(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 127 579 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
05.09.2018 Bulletin 2018/36

(21) Application number: **15774068.9**

(22) Date of filing: **31.03.2015**

(51) Int Cl.:
A61N 1/36 *(2006.01)* ***A61N 1/05*** *(2006.01)*
A61B 5/00 *(2006.01)*

(86) International application number:
PCT/ES2015/070257

(87) International publication number:
WO 2015/150613 (08.10.2015 Gazette 2015/40)

(54) **SIMULATOR SYSTEM FOR DIFFERENT LIQUID FLAVORS**

SIMULATORSYSTEM FÜR UNTERSCHIEDLICHE FLÜSSIGE AROMEN

SYSTÈME SIMULATEUR DE SAVEURS DISTINCTES DES LIQUIDES

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **04.04.2014 ES 201400289**

(43) Date of publication of application:
08.02.2017 Bulletin 2017/06

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- **NIMESHA RANASINGHE ET AL: "Tongue Mounted Interface for Digitally Actuating the Sense of Taste", WEARABLE COMPUTERS (ISWC), 2012 16TH INTERNATIONAL SYMPOSIUM ON, IEEE, 18 June 2012 (2012-06-18), pages 80-87, XP032208103, DOI: 10.1109/ISWC.2012.16 ISBN: 978-1-4673-1583-8**
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- **RANASINGHE, N ET AL.: 'FunRasa. 8th International Conference on Tangible' EMBEDDED AND EMBODIED INTERACTION (TEI'14 pages 133 - 136, XP058044479**
- **RANASINGHE N ET AL.: 'Tongue mounted interface for digitally actuating the sense of taste.' 16TH ANNUAL INTERNATIONAL SYMPOSIUM ON WEARABLE COMPUTERS (ISWC 2012, pages 80 - 87, XP032208103**

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EP 3 127 579 B1

Description

OBJECT OF THE INVENTION

[0001] The present invention relates to a simulator system for different liquid flavors, and more specifically to a system which makes it possible to provide liquids with different flavors from a small quantity of them and water.

[0002] An object of the invention is to provide a system which, once a liquid (drink) is selected, which will be called "target drink", and thanks to a suitable programming of the operation, it allows the user thereof to achieve the sensation of enjoying said target liquid or drink with the following characteristics:

1. -A flavor similar to that of the target liquid.
2. -A texture similar to that of the target liquid.
3. -A smell similar to that of the target liquid.
4. -A color similar to that of the target liquid.
5. -A temperature which aids a better appreciation of the previous characteristics

FIELD OF APPLICATION OF THE INVENTION

[0003] The field of the invention is related to drink consumption.

[0004] A first classification of the drinks could be as follows:

- Water
- Health drinks
- Infusions
- Soft drinks
- Other drinks

[0005] Within infusions we could also include milk, chocolate, etc., in addition to tea, chamomile tea, linden and other similar ones.

[0006] Soft drinks include those that are ingested with the main purpose of quenching the thirst and due to the pleasant, generally sweet, flavour.

[0007] Within "others" we could include wine and other alcoholic drinks, carbonated or non-carbonated. They apparently provide certain beneficial properties if they are administered suitably and in very limited quantity, with their excess being clearly harmful.

[0008] For the purposes of the present invention, the drinks are initially going to be classified in two large groups: carbonated and non-carbonated, and although a generalization thereof allows a much wider field, the invention is going to be centred on those with a density around the unit, i.e. similar to the density of water.

[0009] Although the object of the invention is to replace a drink which we will call "target" for another, mainly water, without the user being able to observe a difference between them, the invention may also be applied to avoid the unpleasant flavor of some drinks, such as, for example, some type of medicine that must be ingested.

[0010] Although it is true that some drinks provide nutrients and beneficial effects for the body, many of them do not and are even harmful, and even those that are generally good may, if abused, or in the case of allergic or intolerant subjects, be harmful.

[0011] Furthermore, we should not forget the additives responsible for enhancing the flavor, color, smell, etc. which are usually of doubtful effect for the body.

[0012] Many consumers do not distinguish very well which drinks are good for the body and which as simply good from a flavor standpoint.

