



US 20170246390A1

(19) **United States**(12) **Patent Application Publication**
Tchao et al.(10) **Pub. No.: US 2017/0246390 A1**(43) **Pub. Date: Aug. 31, 2017**(54) **DEVICE FOR THE PREVENTION OF
OVERDOSE BY OPIATE AND DEPRESSANT
USERS***A61B 5/0452* (2006.01)*A61M 11/00* (2006.01)*A61K 31/137* (2006.01)*A61B 5/00* (2006.01)(71) Applicant: **David Tchao**, Dix Hills, NY (US)(52) **U.S. Cl.**(72) Inventors: **David Tchao**, Dix Hills, NY (US); **Paul
Tchao**, Dix Hills, NY (US)CPC *A61M 5/20* (2013.01); *A61K 31/137*
(2013.01); *A61K 38/26* (2013.01); *A61K 31/56*
(2013.01); *A61K 31/167* (2013.01); *A61K*
31/46 (2013.01); *A61B 5/4839* (2013.01);
A61B 5/0205 (2013.01); *A61B 5/14551*
(2013.01); *A61B 5/14532* (2013.01); *A61B*
5/0452 (2013.01); *A61B 5/746* (2013.01);
A61M 11/00 (2013.01); *A61M 5/1723*
(2013.01); *A61M 2005/206* (2013.01); *A61M*
2005/2006 (2013.01); *A61M 2202/0007*
(2013.01); *A61M 2205/3303* (2013.01); *A61M*
2205/3592 (2013.01); *A61M 2205/50*
(2013.01); *A61M 2205/8206* (2013.01)(73) Assignee: **David Tchao**, Dix Hills, NY (US)(21) Appl. No.: **15/054,111**(22) Filed: **Feb. 25, 2016****Publication Classification**(51) **Int. Cl.***A61M 5/20* (2006.01)*A61K 38/26* (2006.01)*A61K 31/56* (2006.01)*A61K 31/167* (2006.01)*A61K 31/46* (2006.01)*A61M 5/172* (2006.01)*A61B 5/0205* (2006.01)*A61B 5/1455* (2006.01)*A61B 5/145* (2006.01)

(57)

ABSTRACT

An automated wearable device measure physiological signals, and when parameters which cause the wearer to be at risk are measured, the device delivers an antidote for a given medical condition. This prevents overdose or medical conditions from occurring.

