SMART ELECTRONIC CIGARETTE

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ABSTRACT

An electronic cigarette includes a memory, a processor communicatively coupled to the memory and configured to run an electronic cigarette application stored in the memory, and an output circuit that transfers information from the electronic cigarette application to a remote electronic cigarette application separate from the electronic cigarette. An indicator such as an audible indicator and/or a visual indicator provides information, such as an indication that the electronic cigarette needs recharging or an indication to a user implementing a smoking cessation program. The remote electronic cigarette application can be a remote server-based application, a remote cloud-based application, and/or a mobile-device-based application. The remote electronic cigarette application shares transferred information with a social media account. An input circuit receives from the remote electronic cigarette application remote information and/or remote commands.
FIG. 2
FIG. 3
Establish a connection between the electronic cigarette and a remote application

Send information from the electronic cigarette to the remote application

FIG. 4
500

505

Receive information from the electronic cigarette

510

Monitor usage of the electronic cigarette based on the received information

FIG. 5
SMART ELECTRONIC CIGARETTE
CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application Ser. No. 61/740,498, filed on Dec. 21, 2012, the entire disclosure of which is hereby incorporated herein by reference in its entirety.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable

FIELD OF THE INVENTION

[0003] The present invention relates to the field of electronic cigarettes. The present disclosure relates to information and analytics related to usage of electronic cigarettes.

BACKGROUND OF THE INVENTION

[0004] The concept of the electronic cigarette was first devised over fifty years ago. The modern electronic cigarette is a smokeless non-tobacco cigarette that is capable of delivering nicotine to a user’s lungs when inhaled from the electronic cigarette. Although advances have been made in the delivery of a pleasurable experience to the user through the liquids used for producing vapor and vapor flavors, there is presently no electronic cigarette that is capable of collecting and storing user experience data.

[0005] Thus, a need exists to overcome the problems with the prior art systems, designs, and processes as discussed above.

[0006] Thus, a need exists to overcome the problems with the prior art systems, designs, and processes as discussed above.

SUMMARY OF THE INVENTION

[0007] The invention provides an electronic cigarette that overcomes the hereinafore-mentioned disadvantages of the heretofore-known devices and methods of this general type and that provide such features with a smart electronic cigarette having various components.

[0008] With the foregoing and other objects in view, there is provided, in accordance with the invention, an electronic cigarette including a memory, a processor communicative coupled to the memory and configured to run an electronic cigarette application stored in the memory, and an output circuit that transfers information from the electronic cigarette application to a remote electronic cigarette application separate from the electronic cigarette.

[0009] In accordance with another feature of the invention, there is provided at least one indicator.

[0010] In accordance with a further feature of the invention, the at least one indicator is at least one of an audible indicator and a visual indicator.

[0011] In accordance with an additional feature of the invention, the at least one indicator provides an indication that the electronic cigarette needs recharging.

[0012] In accordance with yet another feature of the invention, the at least one indicator provides at least one indication to a user implementing a smoking cessation program.

[0013] In accordance with yet a further feature of the invention, the remote electronic cigarette application separate from the electronic cigarette is a remote server-based application.

[0014] In accordance with yet another feature of the invention, the remote electronic cigarette application separate from the electronic cigarette is a remote cloud-based application.

[0015] In accordance with yet an additional feature of the invention, the remote electronic cigarette application separate from the electronic cigarette is a mobile-device-based application.

[0016] In accordance with another feature of the invention, the remote electronic cigarette application shares the transferred information with a social media account.

[0017] In accordance with a further feature of the invention, there is provided an input circuit. The input circuit and the output circuit comprise a transceiver circuit.

[0018] In accordance with an added feature of the invention, the input circuit receives from the remote electronic cigarette application at least one of remote information and remote commands.

[0019] In accordance with an additional feature of the invention, based on the received remote commands, the processor causes the electronic cigarette to turn on or shut down.