[0013] One thing is obvious, water is not bad and there are few occasions when a consumer feels bad after ingesting it, unless it is drunk in excess, this being suitable for consumption. On the other hand, it is cheap, easy to get, with the replacement of any drink by water being the object of the present invention.

[0014] In short, in accordance with the aforementioned, we can state that if we were capable of replacing the entire set of drinks that are consumed for their flavor, together which those which are harmful for the subject, by simple water, the effect would be beneficial for health.

BACKGROUND OF THE INVENTION

[0015] There are few references of artificial flavor creation devices by means of electronic stimulation of the tongue's nerve cells. An example thereof is given in "FunRasa: An interactive drinking platform", 8th International Conference on Tangible, Embedded and Embodided Interaction (TEI'14), 16 February 2014, doi:10.1145/2540930.2540939, ISBN 978-1-4503-2635-3, pages 133 - 136.

[0016] Devices are known to generate flavor in artificial cigarettes, such as those disclosed in patents US 6125853A and EP0845220B1, although in no case can they be considered a reference worthy of analysis or comparable with the system object of the present invention.

DESCRIPTION OF THE INVENTION

[0017] The present invention provides a simulator system for different liquid flavours as defined in claim 1. Preferred embodiments are defined by the dependent claims.

[0018] The system of the invention provides the sensation by the corresponding means of stimulation, of drinking a liquid which we will call "target", of a similar density to what is being really drunk, "base liquid", and which will generally be carbonated or non-carbonated water.

[0019] The system claimed is capable of simulating the flavor of the target liquid by means of the electrical stimulation of different parts of the user's tongue, by means of a matrix of electrodes for said purpose. Likewise, it is capable of simulating the texture thereof, by means of the presence or not of carbon dioxide in the water used.

[0020] As regards replicating the smell and the image

thereof, this is carried out by a small sample of the real target liquid.

[0021] Thus, for the smell and the image of the target liquid, a small sample of this is introduced in a small reservoir, in the part of the system corresponding to the nose, which will be detailed below. In this way, the smell, the color, etc., of the real liquid are provided with absolute fidelity to the user.

[0022] Said user will see and smell this small portion of target liquid, providing him or her with real sensations with respect to that desired smell and image.

[0023] The temperature is also modified with the system, with the aim of helping that the appearance of the target liquid is as close as possible to the real appearance.

[0024] The system consists of a vessel which is provided in correspondence with the lower part of its upper opening disposed for use, an element which adapts to the user's tongue, and which is to provide a series of stimuli with a matrix of electrodes placed inside it and which generate the electric patterns that are going to stimulate that the stimulus that the target liquid would generate in the neurons, behind the taste buds found in the user's tongue. This process stimulates the nerve cells, producing a similar effect to that which the real target liquid would generate.

[0025] The electronics generated by said stimulation is preferably found in two modules, one outside the vessel or container and another in the interior thereof, although all of this could be included within the container.

[0026] Said electronics is formed by a set of voltage/current generators of a correct stimulation of the tongue.

[0027] Each generator consists of a function generator, which may be materialized by a simple digital-analogue converter, and an amplifier, with there existing as many units as electrodes in the exciter element of the tongue. In a preferred form, they participate in a number of 64, without prejudice to said number being able to increase until the effect is as faithful as possible to the intended reality. Aside from the mentioned generators, we should highlight the existence of a processor or microcontroller which generates the data that will form the stimuli signals, as well as other auxiliary functions, such as the detection and measurement of temperatures from temperature sensors for liquid, a temperature which will be suitable for said processor by means of the corresponding heating/cooling means, which can be materialized in simple electrical resistances or Peltier cells, to generate the desired temperatures. This processor will be provided with a data input to modify the behaviour program which gives rise to the set of different stimuli for each target drink or flavor intended.

[0028] Of the Peltier cells, one generates the suitable temperature of the tongue according to the chosen target and helps in the system to obtain the selected stimuli. The other Peltier cell modifies the temperature of the base liquid to best adapt it to the intended effect.

