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(54) **THERMAL BOX**

(57) This invention refers to a homogenizer dispenser with ventilation controller and environment temperature for thermal box, which aims, in a forced manner through fans (3), to perform the circulation of air inside the thermal box (1) through ice or other cold or hot materials (4), so that there is a uniform temperature throughout the area of the thermal box (1). Inside the dispenser cabinet (2), the cold or hot materials (4) are deposited

through the lid (5). The air enters the dispenser cabinet (2) through the holes (6) in its bottom, flows through the ice or other cold or hot materials (4), standardizing its temperature, and is expelled by the fans (3) on the top. The system is driven by a rechargeable battery (7), while the control of the fans (3) and the registration of the information collected by the sensor (9) is done by the electronic control module (8).

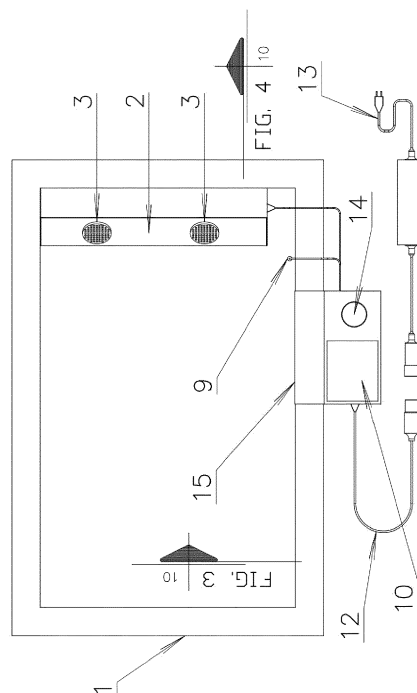


FIG. 1.10

Description

[0001] This is about the patent of Invention of the "Arrangement introduced in a homogenizer dispenser with ventilation and environment temperature controller for thermal box", which acts as a cooler or heater, depending on the temperature regulating material (hot or cold) deposited inside, with the purpose of providing a homogeneous and constant temperature where it is installed.

[0002] In the state of the art, currently for the transportation of cargo requiring refrigeration, such as vaccines, pharmaceutical drugs, blood, organs, biological products, food and others, are used thermal boxes with the addition of ice, dry ice or containers with gel, positioned at the internal ends of the thermal box or on the products that are inside it. With this arrangement, there is no control of uniformity of the thermal transfer between the ice and the transported products. Sometimes the contact of the products with the ice, due to its proximity and low temperature, leads to freezing of the transported material, causing its loss. Sometimes, the frequent opening of the lid/door, raises the temperature inside the thermal box, and the ice is no longer able to provide the necessary thermal transfer and the transported products are lost due to lack of appropriate refrigeration. The ice or containers with gel, at a first moment, for being at a very low temperature, promote a great exchange of heat in the environment, as they are deposited in the thermal box without mechanisms that control this exchange, and at a second moment, they are not capable of maintaining this effect for long periods of time, because this exchange occurred too much at the first moment and tends to uniform the temperature, heating them. As an exchange occurs exclusively by convection, the cold air, being denser, tends to go down, while the hot air tends to rise, causing temperature variations at different points in the same thermal box. Therefore, within the same thermal box, there may be freezing points due to direct contact with ice, or because they are close to the ice, intermediate points of temperature that would be the ideal and points of higher temperature, above the maximum allowable for the conservation of the product inside, resulting in product losses due to lack of homogeneity, as it occurs in vaccines that no longer are effective when applied in humans and/or animals because they went through damage in their conservation in thermal boxes that adopt ice, dry ice or gel containers without control mechanisms.

[0003] This Invention aims to present a compartment-shaped device that occupies a small space inside a thermal box that receives in its interior cooling elements, such as ice, containers with gel, or heating elements, or even the dispenser to be filled with gel or other element of thermal load and carried throughout the dispenser for freezing or heating, because it has in its upper end one or more fans powered by battery. The air projected by these fans in the environment of the thermal box, enters in a forced way in the dispenser by its lower end, which has holes and blinds, and when flowing through the ma-

terial deposited inside it, cooled or heated, it exchanges heat with them, balances its temperature and returns to the environment where the homogenizing dispenser is installed, which through the fans monitored by the temperature controller, determines the necessary Air speed, so that the temperature of the environment of the thermal box is that programmed and homogeneously in all recesses of the environment.

[0004] To control and follow up the temperature homogeneity, there is the external electronic control module, which has a temperature sensor that is installed anywhere inside the cooler to read the temperature, in which module the rechargeable battery is located, in addition to the battery charge controller and the temperature display. Through the controller, it is possible to set the desired temperature inside the cooler, to see and follow up on the display the current temperature records, maximum and minimum temperatures recorded during the trip or during a desired period, besides other customizable events. The storage of this recorded data is done internally in the controller's memory and can be transferred via pen drive, memory cards, RFID, wi-fi, Bluetooth, among others, allowing remote monitoring by a computer or a cell phone. There is also the possibility of setting alerts, such as: temperature out of the setting range, alert of the need to replace the chilled or heated material that is inserted inside the homogenizer dispenser, so that the proper continuity of the heat exchange and conservation process inside the thermal box is maintained.

[0005] The drawing under No. 1/10, in fig. 1.10, shows the controller and dispenser in top view installed in a thermal box (1).

[0006] The drawing under No. 2/10, in fig. 2.10, shows the controller in a front view of the installer to the external side of the thermal box where it allows viewing temperatures and data even with the box closed.

[0007] The drawing under No. 3/10, in fig. 3.10, shows the dispenser in a front view installed inside the thermal box that is in a cross section and the controller in a view from its left side.