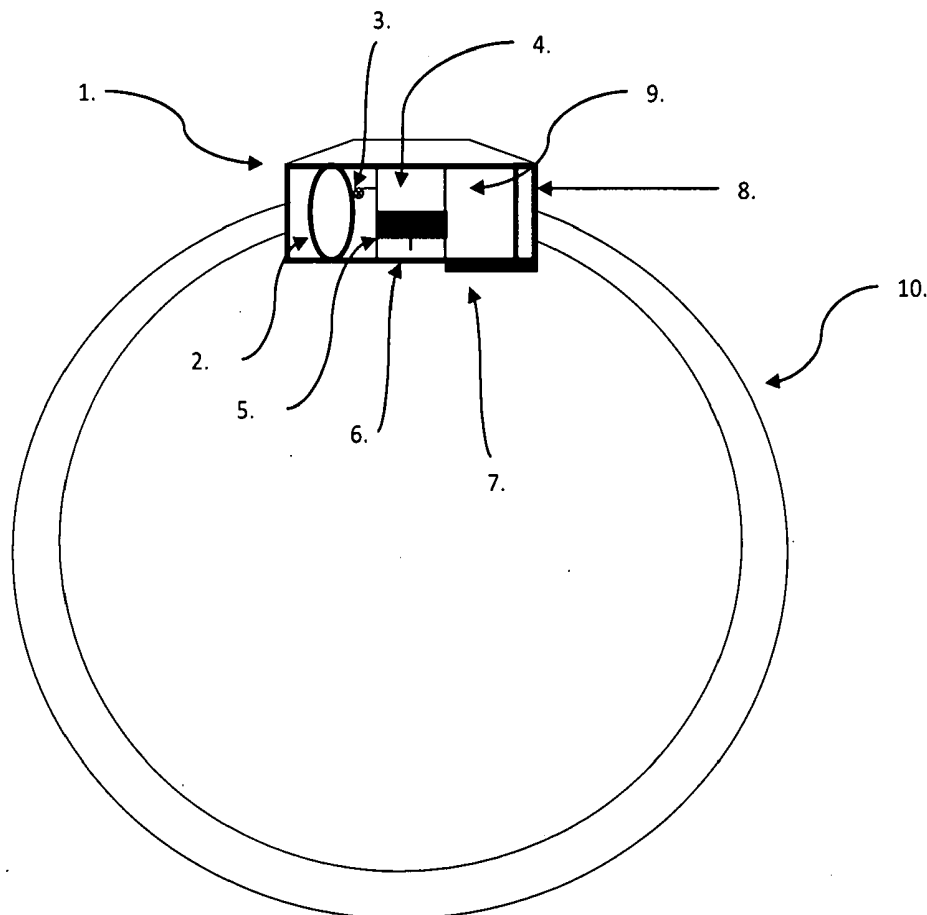
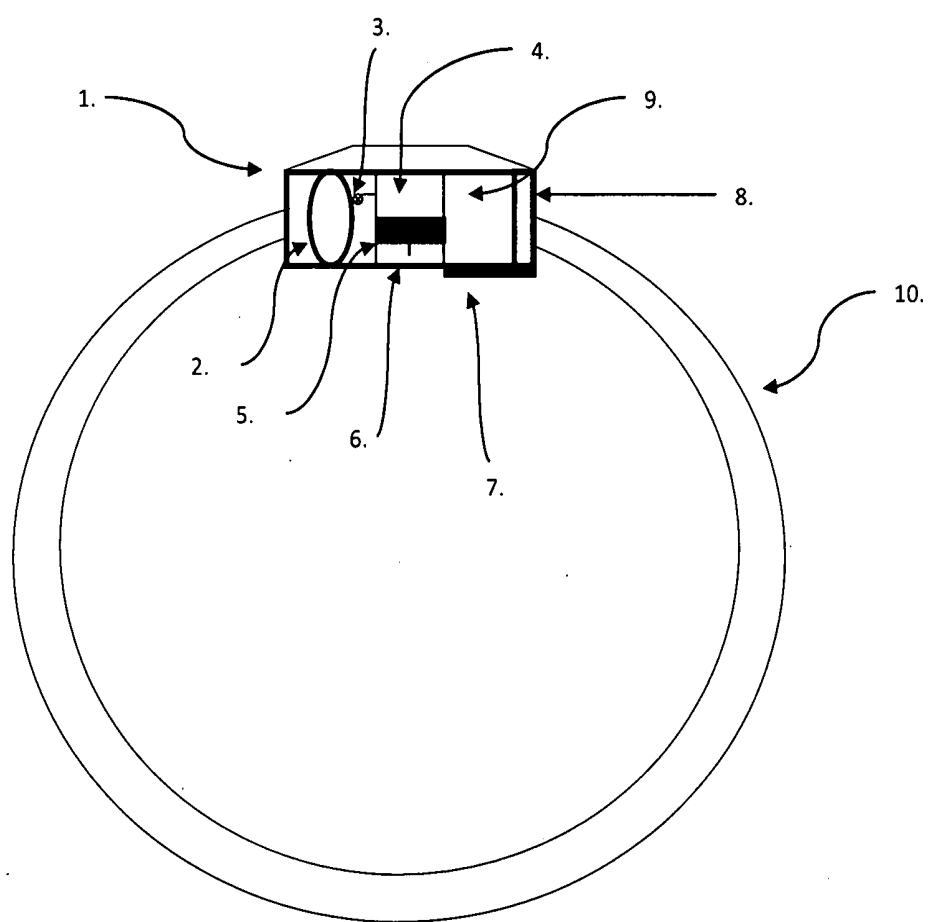