[0029] In the upper part of the vessel, right in that area wherein the user's nose enters when he or she is drinking the liquid inside, a small reservoir is disposed, wherein a sample or small quantity of the target liquid is introduced with the aim of achieving an identical smell to the intended one, so that the user whilst drinking the water from the lower part of the vessel can see and smell the target liquid of the upper part thereof.

[0030] The vessel will mainly contain water, carbonated or non-carbonated, in accordance with the nature of the target liquid.

[0031] In a preferred form, the system is connected by means of a cable, via a plug, to an externally powered electronics. The supply provides power for its correct operation, whilst the electronics supplies it with the suitable signals for stimulation of the user's tongue in the correct and suitable measurement. Another option is the inclusion of all type of generation electronics within the vessel, as well as a rechargeable battery or similar, which will allow storing energy for an autonomous operation, i.e. without connection with the cable, during a sufficient time for the use of the system.

[0032] This power supply can even be by electromagnetic waves to avoid any physical connection of the system with the exterior. The same mechanism can be used to program the system with a new target liquid or flavor.

[0033] The tongue has taste buds or sensors mainly in the upper part. These sensors are responsible for the different ranges of tastes. The main objective of this invention is to be able to stimulate said sensors by means of electric means, generating a potential that excites them or by an electromagnetic process, similar to the previous but using a magnetic field to excite the nerve endings behind the taste buds in the user's tongue.

[0034] For the purposes described in the previous paragraph, the system has a matrix of electric or electromagnetic electrodes placed similarly to the tongue's sensors and which can be controlled independently by the previously specified electronics, by means of the use of the microcontroller and a sufficient number of output ports. Said processor will be associated with a control software which will be responsible for the uploading in memory of the desired patterns, as well as the generation of signals in accordance with it, which will be those responsible for generating the appropriate stimulation. At least one point or electrode provides the voltage reference to said generated circuits. In this preferred implementation, two points of mass or reference are used and an earth connection to avoid undesired currents in the user's body.

[0035] It also includes a sensor of inclination of the vessel which allows the system to start generating stimuli or stopping it, with the aim of saving energy when the system is in vertical position.

[0036] In short, it is a system whereby it aims to have the sensation of drinking the target liquid, when in fact what he or she is drinking is water or in certain special cases another base liquid.

[0037] Evidently, the advantages of drinking water instead of beer, wine, champagne or other soft drinks, whilst you think you are drinking said drinks, seem obvious and at least very advantageous in certain circumstances.

DESCRIPTION OF THE DRAWINGS

[0038] To complement the description that will be made below and in order to aid towards a better understanding of the characteristics of the invention, in accordance with a preferred example of practical embodiment thereof, a set of drawings is attached as an integral part of said description wherein, with illustrative and non-limiting character, the following has been represented:

Figure 1.- Shows the diagram corresponding to the system in which the system of the invention is materialized.

Figure 2.- Shows the diagram corresponding to the electronics that participates in the device or system of the invention, as well as the Peltier cell and the support with the electrodes which also participate in the system or device of the invention.

PREFERRED EMBODIMENT OF THE INVENTION

[0039] As can be seen in the mentioned figures, the device in which the system of the invention is materialized is formed from a container or vessel (1), with a reservoir (2) wherein a small quantity of target liquid is introduced, with the purposes of simulating the smell, and the vessel (1) whereof also includes a receptacle (4) where the control electronics (6) is placed, with the vessel (1) also including a main receptacle (3) wherein water is deposited which may be carbonated or non-carbonated, depending on the texture of the target liquid, so that in this main receptacle (3) it is possible to optionally include an additional Peltier or similar device to change the temperature of the liquid to ingest.

[0040] The vessel (1) is connected by means of a cable (8) to a voltage adapter (9) which is also connected to the mains by a plug (11) with its cable (10), although optionally all the electronics could be included in the vessel, assisted by the corresponding charger.

[0041] Figure 2 shows how the electronics (6) comprises a power supply (12), signal generators (14) with their respective amplifiers (13) which carry the amplified signal to electrodes (18) embedded in a support element (7), so that under the latter is found a Peltier cell responsible for regulating the temperature which is measured by a sensor (17), which carries the value measured to a processor (16) responsible for feeding back the energy provided to said Peltier (19) by a H bridge (15) or similar.

