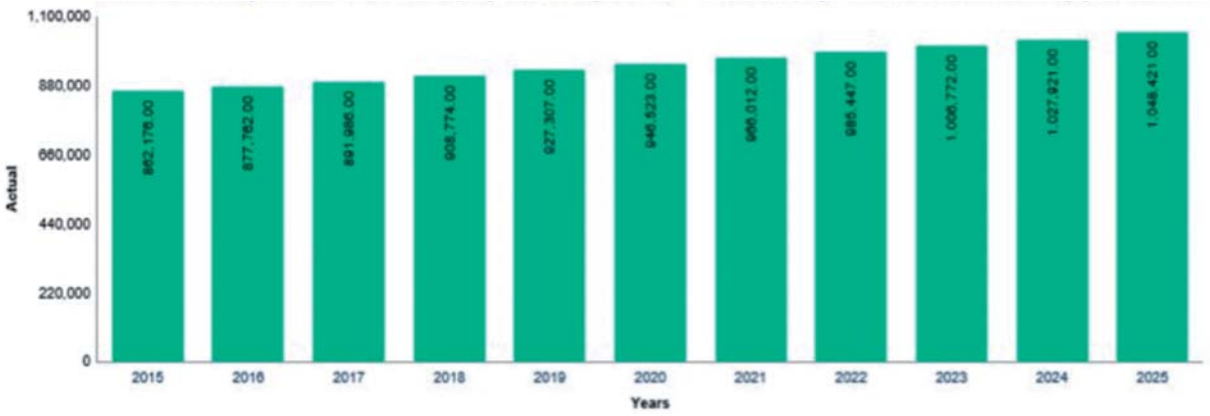
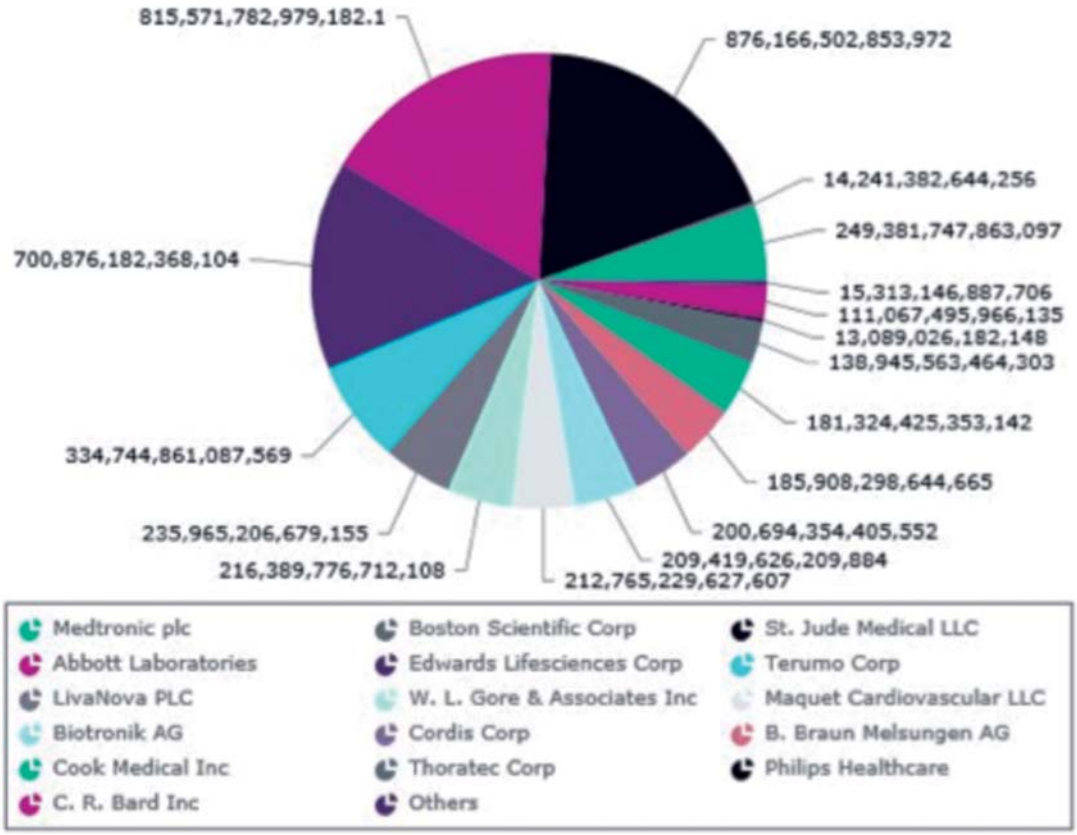
Cardiovascular (Chronic Heart Failure), Spain, therapeutics, >=45 years, diagnosed, prevalent cases (N), 2015-2025



