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(54) DEVICE WITH AN ELECTROMECHANICAL LOCK FOR THE SAFE DISTRIBUTION OF BLOOD OR HEMOCOMPONENTS

(57) This device comprises a transparent rigid-material container (1), fitted with an access mouth (11) and a closing cover (2) with a rear appendix (21) for coupling, in an axial direction, with the container mouth (11); with the container mouth (11) and the rear appendix (21) of the cover presenting similar, irregular outlines for coupling in a single position. Said cover (21) includes an electronic circuit (3) that comprises an electronic control card (31), a data memory (33) data entry and downloading means (32a, 32b, 32c) a data display screen (34) an electric battery (35) and a low-consumption electromechanical lock (36).

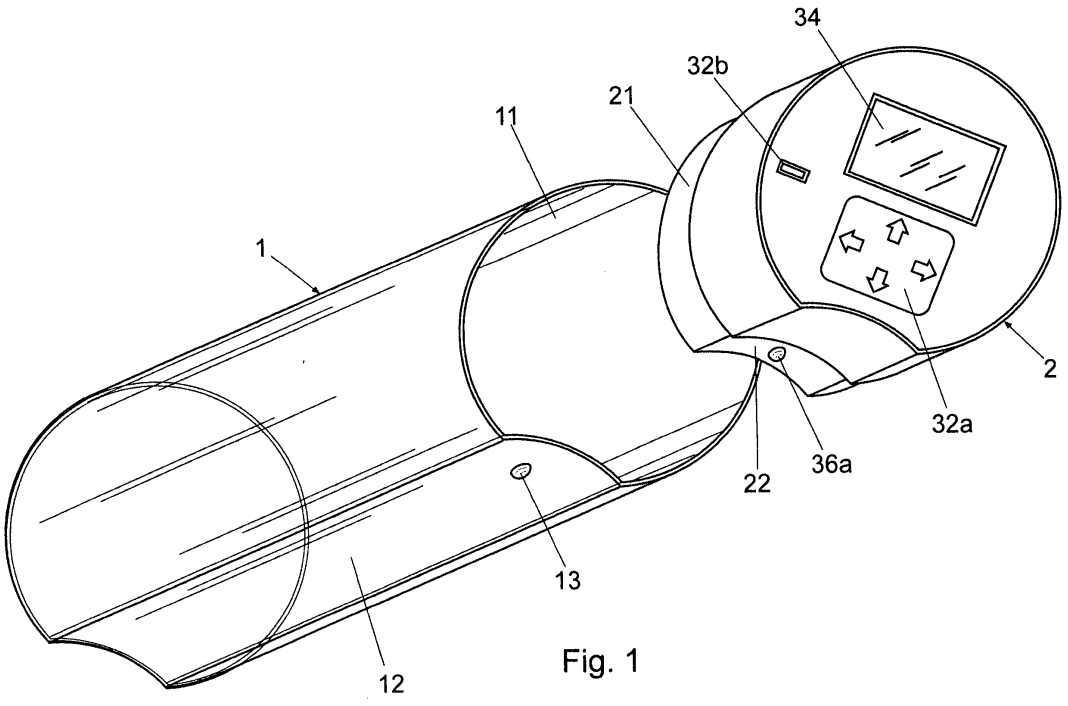

Fig. 1

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Description

PURPOSE OF THE INVENTION

[0001] This invention refers to a device with electromechanical closing for the safe distribution of blood or hemocomponents applicable preferably to medical centres.

BACKGROUND OF THE INVENTION

[0002] In hospitals and health centres in which supplies of hemocomponents and drugs are made for patient treatments, it is very important to ensure that the hemocomponent is supplied to the correct patient. Control of these processes is always delicate, especially in hospitals with large numbers of patients.

[0003] In such centres, it is usual for bags of blood or hemocomponents to be transferred by health staff to the patients' rooms, which could produce mistakes leading to the wrong patient being given the blood or hemocomponent transfusion with the subsequent health risks.

[0004] One employed system for blood or hemocomponent identification to be applied to a patient, is the use of patient identification at the head of the bed, which is annotated on the sample containers that are sent to the blood bank. After performing the corresponding analyses, the blood bank sends the hemocomponents to the requesting personnel or the requested drugs from the pharmacy, together with a tracking code for said hemocomponents. The health staff receiving the hemocomponents or drugs are usually responsible for several patients and distribute them in accordance with the supplied codes and fill out a report if there are any incidents or problems. These codes are normally handwritten which involves the possibility of the personnel intervening in the successive steps misreading the codes or accidentally changing the packages employed, with subsequent risk to the patent's health.