[0042] The programming of the processor (16) so that the desired stimuli are generated in the indicated electrodes (18), is performed from the exterior by electromagnetic waves, by means of a standard process such as that used in RFIDs, bluetooth, wi-fi, or more specifically by radio, which is provided with an antenna (5).

[0043] The system may also include an internal battery with its corresponding charger which will allow drinking without the need for the vessel to be joined with a cable to an external power source, as previously commented, and the internal battery of which is rechargeable to be able to continue supplying electricity to the system when it is not connected to an external charger, which may be an electromagnetic charger that generates radiofrequency waves capable of supplying energy to a coil within the device and thus recharge its batteries or elements for this purpose.

[0044] The fact should also be highlighted that the information for the programming can be transmitted by radio as previously stated, and captured by a coil inside the device, responsible for providing said information to the internal processor responsible for generating the suitable stimuli and thus the target flavors.

[0045] The temperature sensor which can be positioned beside the heat generator, may be a resistance which provides heat to the liquid to obtain the most suitable temperature in accordance with the intended target liquid, said heat/cold generator may also be materialized in a Peltier cell, which provides cold or heat to the liquid to obtain the most suitable temperature in accordance with the intended target liquid.

[0046] Furthermore, we can highlight the fact that the element wherein the electrodes are disposed is soft and is moulded to the upper form of the user's tongue and with the electrodes being preferably of electromagnetic type, i.e. they do not need physical contact with the tongue to generate the necessary stimuli, or have areas similar to those of the taste buds in the tongue.

[0047] Finally, it should be stated that the system may include one or more sensors which allow determining if the user is drinking to generate the stimuli and, thus, be able to save energy in generation of the stimuli whilst knowing the operating status of the system, which shall be complemented with a switch to turn it off, and may be manual or automatic operation.

Claims

1. Simulator system for different liquid flavors, **characterized in that** it comprises a vessel (1), with three receptacles or reservoirs: one reservoir (2) wherein a sample of target liquid is housed which provides the smell and image thereof, a main receptacle (3) where carbonated or non-carbonated water is housed and corresponding to the liquid to drink, and another (4) for an electronics (6) assisted by a voltage adapter (9), being complemented with a set of signal generators (14) and a set of amplifiers (13) of the signal generated, as well as a set of electrodes (18) placed so that the different areas of the tongue

sensitive to flavor receive the excitation thereof, being complemented with a support (7) for said electrodes (18) that, on drinking, comes into contact with the tongue and which includes said electrodes (18), making contact with the sensitive areas thereof; with the special characteristic of the electronics (6) being controlled by a processor (16) configured to generate the appropriate stimuli and controlling the overall operation of the system.

2. Simulator system for different liquid flavors, according to claim 1, further comprising data transmission means by radio associated to a coil for its control and programming.

3. Simulator system for different liquid flavors, according to claim 1, further comprising a Peltier cell (19) with a temperature sensor (17) as temperature control element of the support element (7) wherein the electrodes are disposed.

4. Simulator system for different liquid flavors, according to claim 1, further comprising a temperature sensor together with a heat generator, such as a resistance.

5. Simulator system for different liquid flavors, according to claim 1, wherein the electrodes (18) are disposed in a soft element adaptable to the upper form of the user's tongue.

6. Simulator system for different liquid flavors, according to claim 1, wherein the electrodes (18) are of electromagnetic type.

7. Simulator system for different liquid flavors, according to claim 1, wherein the electrodes (18) are distributed similar to the taste buds in the tongue.

8. Simulator system for different liquid flavors, according to claim 1, further comprising a switch for switching off, which can be manual or automatic.