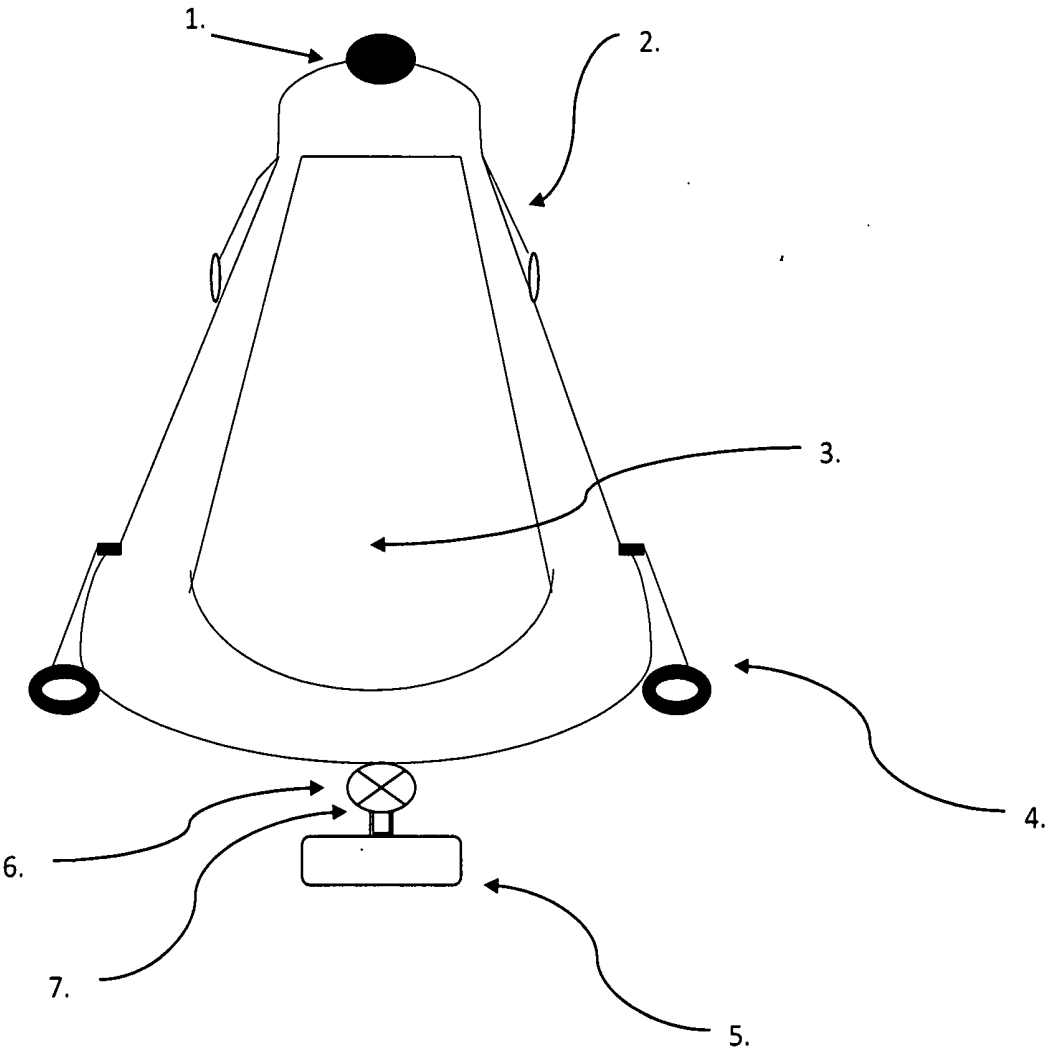