[0005] One alternative is to make use of a bracelet with several self-adhesive labels for printed codes, a writable area for the patient's name and the label codes, together with a simple closing mechanism. The bracelet is worn on the patient's wrist and the sample containers are identified with the self-adhesive labels. However, there is the problem of hemocomponents or drug reception because the staff who are going to administer the product must visually read the numeric code with the accompanying possibility of a mistake in reading such abstract data.

[0006] There are other systems based on the use of handheld computers by the health staff involved in all the steps for supplying the hemocomponents or drugs so that patient identification is not made on the sample, but within the computer network. This system is much safer and objective, but does mean higher costs and more complex handling because the health staff is obliged to learn more or less complex computer applications. Moreover, in services such as emergencies or operating theatres, agility and simplicity of use are essential and so, systems that are complicated to use by the associated health staff cannot be employed.

[0007] The problem thus lies in the development of a device with an electro-mechanical locking mechanism for safe blood distribution, the opening of which requires the entering of certain previously assigned codes in a biunivocal manner to the corresponding patient to prevent the blood transported in the mentioned container being mistakenly given to another patient.

DISCLOSURE OF THE INVENTION

[0008] The device with electromechanical lock for the safe distribution of blood ort hemocomponents, the object of the invention, present certain constructional peculiarities intended to allow at least one bag of blood or hemocomponent to be placed inside with the device lock preventing access to the contents because it is necessary to enter codes into the device, associated with the patient for whom the blood or hemocomponent is intended, in order to unblock and open the device. In this way, undesired content manipulation and mistakes in supplying patients are avoided.

[0009] In accordance with the invention, this device comprises a transparent rigid-material container, fitted with an access mouth for placing the bag of blood or hemocomponent to be transported inside and a closing cover fitted with a rear appendix for axial coupling to the container mouth; with the container mouth and the rear appendix of the cover presenting similar irregular outlines for coupling in a single position.

[0010] The lock cover incorporates an electronic circuit that, in a basic configuration, comprises an electronic control card, the means to enter and download data, a data memory, a data display screen, an electric battery and low consumption electromechanical closing.

[0011] Said electromechanical lock is fitted with a stop that is moveable between a protruding blocking position in which the stop is housed inside a lateral seating defined on the container mouth and an inoperative position in which said stop is housed inside the cover allowing it to be released from the container and electric, low consumption closing blocking means governed by the electronic control card when the code or data received via the data acquisition means are correct.

[0012] The shape of the transparent rigid-material container allows the bag of blood or hemocomponent inside to be identified without having to open the device.

The means for entering and downloading the data in the memory that are associated with the electronic control card inside the container cover comprise pushbuttons that are accessible from outside the cover and an external device connection for data processing and recording.

[0013] These means for entering and downloading the data allow the dumping of the data held in an external device and to format the data memory inside the container cover, leaving the device ready for subsequent usage.

[0014] In an embodiment of the invention, the closing stop unblocking means comprise an electrically operated low-consumption piezoelectric mechanism. This low-consumption mechanism is governed by the electronic control card that produces its unblocking when opening codes, coinciding with those held in the data memory and previously assigned to a determined patient, are entered by keypad or a wireless transmitter-receiver.

[0015] In this way, device opening is guaranteed to only occur via the codes associated with a patient, thus preventing mistakes in opening it and in manipulation of the contents by unauthorised persons.

[0016] In accordance with the invention, the cover comprises, at one end, a temperature sensor connected to the electronic control card, which detects and records the temperature inside the container. This temperature record will determine whether the bags of blood or hemocomponents being transported inside the device have been exposed to unsuitable temperatures during distribution.

[0017] In an embodiment of the invention, the cover additionally comprises an acoustic signal emitter, connected to the electronic control card that emits different acoustic signals indicating acceptance or rejection of the entered data, such as electromechanical lock opening codes.

DESCRIPTION OF THE FIGURES

[0018] To complement this description and to facilitate understanding of the characteristics of the invention, this descriptive report is accompanied by a set of drawings, having merely an illustrative, non-limiting character in which the following is represented:

Figure 1 is a perspective view of an exemplary embodiment of the device in the open position.

Figure 2 is an elevation view of the device with the container sectioned by a vertical plane and with the cover partially sectioned and blocked in the locked position.