Patentansprüche

1. Simulatorsystem für unterschiedliche flüssige Aromen, **dadurch gekennzeichnet, dass** es ein Gefäß (1) mit drei Behältern oder Speichern umfasst: einen Speichern (2), in dem eine Probe der Zielflüssigkeit eingehaust ist, die den Geruch und das Bild davon bereitstellt, einen Hauptbehälter (3), in dem mit Kohlensäure versetztes oder nicht mit Kohlensäure versetztes Wasser eingehaust ist und der zu trinkenden Flüssigkeit entspricht, und einen anderen (4) für eine Elektronik (6), unterstützt von einem Spannungsadapter (9), wobei es ergänzt ist durch einen Satz von Signalgeneratoren (14) und einem Satz von Verstärkern (13) des generierten Signals sowie einem Satz von Elektroden (18), die so positioniert sind, dass die verschiedenen auf Aroma sensiblen Bereiche der Zunge die Erregung davon erhalten, wobei es ergänzt ist durch eine Halterung (7) für die Elektroden (18), die beim Trinken mit der Zunge in Berührung kommt, und die die Elektroden (18) enthält, die die Berührung mit den sensiblen Bereichen davon herstellen; mit dem besonderen Merkmal, dass die Elektronik (6) von einem Prozessor (16) gesteuert ist, der konfiguriert ist, um die geeigneten Reize zu erzeugen und den allgemeinen Betrieb des Systems zu steuern.

2. Simulatorsystem für unterschiedliche flüssige Aromen, nach Anspruch 1, weiter umfassend Mittel zur Übertragung von Daten über Funk, verbunden mit einer Spule für deren Steuerung und Programmierung.

3. Simulatorsystem für unterschiedliche flüssige Aromen, nach Anspruch 1, weiter umfassend eine Peltier-Zelle (19) mit einem Temperaturfühler (17) als Element zur Temperatursteuerung des Unterstützungselements (7), in dem die Elektronen enthalten sind.

4. Simulatorsystem für unterschiedliche flüssige Aromen, nach Anspruch 1, weiter umfassend einen Temperaturfühler zusammen mit einem Wärmeerzeuger, wie einem Widerstand.

5. Simulatorsystem für unterschiedliche flüssige Aromen, nach Anspruch 1, wobei die Elektroden (18) in einem weichen Element enthalten sind, das an die obere Form der Zunge des Benutzers anpassbar ist.

6. Simulatorsystem für unterschiedliche flüssige Aromen, nach Anspruch 1, wobei die Elektroden (18) vom elektromagnetischen Typ sind.

7. Simulatorsystem für unterschiedliche flüssige Aromen, nach Anspruch 1, wobei die Elektroden (18) ähnlich verteilt sind wie die Geschmacksknospen auf der Zunge.

8. Simulatorsystem für unterschiedliche flüssige Aromen, nach Anspruch 1, weiter umfassend einen Schalter zum Ausschalten, der manuell oder automatisch sein kann.

Revendications

1. Système de simulateur pour différents arômes liquides, **caractérisé en ce qu'**il comprend un récipient (1), avec trois réceptacles ou réservoirs : un réservoir (2) dans lequel un échantillon de liquide cible

est logé qui fournit l'odeur et image de celui-ci, un réceptacle principal (3) où de l'eau gazéifiée ou non gazéifiée est logée et correspondant au liquide à boire, et un autre (4) pour une électronique (6) assistée par un adaptateur de tension (9), étant complété par un jeu de générateurs de signal (14) et un jeu d'amplificateurs (13) du signal produit, aussi bien qu'un jeu d'électrodes (18) placé de sorte que les différentes zones de la langue sensible aux arômes reçoivent leur excitation, étant complété par un support (7) pour lesdites électrodes (18) qui, en buvant, entre en contact avec la langue et qui inclut lesdites électrodes (18), faisant contact avec ses zones sensibles ; la caractéristique spéciale de l'électronique (6) étant commandée par un processeur (16) configuré pour produire les stimuli appropriés et commandant le fonctionnement global du système.

2. Système de simulateur pour différents arômes liquides, selon la revendication 1, comprenant en outre un moyen de transmission de données par radio associé à une bobine pour sa commande et sa programmation.

3. Système de simulateur pour différents arômes liquides, selon la revendication 1, comprenant en outre une cellule Peltier (19) avec un capteur de température (17) comme élément de commande de température de l'élément de support (7) dans lequel les électrodes sont disposées.

4. Système de simulateur pour différents arômes liquides, selon la revendication 1, comprenant en outre un capteur de température en même temps qu'un générateur de chaleur, tel qu'une résistance.