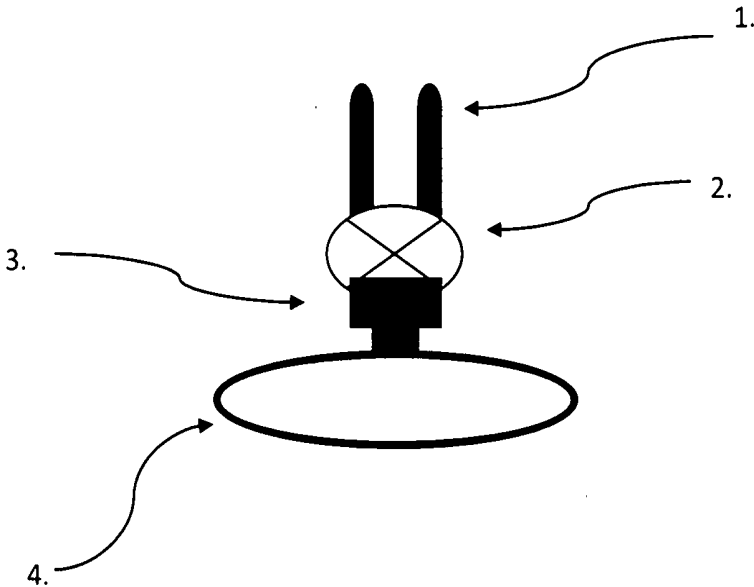
Fig.1/



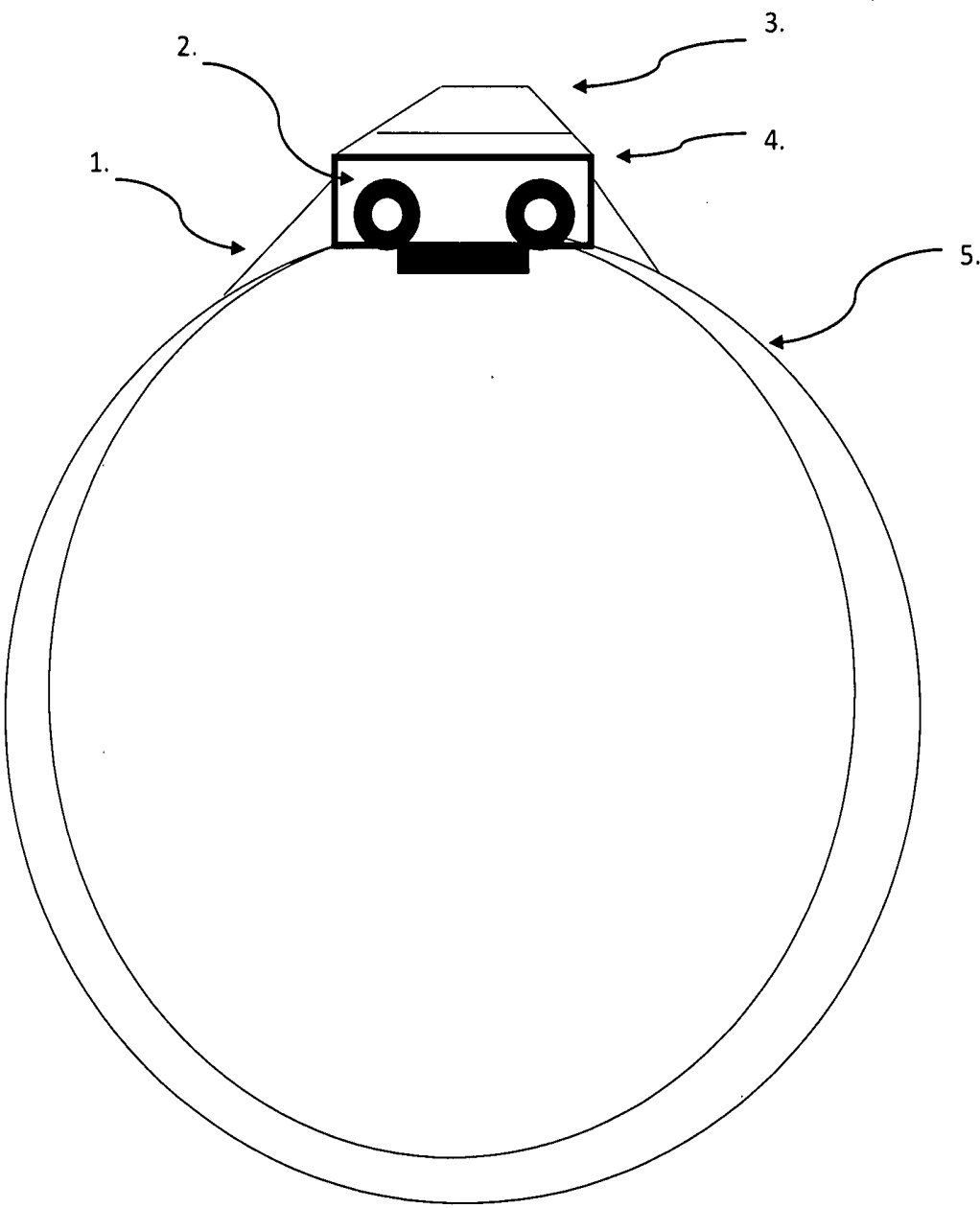
Drawings Fig 2./5



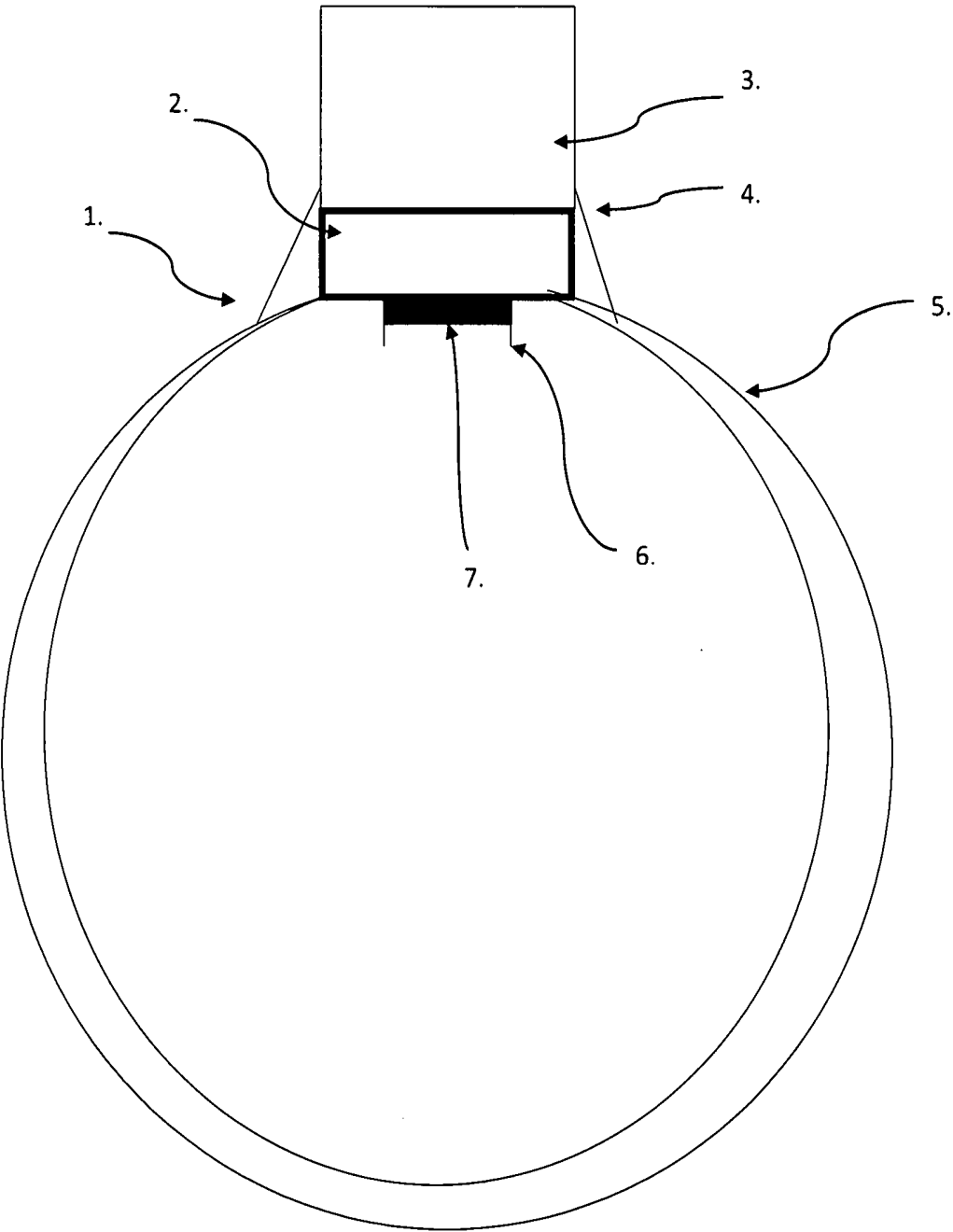
Drawings Fig 3./5



Drawings Fig 4./5



Drawings Fig 5./5



DEVICE FOR THE PREVENTION OF OVERDOSE BY OPIATE AND DEPRESSANT USERS

FIELD OF THE INVENTION

[0001] The field of the invention is medical devices.

BACKGROUND OF THE INVENTION

[0002] Opiate addiction is the leading cause of death among adults under twenty four in many regions of the United States. Opiates are powerfully addictive since they bind with greater affinity than the body's natural dopamine. The majority of opiate users today start their addiction with prescription drugs. When they can no longer afford prescription opiates, they often turn to heroin use. According to the Center for Disease Control, 44 Americans die every day in the US from opiates.