[0008] The drawing under No. 4/10, in fig. 4.10, shows the dispenser in a side view inside the cooler, in a longitudinal section with representation of the air flow inside the thermal box (1).

[0009] The drawing under No. 5/10, in fig. 5.10, shows the dispenser in a rear view and the controller in its right-side view, without the thermal box (1).

[0010] The drawing under No. 6/10, in fig. 6.10, shows the dispenser and controller in a rear view, without the thermal box (1).

[0011] The drawing under No. 7/10, in fig. 7.10, shows the dispenser and the controller in a bottom view, without the thermal box (1).

[0012] The drawing under No. 8/10, in fig. 8.10, shows the dispenser in a section, without the thermal box (1).

[0013] The drawing under No. 9/10, in fig. 9.10, shows the dispenser with the controller in a top right perspective with the dispenser filler lid (5) closed.

[0014] The drawing under No. 10/10, in fig. 10, shows the dispenser with the controller in a top left perspective with the dispenser filling lid (5) open.

[0015] As indicated in figures 1.10 to 10.10, this Invention has a thermal box (1), of which lid must be removed to access its interior. Inside the thermal box is the cabinet of the dispenser cabinet (2), of which compartment for storing cold or hot material (4) is accessed through the thermally insulated lid (5). At the upper end of the dispenser cabinet (2) are the fans (3), responsible for exhausting the air that enters through the holes (6), located at the bottom of the dispenser cabinet (2). When this air flows through the internal compartment of the dispenser cabinet (2) with ice or other cold or hot material (4), it will have its temperature regulated to return to the inside of the thermal box (1), at the ideal temperature due to the speed control of the fans (3) provided by the electronic control module (8). The internal walls of the dispenser cabinet (2) have fins (11), so that the ice or other cooling/heating materials (4) do not touch the walls, and therefore the air flows freely. By entering from below and passing through the ice or other cold or hot material (4) and exiting from above the dispenser cabinet (2), the circulating air inside the thermal box (1) will be at a constant and homogeneous temperature, promoting the ideal conservation of the products existing there.

[0016] The power supply of the entire system is provided by the rechargeable battery (7), located on the outside of the thermal box (1), next to the electronic control module (8) that is supported by the support (15). During operation, the electronic control module (8) is responsible for regulating the intensity at which the fans (3) work, based on the temperature read by the sensor (9), which is positioned at any point inside the thermal box (1). Besides the real-time operation, the electronic control module (8) is responsible for all the configuration and programming of the device, where the ideal desired temperature is inserted, and all the information obtained by the sensor (9) is registered. The display (10) shows the information needed to adjust and follow up the readings of the electronic control module (8), of which interaction happens through the control button (14). It is also possible, through the electronic control module (8), to set alerts, such as when cold or hot material (4) must be replaced inside the dispenser cabinet (2). It is possible to extract the data recorded in the memory in the electronic control module (8) through a pen drive, memory cards, RFID, wi-fi, Bluetooth, among other data communication modes.

[0017] To recharge the battery in a 12 or 24 DCV source, at one end, the vehicle plug (12) is connected to the electronic control module (8), which through the charger (16) feeds the battery (7). The other end of the plug (12) can be connected to the vehicle's cigarette lighter, where the transport is taking place, or can also be connected to a power source (13) connected to a common 110 or 220 DCV outlet.

Claims

1. "ARRANGEMENT INTRODUCED IN A HOMOGENIZER DISPENSER WITH VENTILATION CONTROLLER AND ENVIRONMENT TEMPERATURE FOR THERMAL BOX", used in a thermal box (1), which has the dispenser cabinet (2), where the air is forced into it through the holes (6), flowing through ice or other cold or hot material (4), deposited inside through the lid (5) and positioned by the fins (11), through the action of fans (3), which are controlled by the electronic control module (8), which when connected to the sensor (9) is responsible for monitoring and recording temperatures, of which information that is shown on the display (10), stored in the memory and configured by the control button (14). The system is powered by a rechargeable battery (7), which is charged by the charger (16), which is powered by a vehicle plug (12), connected to the vehicle or to a power source (13), **characterized by**; thermal box (1) with dispenser cabinet (2), which has fans (3), lid (5), fins (11) and holes (6), connected to the electronic control module (8), which has a sensor (9), a display (10), a control button (14), located above the battery (7), connected to the charger (16), connected to the vehicle plug (12) and to a power supply (13).