5. Système de simulateur pour différents arômes liquides, selon la revendication 1, dans lequel les électrodes (18) sont disposées dans un élément mou adaptable à la forme supérieure de la langue de l'utilisateur.

6. Système de simulateur pour différents arômes liquides, selon la revendication 1, dans lequel les électrodes (18) sont de type électromagnétique.

7. Système de simulateur pour différents arômes liquides, selon la revendication 1, dans lequel les électrodes (18) sont réparties de manière similaire aux papilles gustatives de la langue.

8. Système de simulateur pour différents arômes liquides, selon la revendication 1, comprenant en outre un commutateur pour l'extinction, qui peut être manuel ou automatique.

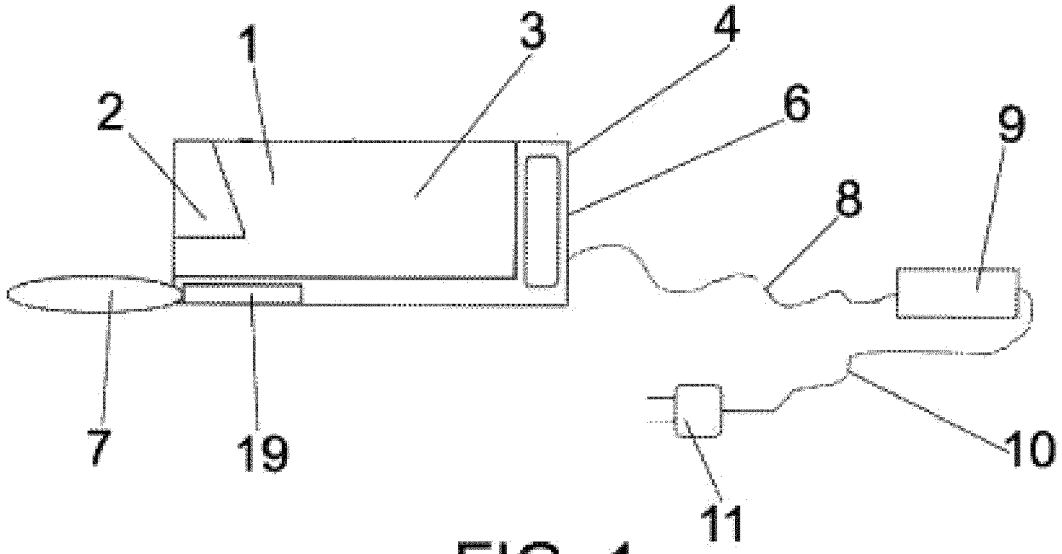

FIG. 1

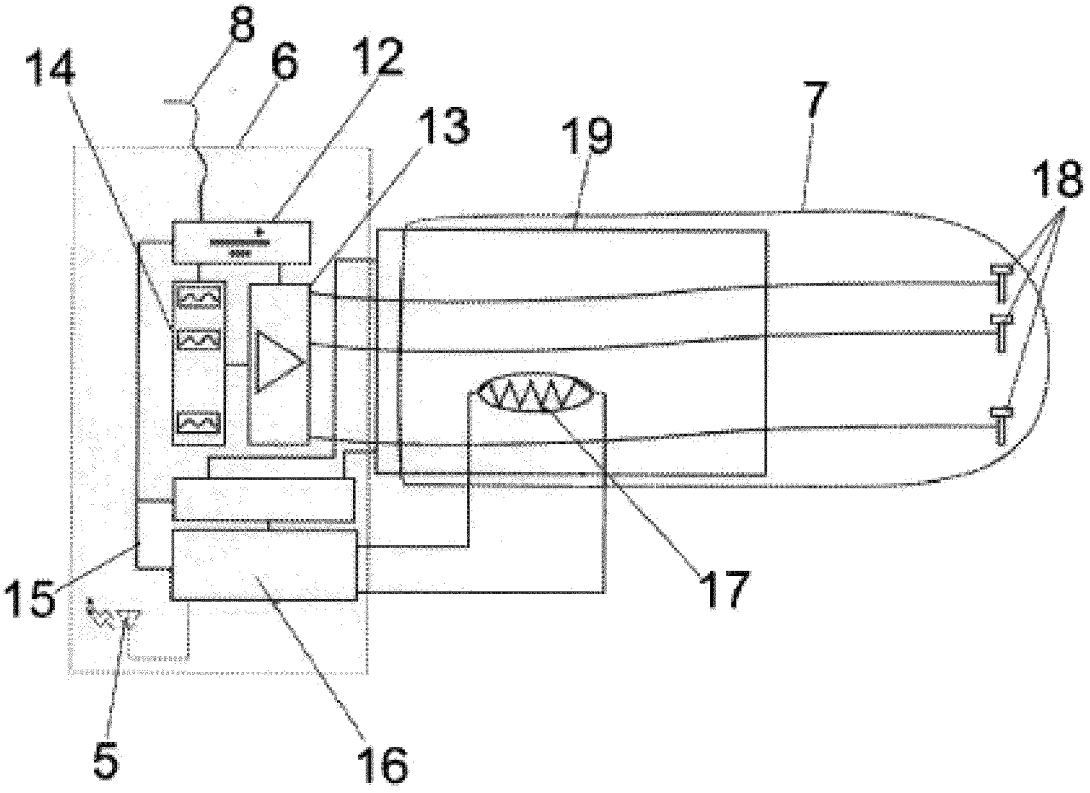

FIG. 2

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

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- US 6125853 A **[0016]**
- EP 0845220 B1 **[0016]**