[0003] Drug overdose is caused by a variety of effects on the body. Opiates slow down breathing, heart rate, and drop blood pressure to fatal levels. The opiate user is impaired and incapable of self-administering antidote such as adrenaline or naloxone. In addition, medical professionals such as physicians and emergency-medical-technicians are often unaware of the causes of the loss of consciousness and may accidentally mis-prescribe the intervention procedure.

[0004] Much of the prior art is driven by the desire to deal with chronic conditions, such as diabetes, or constant medication for a given conditioning, in order to reduce the labor associated with repeated regular treatment.

[0005] Syringe-based injection systems exist in a variety of applications in the public domain. Bryant Jr et al. in U.S. Pat. No. 9,132,227 describe an infusion pump for the introduction of liquids intravenously. In U.S. Pat. No. 9,114,208 describes a medication delivery device with a cartridge system. In U.S. Pat. No. 9,101,707 an implantable delivery system for bio-secretions.

[0006] The inventors in U.S. Pat. No. 9,095,650 have a precision piston syringe system. In U.S. Pat. No. 9,067,047 a programmable injection system is described by the inventors. These are all developments which seek to attain automation or continuous drug delivery. In U.S. Pat. No. 9,061,097 Holt et al. U.S. Pat. No. 9,061,097 a wearable drug delivery system is described. It has a disposable cartridge system for single dosage use. Chong et al. U.S. Pat. No. 8,979,808 describe an on-body injection device. Sonderger et al. describe a device with a rechargeable syringe delivery system. In another invention in the prior art, Trembly III et al, U.S. Pat. No. 8,747,358 describe an injection system with manual control instead of automation. This allows control by the patient or care giver, especially when the prior is disabled or unable to use a loose syringe.