Figure 3 shows a schematic of the electronic circuit associated with the cover for entering, displaying and recording data and the cover blocking device operation.

PREFERRED EMBODIMENT OF THE INVENTION

[0019] The exemplary embodiment shown in the attached figures comprises a rigid transparent material container (1), fitted with a mouth (11) for access inside and a cover (2) the end of which presents a rear appendix (21) that can be coupled to the container mouth (11).

[0020] The container (1) and the cover (2) present a generally cylindrical configuration of suitable dimensions for use in conventional pneumatic transporters.

[0021] The container (1) and the rear appendix (21) of the cover each present lateral curvo-concave configurations (12, 22) that determine a single coupling position between cover (2) and container (1).

[0022] The cover (2) incorporates an electronic circuit (3) which, in the exemplary embodiment shown in figure 3, comprises an electronic control card (31), data entering and downloading means represented by a keypad (32a), a connection (32b), in this case USB type, a wireless transmitter-receiver (32c), a data memory (33), a data display screen (34), an electric battery (35), a low-consumption electromechanical lock (36), a temperature sensor (37) and an acoustic signal emitter (38).

[0023] The electromechanical lock (36), responsible for blocking the cover (2) in the container (1) closed position, is fitted with a movable stop (36a), represented by a ball, intended to be housed in a lateral seating (13) defined in the container mouth and unblocking means (36b) specifically consisting of a low consumption piezoelectric mechanism.

[0024] As previously indicated, the data to be recorded in memory (33), such as the electromechanical lock opening codes associated with the patient, or any others, can be entered by two pushbuttons (32a) or in a wireless manner via the wireless transmitter-receiver (32c).
When the cover (2) is in the container (1) locked, the previously stored opening codes have to be re-entered in order to unblock the electromechanical lock (36) and open the top, thus preventing the device being opened by unauthorised persons.

[0025] Once the container has been used, the stored data are downloaded and the memory is formatted, using the connector (32b) and the transmitter receiver (32c).

[0026] The acoustic signal emitter (38) is responsible for using different acoustic signals to indicate whether the codes entered to open the electromechanical lock are correct or not.

[0027] Once the nature of the invention is sufficiently described, together with an exemplary embodiment, it is placed on the record for whatever purpose that the materials, shape, size and arrangement of the described elements may be modified, provided this does not involve any alteration to the essential characteristics of the invention that are claimed below.

Claims

1. A device with electromechanical locking for secure distribution of blood or hemocomponents; **characterised in that** it comprises a transparent rigid-material container (1), fitted with an access mouth (11) and a closing cover (2) with a rear appendix (21) for coupling, in an axial direction, with the container mouth (11); with the container mouth (11) and the rear appendix (21) of the cover presenting similar, irregular outlines for coupling in a single position; and **in that** said cover (21) includes an electronic

circuit (3) that comprises an electronic control card (31), a data memory (33) data entry and downloading means (32a, 32b, 32c) a data display screen (34) an electric battery (35) and a low-consumption electromechanical lock (36).

2. A device in accordance with claim 1 **characterised in that** the electromechanical lock (36) comprises a stop (36a) that is movable between a protruding blocking position in which said stop is housed inside a lateral seating (13) defined in the container (1) mouth (11) and a non-operative position in which said stop (36a) is housed inside the cover (2) permitting the release of the container and electric low-consumption blocking means (36b) governed by the electronic control card (31) in function of codes or data received via the data entry means (32a, 32c).

3. A device in accordance with any of the previous claims **characterised in that** the data download and entry means comprise a keypad (32a) that is accessible from outside the cover (2).

4. A device in accordance with any of the previous claims **characterised in that** the data download and entry means comprise a wireless transmitter-receiver (32c).

5. A device in accordance with any of the previous claims **characterised in that** the data download and entry means comprise a connection (3b) for external data processing and recording devices.

6. A device in accordance with claim 2 **characterised in that** the movable unblocking means (36b) for the stop (36a) comprise an electric low-consumption piezoelectric mechanism.

7. A device in accordance with any of the previous claims **characterised in that** the cover (2) comprises a temperature sensor (37) at the rear end that is connected to the electronic control card (31) for the detection and recording of the temperature changes inside the container (1) during device usage.

8. A device in accordance with any of the previous claims **characterised in that** the cover (2) comprises an acoustic signal emitter connected to the electronic control card (31), for the emission of acoustic signals indicating acceptance or rejection of the entered data, such as electromechanical lock (36) opening codes.