Non-patent literature cited in the description

- FunRasa: An interactive drinking platform. *8th International Conference on Tangible, Embedded and Embodided Interaction (TEI'14),* 16 February 2014, ISBN 978-1-4503-2635-3, 133-136 **[0015]**

专利名称(译)	适用于不同液体香精的模拟器系统		
公开(公告)号	EP3127579B1	公开(公告)日	2018-09-05
申请号	EP2015774068	申请日	2015-03-31
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申请(专利权)人(译)	ADARVE LOZANO，ALBERTO		
当前申请(专利权)人(译)	ADARVE LOZANO，ALBERTO		
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发明人	ADARVE LOZANO, ALBERTO		
IPC分类号	A61N1/36 A61N1/05 A61B5/00		
CPC分类号	A61B5/4017 A61N1/0548 A61N1/36014 B67D1/0021 B67D1/0066		
优先权	2014000289 2014-04-04 ES		
其他公开文献	EP3127579A1 EP3127579A4		
外部链接	Espacenet		

摘要(译)

本发明涉及一种用于实现饮用特定饮料的感觉的系统，该饮料被称为目标，而实际上正在饮用另一种饮料，例如水。本发明由不仅含有水而且含有少量目标饮料的玻璃组成，以提供所需饮料的真实气味和图像，以及用于产生一系列信号的电子系统，电极装置刺激使用者的舌头，其作用是作用于一系列神经细胞，为大脑提供尽可能类似于真实饮料提供给使用者味蕾的信号。因此，系统的使用者具有饮用目标饮料的感觉。

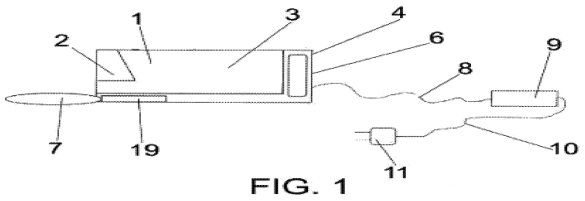

FIG. 1

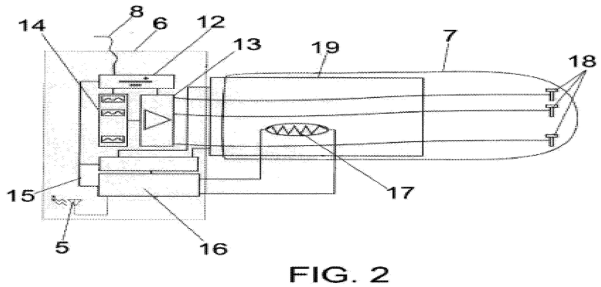

FIG. 2