OBJECTS OF THE INVENTION

[0007] One object of the invention is to develop an automated injection system which uses vital signs to be activated. Yet another object of the invention is to develop a wearable drug delivery system. Yet another object of the invention is to develop a device for opiate overdose prevention. Another object of the invention is to develop a device which radio signals medical professionals with information from an overdosing patient. Yet another object of the invention is to block opiate overdose by means of nasal spray vectored antidote.

SUMMARY OF THE INVENTION

[0008] The invention is a wearable band containing an electronic vital-signs detector linked to an electronic activated drug syrette. When the wearers blood pressure and pulse drop off indicating an overdose, the syrette with antidote is activated and administered automatically.

DETAILED DESCRIPTION OF THE INVENTION

[0009] A wearable band contains electrodes or other sensors to detect pulse and blood pressure levels. This data is sent to a small central processing unit contained inside the band. The device contains an injectable syrette with medication which is automatically injected when the device registers abnormally low pulse or blood pressure. When this occurs, a radio signal is emitted which allows for the wearer to both be located, and pre-diagnosed by medical personnel en route to the location. The radio signal contains the location of the wearer, the blood pressure, and pulse, as well as an announcement that the condition is drug induced.

EXAMPLES

[0010] In a preferred embodiment of the invention, illustrated in FIG. 1, the unit is a rectangular flat device with lateral attached rods which serve as band attachment points. The device is 2 inches squared in surface area and one inch to one-half inches thick on its profile. The rectangular device housing contains a small central processing unit which has wire relays to a radio-emitter, a gas-release valve, and two blood pressure and pulse sensors. When the blood-pressure and pulse sensors measure values and frequency which indicate that the wearer is undergoing an overdose, the central processing unit simultaneously opens a gas release valve which sends pressurized gas powered syrette into the limb of the wearer, emptying the syrettes contents into the bloodstream, while simultaneously sending out an emergency radio signal indicating where the wearer is, and what the physiological data is, and that the wearer is a drug user, to prepare the medical intervention.

[0011] The syrette is in the configuration of a thumb tac. The reservoir is flush with the edges of the cylinder, which when filled with compressed gas, acts as a gas-piston to drive the syrette down through a permeable membrane, and further compresses the compressible syrette to inject the medication. Preferred embodiments include the use of noxalone and adrenanline as opiate antidotes. The central processing unit has a built in battery or uses a small hearing aid battery to power normal function and emergency activation. A small pressurized replaceable gas cylinder fits into a chamber which is connected by the syrette cylinder by a small gas channel controlled by an electrically activated gas-release valve. The central processing unit only activates the valve release as well as the radio emitter in critical physiological function declines past acceptable levels. Once this occurs, pressurized gas is released from the compressed gas cylinder via a gas release valve controlled by the central processing unit. This gas plunges the syrette into the wearer, and further gas compression collapses the reservoir injecting the drug. The radio emitter simultaneously emits a signal.

[0012] In another preferred embodiment the opiate antidote medicine is supplied as a nasal mist via a mask or a nose-clip.

[0013] In another preferred embodiment an armband holds a syringe box which is held flat while not activated, and is pulled into a perpendicular position by a tightening retractable armband and further compressed to inject the antidote (s) into the wearer.

[0014] The information obtained by the monitoring device are analyzed by the device computer central processing unit and a diagnosis can be made according to preset algorithms. It then trigger the delivery of the treatment drugs. There may be multiples drugs contained in one delivery system for several different emergency conditions.

[0015] This device may be synchronized with an automatic external defibrillator during cardio-pulmonary resuscitation in order to automatically administer medication when needed.

1. An arm or leg-band which carries an opiate overdose antidote syringe and is controlled by a vital sign monitoring central processing unit which activates injecting the wearer in overdose with antidote.

2. The claim in 1 where the activation of the injection is coupled with radio emissions from the device which give real time medical information to incoming emergency medical professionals.

3. A nose clip with a breathing sensor activated release of opiate overdose antidote as a nasal mist directly into the sinuses.