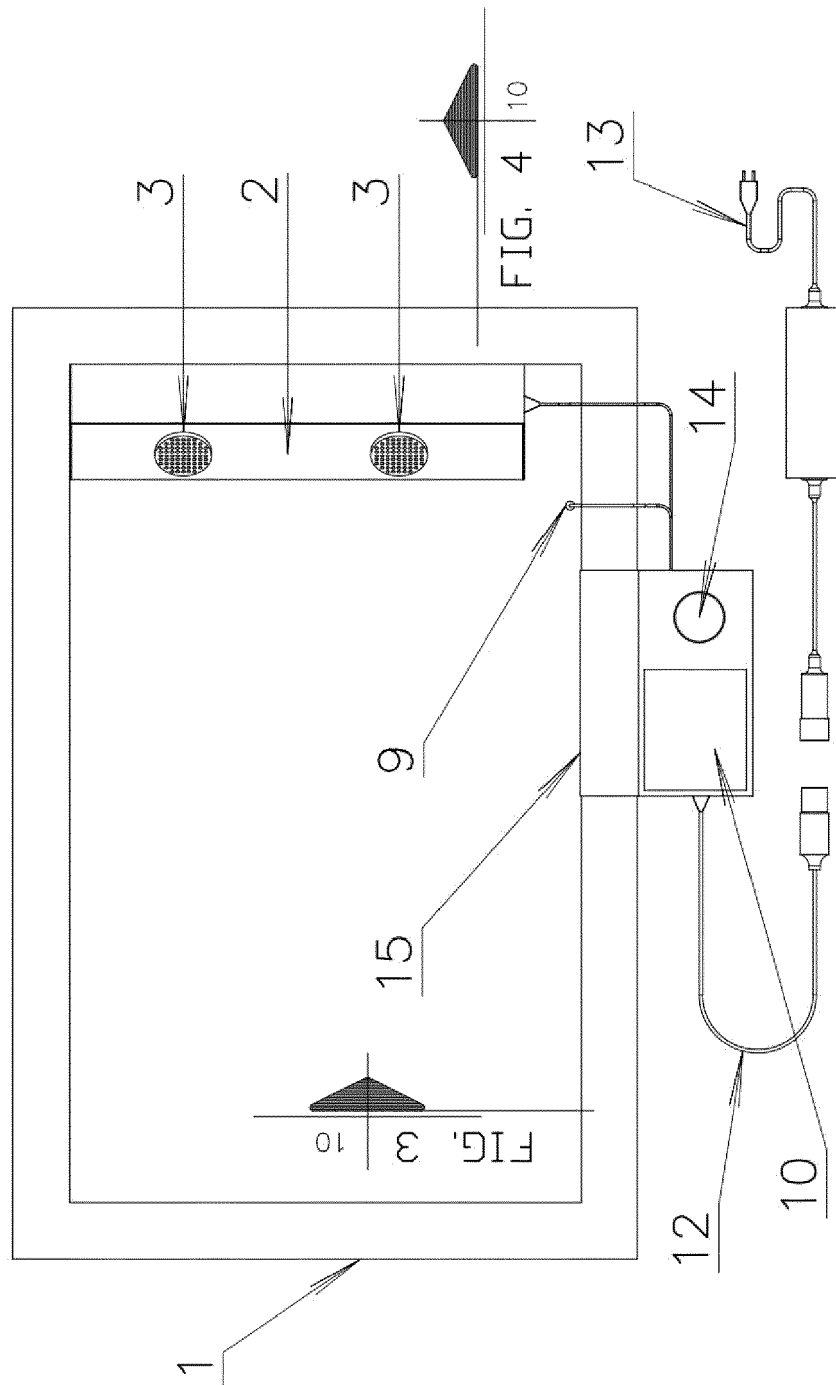


FIG. 1.10

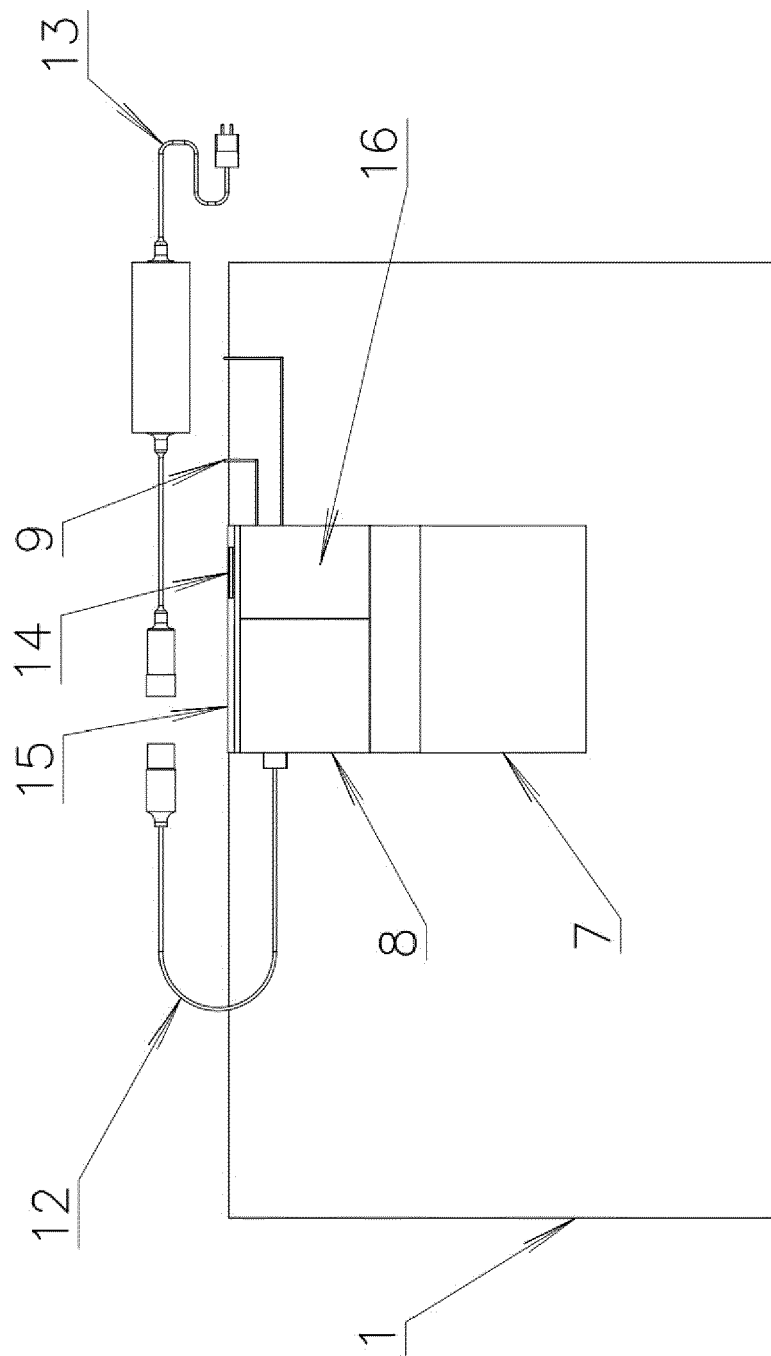


FIG. 2.10

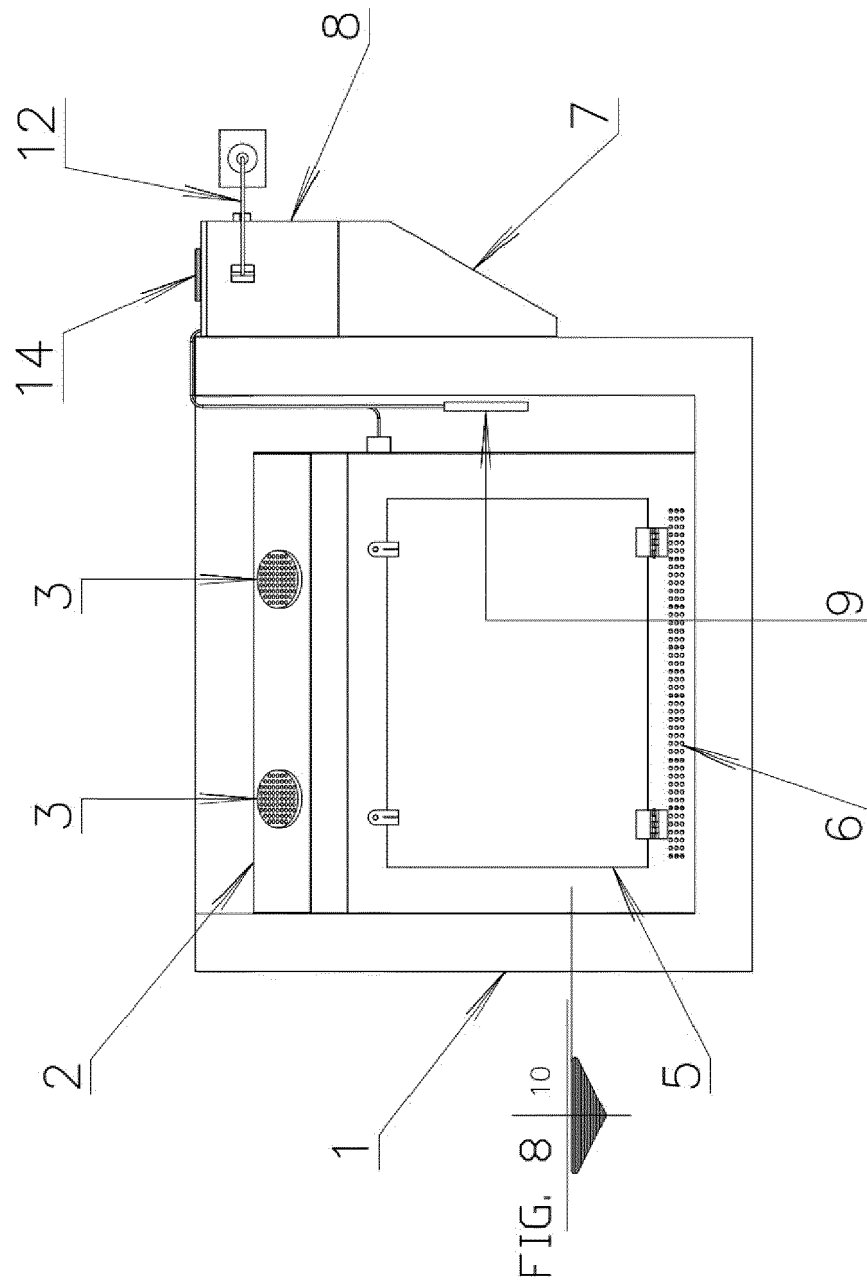


FIG. 3.10

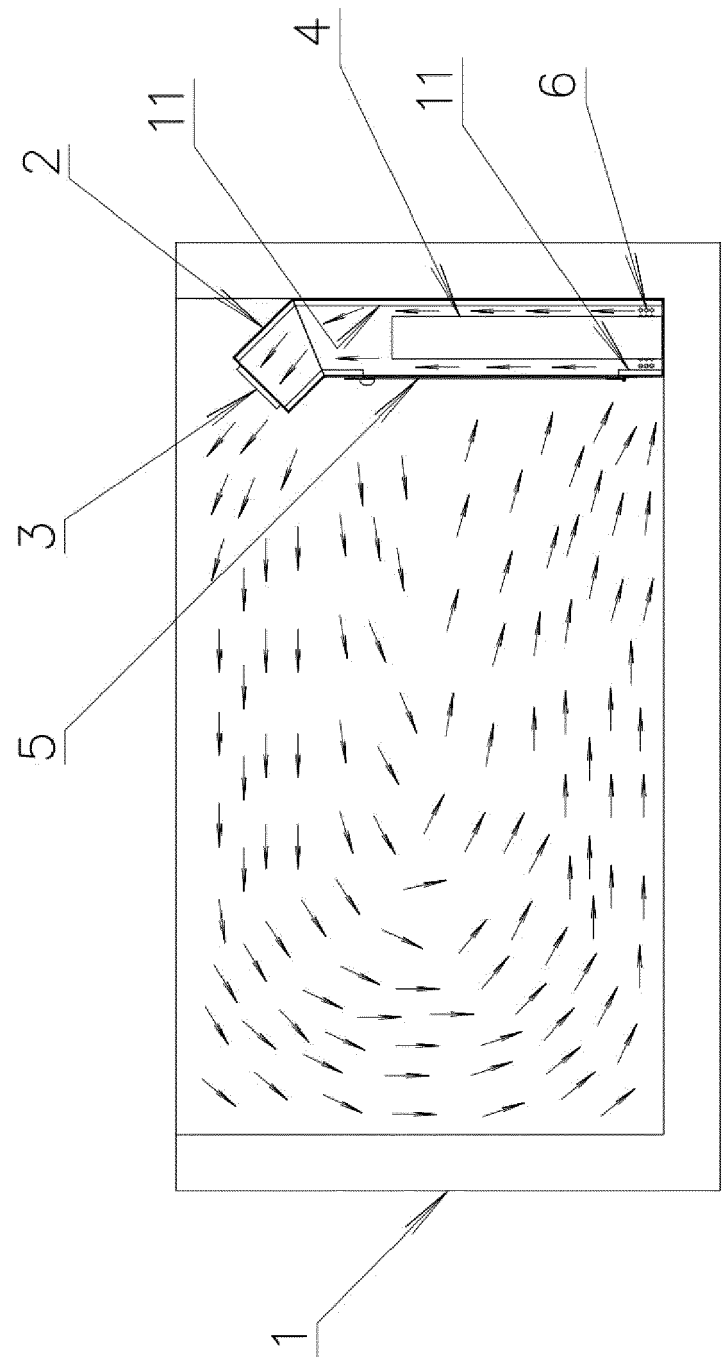


FIG. 4.10

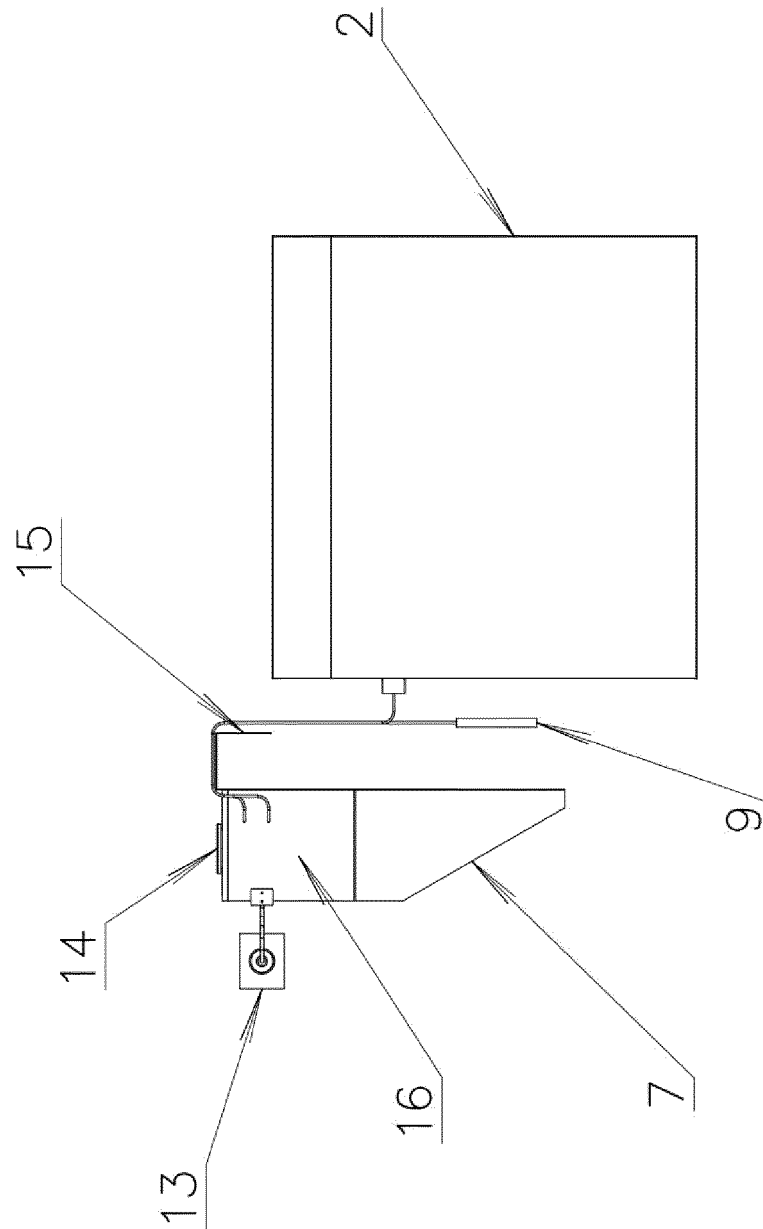


FIG. 5.10

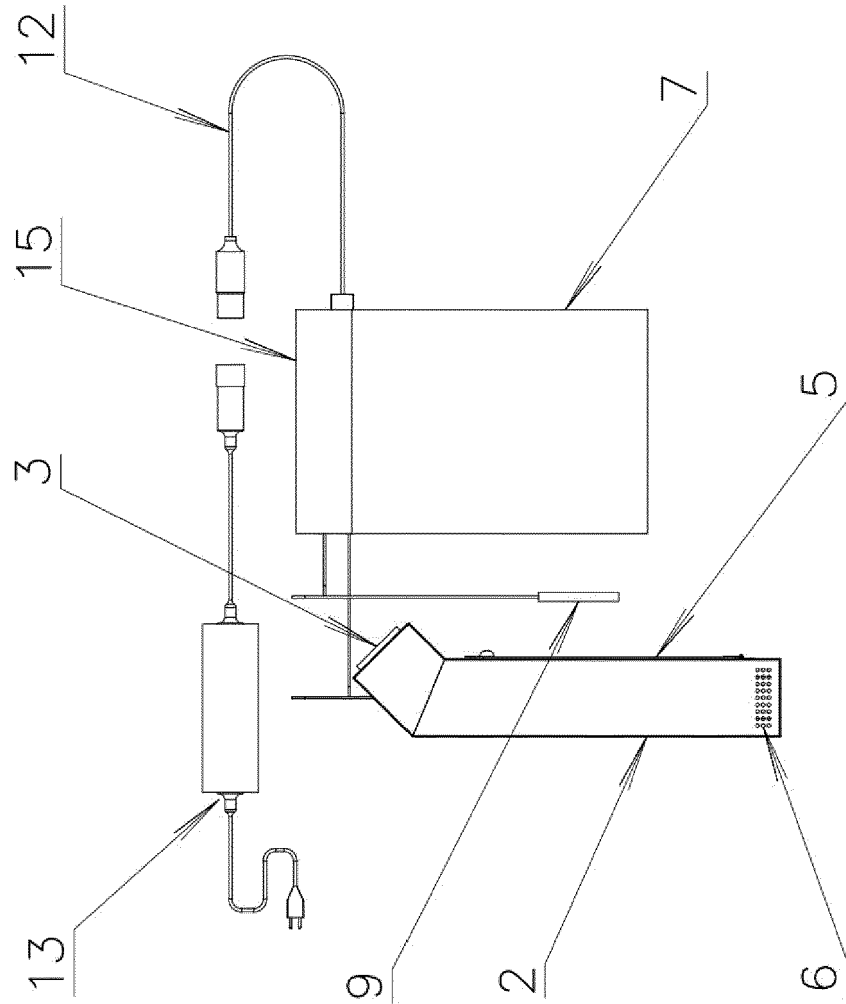