[0020] In accordance with still another feature of the invention, the electronic cigarette application comprises a smoking cessation program, and, based on the received remote commands, the processor causes the electronic cigarette to implement the smoking cessation program.

[0021] In accordance with still a further feature of the invention, the received information is user setting data.

[0022] In accordance with still an added feature of the invention, the received information is pre-set configuration data.

[0023] In accordance with still an additional feature of the invention, the received information is electronic cigarette application update data.

[0024] In accordance with a further feature of the invention, there is provided a clock used by the electronic cigarette application to determine at least one of when and how long the electronic cigarette is operated.

[0025] In accordance with an added feature of the invention, there is provided a global positioning system receiver that provides location information of the electronic cigarette.

[0026] In accordance with a concomitant feature of the invention, the electronic cigarette application provides the location information to the remote electronic cigarette application.

[0027] Although the invention is illustrated and described herein as embodied in an electronic cigarette, it is, nevertheless, not intended to be limited to the details shown because various modifications and structural changes may be made therein without departing from the spirit of the invention and within the scope and range of equivalents of the claims. Additionally, well-known elements of exemplary embodiments of the invention will not be described in detail or will be omitted so as not to obscure the relevant details of the invention.

[0028] Additional advantages and other features characteristic of the present invention will be set forth in the detailed description that follows and may be apparent from the detailed description or may be learned by practice of exemplary embodiments of the invention. Still other advantages of
the invention may be realized by any of the instrumentalities, methods, or combinations particularly pointed out in the claims.

[0029] Other features that are considered as characteristic for the invention are set forth in the appended claims. As required, detailed embodiments of the present invention are disclosed herein; however, it is to be understood that the disclosed embodiments are merely exemplary of the invention, which can be embodied in various forms. Therefore, specific structural and functional details disclosed herein are not to be interpreted as limiting, but merely as a basis for the claims and as a representative basis for teaching one of ordinary skill in the art to variously employ the present invention in virtually any appropriately detailed structure. Further, the terms and phrases used herein are not intended to be limiting; but rather, to provide an understandable description of the invention. While the specification concludes with claims defining the features of the invention that are regarded as novel, it is believed that the invention will be better understood from a consideration of the following description in conjunction with the drawing figures, in which like reference numerals are carried forward.

[0030] BRIEF DESCRIPTION OF THE DRAWINGS

[0031] The accompanying figures, where like reference numerals refer to identical or functionally similar elements throughout the separate views, which are not true to scale, and which, together with the detailed description below, are incorporated in and form part of the specification, serve to illustrate further various embodiments and to explain various principles and advantages all in accordance with the present invention. Advantages of embodiments of the present invention will be apparent from the following detailed description of the exemplary embodiments thereof, which description should be considered in conjunction with the accompanying drawings in which:

[0032] FIG. 1 is a diagrammatic side elevational view of an exemplary embodiment of an electronic cigarette 100;

[0033] FIG. 2 is a block diagram of an exemplary embodiment of a system that incorporates an electronic cigarette;

[0034] FIG. 3 is a block diagram of an exemplary embodiment of a smart electronic cigarette;

[0035] FIG. 4 is a block diagram illustrating a method in accordance with an exemplary embodiment; and

[0036] FIG. 5 is a block diagram illustrating a method in accordance with an exemplary embodiment.

[0037] DETAILED DESCRIPTION OF THE INVENTION

[0039] Relational terms such as first and second, top and bottom, and the like may be used solely to distinguish one entity or action from another entity or action without necessarily requiring or implying any actual such relationship or order between such entities or actions. The terms “comprises,” “comprising,” or any other variation thereof are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element proceeded by “comprises . . . a” does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises the element.

[0040] As used herein, the term “about” or “approximately” applies to all numeric values, whether or not explicitly indicated. These terms generally refer to a range of numbers that one of skill in the art would consider equivalent to the recited values (i.e., having the same function or result). In many instances these terms may include numbers that are rounded to the nearest significant figure.