4. An armband which carried a syringe box at rest and moves it into place vertically aligned with the body surface and is then compressed and injected into the arm where the band-held device is worn delivering opiate anti-overdose drugs when a automatic cable retraction system is activated by a physiological sensor while emitting radio medical information.

5. A face mask which releases a mist of opiate overdose antidote as a nasal mist into the mask while emitting radio signals with medial information about the wearer when sensors detect overdose.

6. The vital signs in claims 1-5 where the vital signs are monitored pulse between 60-100, systolic BP above 90, Pulse Oxymetry above eighty five, normal air flow. When the deviation is too great, the delivery system is activated then a radio-signal alarm is generated alerting emergency medical technicians.

7. The claim in 1 where the antidote is Injection of epinephrine for an allergic reaction.

8. The claim in 2 where the antidote is Injection of epinephrine for an allergic reaction

9. The claim in 1 where the antidote is glucagon when the monitored blood sugar is too low or of insulin when the sugar is dangerously high.

10. The claim in 2 where the antidote is glucagon when the monitored blood sugar is too low or of insulin when the sugar is dangerously high.

11. The claim in 1 where the antidote is a steroid when needed in asthma, allergic reaction, shock with hypotension.

12. The claim in 2 where the antidote is a steroids when needed in asthma, allergic reaction, shock with hypotension.

13. The claim 1 in where the antidote is lidocaine when there are multiple irregular heartbeats in case of acute heart disease.

14. The claim in 2 where the antidote is lidocaine when there are multiple irregular heartbeats in case of acute heart disease.

15. The claim in 1 where the antidote is injection of different antiarrhythmic drugs according to the EKG rhythm.

16. The claim in 2 where the antidote injection of different antiarrhythmic drugs according to the EKG rhythm.

17. The claim in 1 where the antidote is injection of thrombolytic drug during an acute heart attack or a stroke.

18. The claim in 2 where the antidote is injection of thrombolytic drug during an acute heart attack or a stroke.

19. The claim in 1 where the antidote is injection of blood pressure lowering drugs when the BP is dangerously high.

20. The claim in 2 where the antidote is injection of blood pressure lowering drugs when the BP is dangerously high.

21. The claim in 1 where the antidote is atropine when the pulse is too low.

22. The claim in 2 where the antidote is atropine when the pulse is too low.

23. The claim in 1 where the patient who have recurrent seizures may wear this device which can inject anti-seizures drugs during an acute episode of convulsions when the patient is unconscious.

24. The claim in 2 where the patient who have recurrent seizures may wear this device which can inject anti-seizures drugs during an acute episode of convulsions when the patient is unconscious.

* * * * *

专利名称(译)	用于预防阿片类和抑郁剂用户过量的装置		
公开(公告)号	US20170246390A1	公开(公告)日	2017-08-31
申请号	US15/054111	申请日	2016-02-25
[标]发明人	TCHAO DAVID TCHAO PAUL		
发明人	TCHAO, DAVID TCHAO, PAUL		
IPC分类号	A61M5/20 A61K38/26 A61K31/56 A61K31/167 A61K31/46 A61M5/172 A61B5/0205 A61B5/1455 A61B5/145 A61B5/0452 A61M11/00 A61K31/137 A61B5/00		
CPC分类号	A61M5/20 A61M2205/8206 A61K38/26 A61K31/56 A61K31/167 A61K31/46 A61B5/4839 A61B5/0205 A61B5/14551 A61B5/14532 A61B5/0452 A61B5/746 A61M11/00 A61M5/1723 A61M2005/206 A61M2005/2006 A61M2202/0007 A61M2205/3303 A61M2205/3592 A61M2205/50 A61K31/137		
其他公开文献	US10441718		
外部链接	Espacenet USPTO		

摘要(译)

自动可穿戴设备测量生理信号，并且当测量导致佩戴者处于危险中的参数时，该设备为给定的医疗状况提供解毒剂。这可以防止过量或医疗条件的发生。