FIG. 6.10

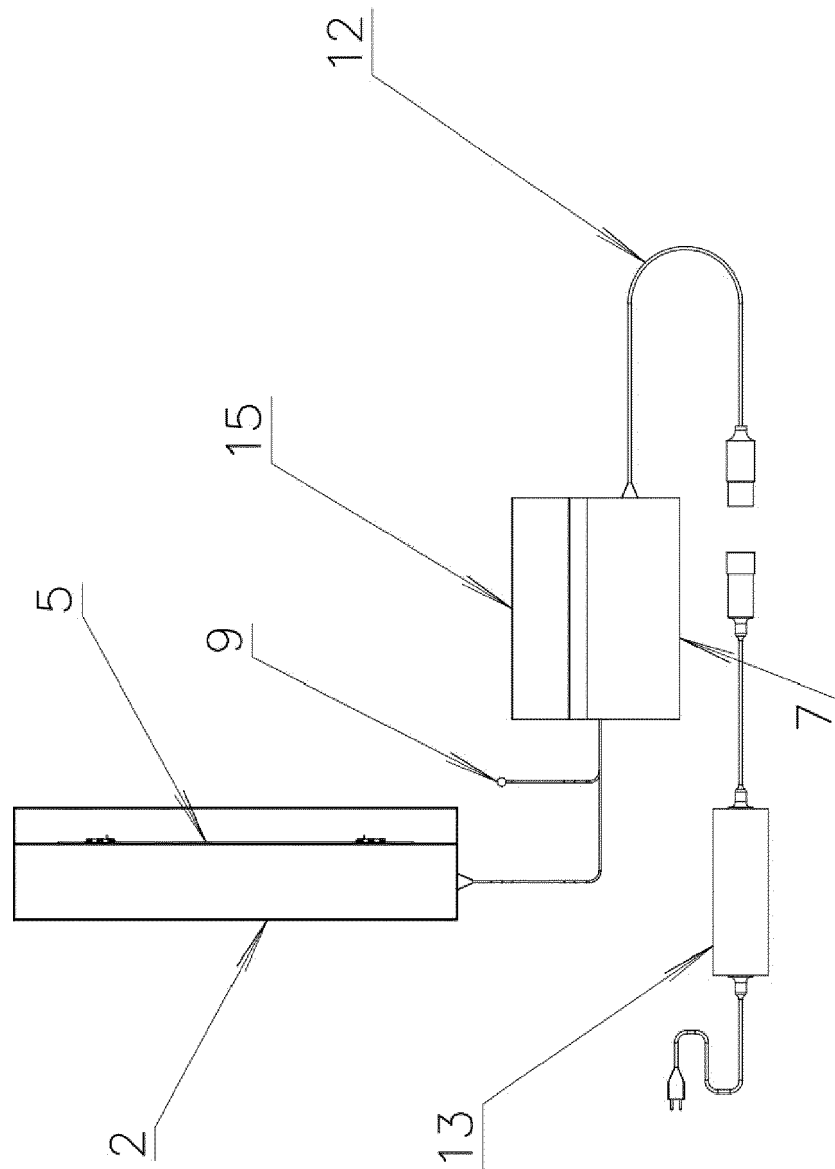


FIG. 7.10

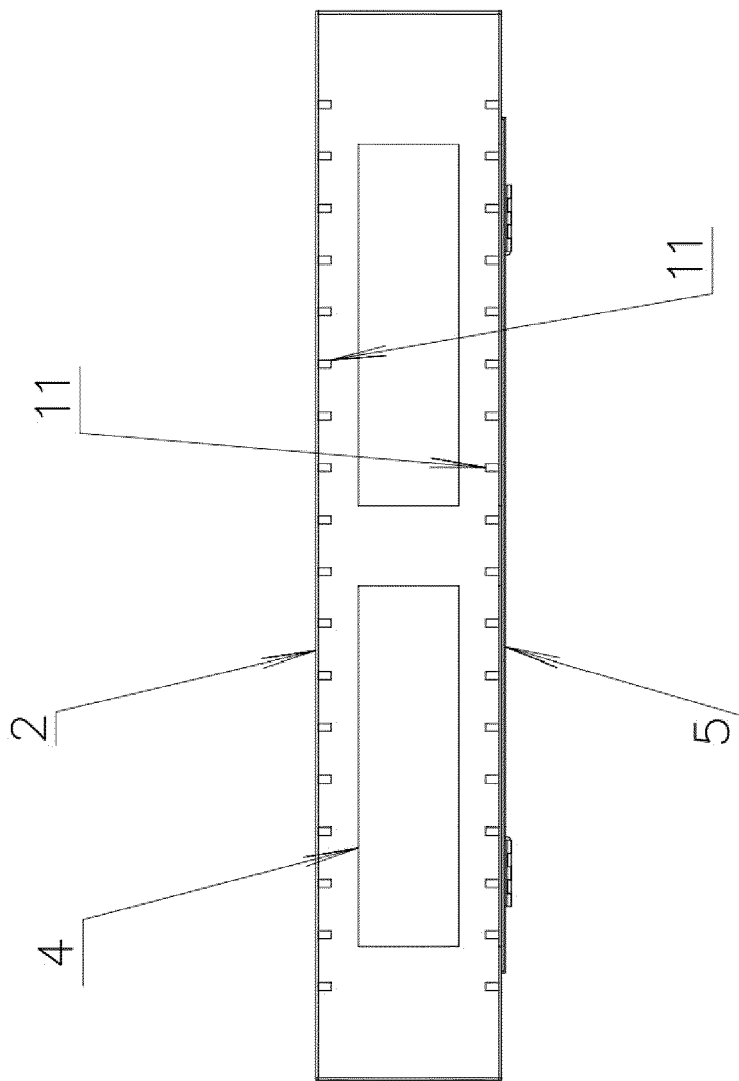


FIG. 8.10

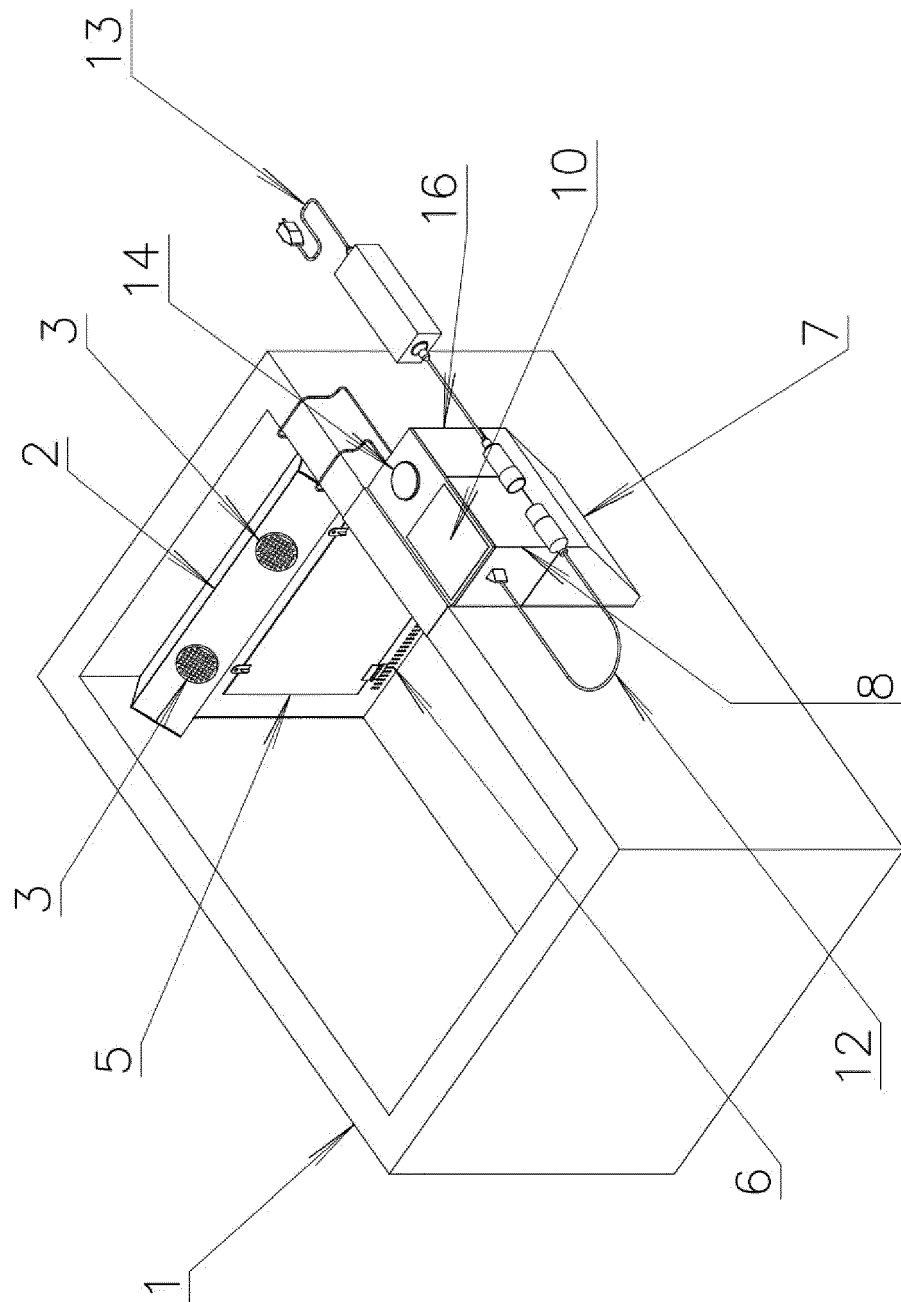


FIG. 9.10

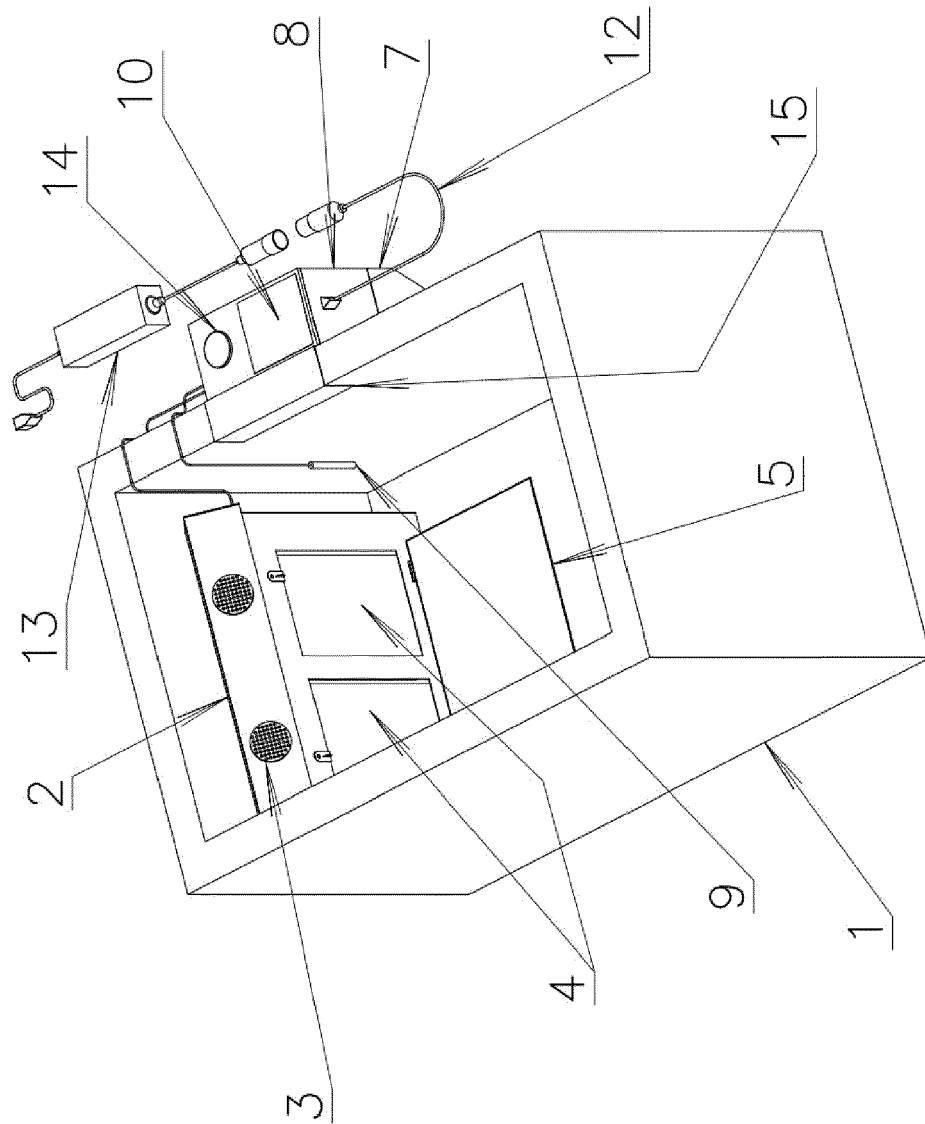


FIG. 10.10



EUROPEAN SEARCH REPORT

Application Number

EP 21 18 8216