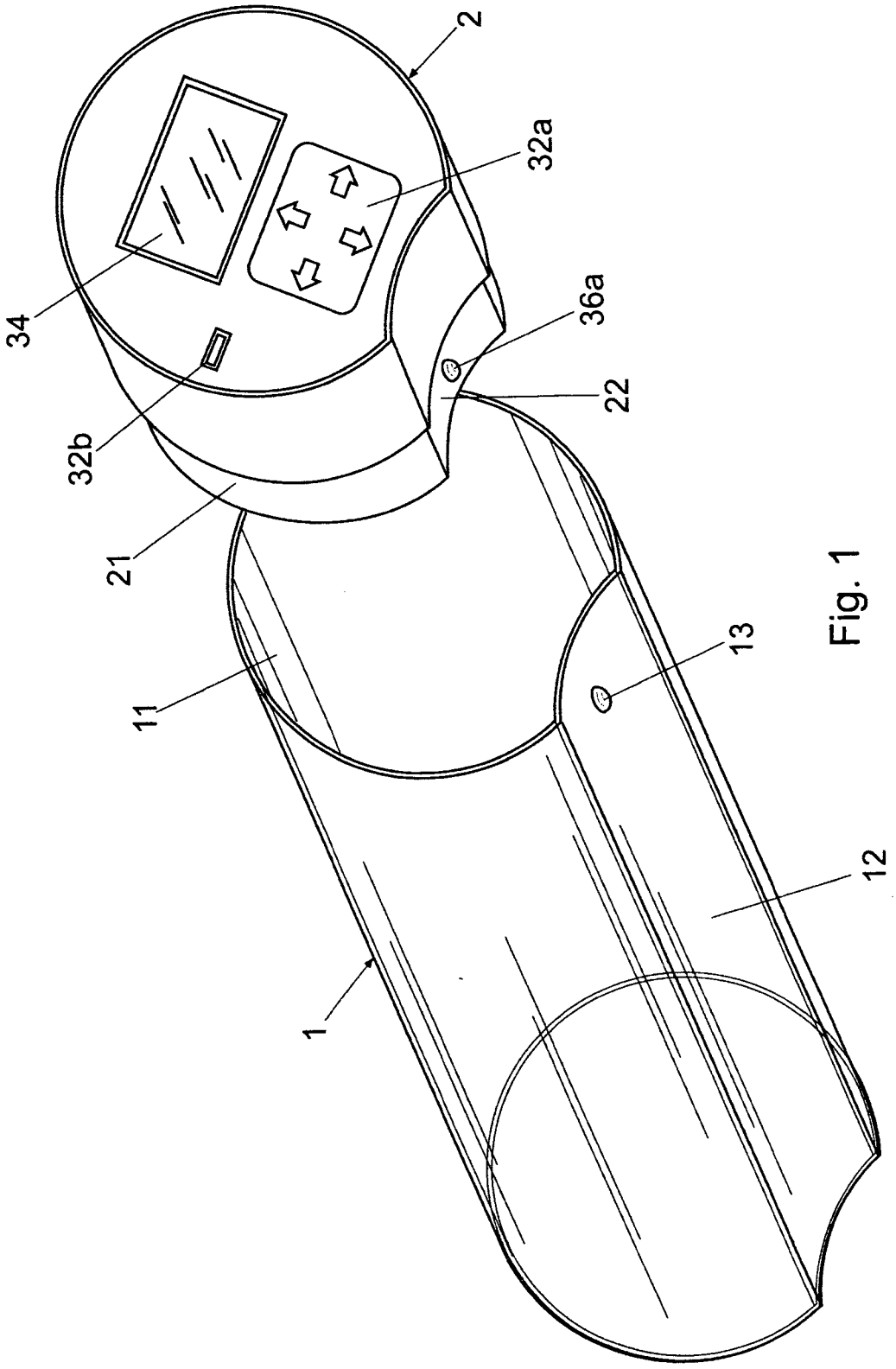

Fig. 1

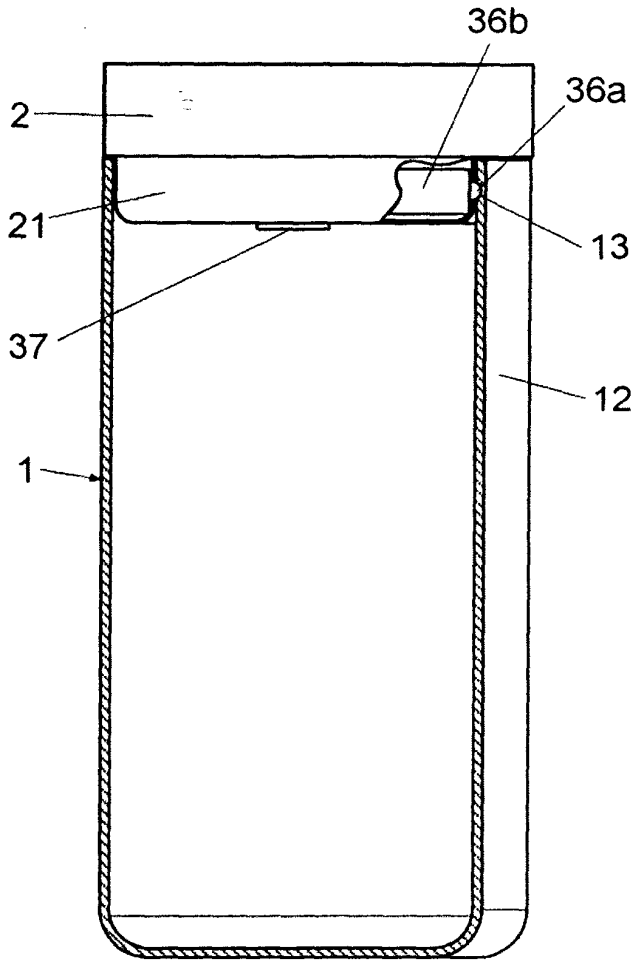

Fig. 2

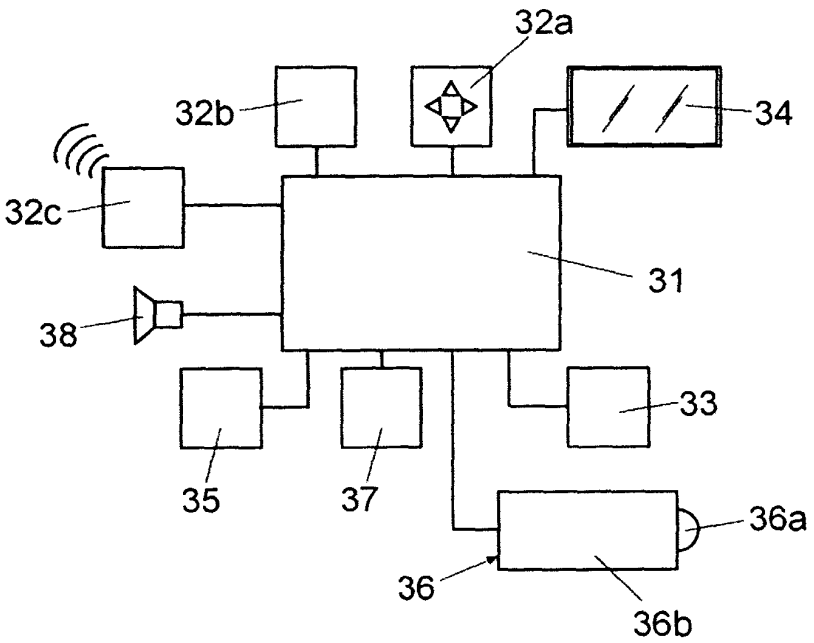

Fig. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ ES 2009/000485

A. CLASSIFICATION OF SUBJECT MATTER

A61J 1/14 (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

INVENES,EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003099158 A1 (DE et al.) 29.05.2003, paragraphs [0116-0309]; figures.	1, 2, 5, 6, 8
Y		3,4,7
Y	WO 0238101 A2 (MDG SOLUTIONS INC ; ASSEO GILAD ; HAITIN DAVID) 16.05.2002, page 4, line 13- page 23, line 20; figures.	3, 7
Y	EP 1526484 A2 (BEAVER MACHINE CORP) 27.04.2005, paragraphs [0013-0030]; figures.	4
A		1

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance.
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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other documents , such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24.February.2010 (24.02.2010)	**(26/02/2010)**
Name and mailing address of the ISA/ O.E.P.M. Paseo de la Castellana, 75 28071 Madrid, España. Facsimile No. 34 91 3495304	Authorized officer E. Álvarez Valdés Telephone No. +34 91 349 84 19

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

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