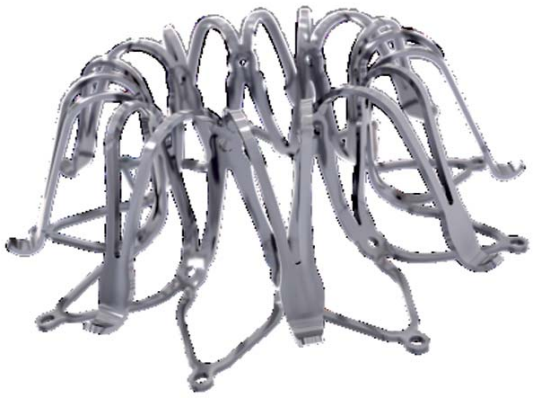
Cardiovascular Devices Market Company Share (%), global, 2016



Noticias

Device Technologies to Reduce Heart Failure Readmissions

DAIC. Diagnostic and Interventional Cardiology
10.02.2017



In the past few years there have been a number of device therapies developed to treat heart failure (HF). This is partly in response to the Centers for Medicare and Medicaid Services (CMS) targeting HF to reduce the staggering costs of treating patients in an HF crisis, rather than less expensive outpatient treatments. Heart failure costs the United States about $30.7 billion each year, according the Centers for Disease Control.[1] HF is also one of the single largest costs for CMS, which is why the agency has targeted HF readmissions with payment penalties to force hospitals to better manage these patients.
About 5.7 million adults in the United States have heart failure, and one in nine deaths in 2009 included heart failure as a contributing cause. About half of the people who develop heart failure die within five years of diagnosis.[1] This makes HF a possible large growth area to increase patient volumes with device therapies for cardiology departments in the coming years. [+]

Reducing Heart Failure Readmissions With Patient-Generated Health Data Analysis

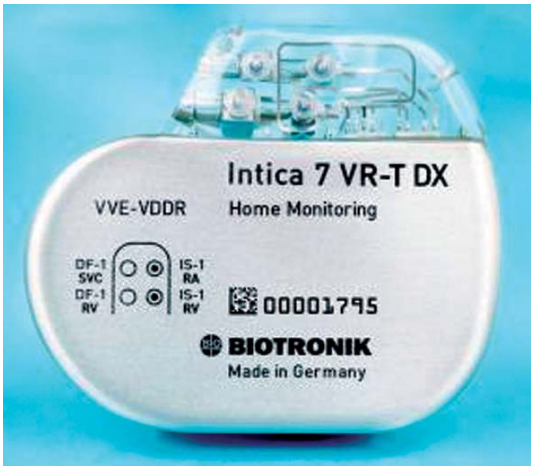
DAIC. Diagnostic and Interventional Cardiology
25.07.2017

Despite their best efforts, many patients tend to develop heart failure after an acute event (e.g., a heart attack or a viral cardiomyopathy). Upon hospitalization, their condition can advance with possibly irreversible and progressive organ damage. Heart failure (HF) is associated with a high level of disability, healthcare costs and mortality – about 50 percent of patients will die within five years from diagnosis. [1,2] However, a new tool that may help cut costs by avoiding acute care episodes and hospital readmissions is the use of automated tracking of patient-generated health datatracking (PGHD).
People in their forties have 20 percent risk to develop a heart failure. As stated in the report from the American Heart Association and the Center for Disease Control (CDC) heart failure fact sheet,[3] about 5.7 million U.S. adults have had HF in 2016. [+]

Noticias

Biotronik Launches DX Technology for U.S. Heart Failure Patients

DAIC. Diagnostic and Interventional Cardiology
21.07.2017



Biotronik announced U.S. Food and Drug Administration (FDA) approval and availability of the Intica DX and Intica cardiac resynchronization therapy (CRT)-DX implantable cardioverter defibrillator (ICD) systems. The launch of Intica CRT-DX extends the benefits of Biotronik's DX technology to heart failure patients. DX eliminates the need for an atrial lead while still providing physicians with critical diagnostic information based on a true atrial signal.
Biotronik launched DX technology in 2013 with a focus on improving patient care and decreasing the rate of complication. DX minimizes hardware and provides critical diagnostics that allow physicians to better monitor, manage and prevent cardiac events. Intica CRT-DX is the first cardiac rhythm management device for the treatment of heart failure patients that delivers atrial diagnostics without an atrial lead. Atrial diagnostics aid physicians in the early identification of supraventricular tachycardia (SVT), atrial fibrillation (AF) and atrial ventricular synchronization. [+]

Vest Wearable Monitor May Reduce Heart Failure Readmissions

DAIC. Diagnostic and Interventional Cardiology
13.07.2017

About 5.7 million adults in the U.S. suffer from heart failure, and because of a dangerous buildup of fluid in their lungs, more than half of those patients end up back in the hospital within six months. But researchers say a high-tech vest that is entering U.S. trials may help doctors monitor a heart patient's symptoms remotely, which may prevent the need for rehospitalization.
The SMILE Trial (Sensible Medical Innovations Lung fLuid status monitor allows rEducing readmission rate of heart failure patients study) will look at the efficacy of the SensiVest, a product developed by Sensible Medical Innovations, headquartered in Israel. The system is comprised of a wearable vest containing two embedded sensors, one in front and one behind the patient, and a bedside console. [+]