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2021/063062 A1 (ALEXANDER CLAYTON [US] ET AL) 4 March 2021 (2021-03-04) * paragraphs [0076], [0085], [0097] * -----	1	INV. F25D3/08 F25D17/06
X	US 2020/224964 A1 (ALEXANDER CLAYTON [US] ET AL) 16 July 2020 (2020-07-16) * paragraphs [0063], [0065], [0069] * -----	1	
X	US 2011/277489 A1 (SCHALLA JAMES P [US] ET AL) 17 November 2011 (2011-11-17) * paragraphs [0067], [0100], [0103], [0105], [0107], [0109], [0110], [0130], [0133]; figure 28 * -----	1	
X	US 2019/128589 A1 (ADAMS JOSHUA [US] ET AL) 2 May 2019 (2019-05-02) * paragraphs [0028], [0032]; figure 6 * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			F25D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 January 2022	Examiner Canköy, Necdet
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2021063062 A1	04-03-2021	NONE	
US 2020224964 A1	16-07-2020	AU 2020206753 A1	15-07-2021
		CA 3125017 A1	16-07-2020
		CN 113557399 A	26-10-2021
		EP 3906383 A2	10-11-2021
		KR 20210113233 A	15-09-2021
		US 2020224964 A1	16-07-2020
		US 2021239394 A1	05-08-2021
		WO 2020146394 A2	16-07-2020
US 2011277489 A1	17-11-2011	CN 102379532 A	21-03-2012
		EP 2386811 A2	16-11-2011
		US 2011277489 A1	17-11-2011
US 2019128589 A1	02-05-2019	NONE	

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