[0041] The terms “program,” “software,” “software application,” and the like as used herein, are defined as a sequence of instructions designed for execution on a computer system. A “program,” “software,” “application,” “computer program,” or “software application” may include a subroutine, a function, a procedure, an object method, an object implementation, an executable application, an applet, a servlet, a source code, an object code, a shared library/dynamic load library and/or other sequence of instructions designed for execution on a computer system.

[0042] Herein various embodiments of the present invention are described. In many of the different embodiments, features are similar. Therefore, to avoid redundancy, repetitive description of these similar features may not be made in some circumstances. It shall be understood, however, that description of a first-appearing feature applies to the later described similar feature and each respective description, therefore, is to be incorporated therein without such repetition.

[0043] Described now are exemplary embodiments of the present invention. Referring now to the figures of the drawings in detail and first, particularly to FIG. 1, there is shown a
first exemplary embodiment of an electronic cigarette 100. Electronic cigarette 100 is comprised of a battery housing 105 and a cartridge 110. Battery/power housing 105 may include a Light Emitting Diode (LED) 115 or other lighting source that provides a visible indication of when a user inhales through cartridge 110. Electronic cigarette can be activated by squeeze activation button 130. In the alternative, smoking can be initiated without the use of button 130, for example, when a user inhales through cartridge 110. Housing 105 may also include a speaker 120 and/or one or more lights 125 that can be used to provide an audible or visual indication to a user of the electronic cigarette 100. This visual or audible indication may be employed to alert a user that the cigarette 100 needs recharging. The visual or audible indication may also be used to aid a user in implementing a smoking cessation program. Lights 125 can also be used as a visual confirmation of power, data exchange, and/or use.

[0044] Cartridge 110 includes a heater (not shown) that is used to provide vaporized nicotine to a user. The vaporized nicotine may delivered with flavors. Some example flavors that can be delivered using cartridge 110 are menthol, chocolate, vanilla, coffee, tobacco, cherry, etc.

[0045] Although elements 120, 125, 130 are shown to be implemented on housing 105, these elements can be placed on either the housing 105 or the cartridge 110.

[0046] The exterior mechanical enclosure of electronic cigarette 100 may change in diameter, length, or material based on industry appearance requirements. These requirements may include branding, tip color, filter color, metal finish, etc.

[0047] FIG. 2 is a block diagram of an exemplary embodiment of a system 200 that incorporates a smart electronic cigarette (smart e-cig) 300, which smart e-cig 300 is shown diagrammatically in FIG. 3. Smart e-cig 300 is capable of communicating information over link 265 to mobile device 205. Link 265 can be an infrared link, a Bluetooth link, or any other short-range wireless method of communicating information from smart e-cig 300 to mobile device 205. Link 265 may also be a wired USB link. Mobile device 205 can be a smartphone, tablet, personal digital assistant, or any other computing device.

[0048] Mobile device 205 comprises a processor (CPU) 210, a memory 215 (e.g., random access memory (RAM) and/or read-only memory (ROM)), and various input/output devices 220, (e.g., a receiver, a transmitter, and other devices commonly required to transmit and/or receive information over a wireless and/or wired link). The receiver and transmitter may comprise a short-range wireless transceiver that communicates using RF transmission, e.g., Wi-Fi, Bluetooth, etc. Input/output device 220 may comprise an infrared receiver capable of receiving infrared transmissions from smart e-cig 300. Input/output device 220 may also comprise near field communication (NFC) circuitry, which can be used to transfer information from smart e-cig 300 to application 225 of mobile device 205. Input/output device 220 may also comprise a wired link, e.g., a USB link. Mobile device 205 has stored in memory 215 a smart e-cig software application that allows for the upload of information from the smart e-cig 300 to the mobile phone 205 using smart e-cig application 225. The application 225 may be a stand-alone application running on mobile device 205. The application 225 may also be used in conjunction with a server application 250 running on server 230 or a cloud-based application 275 running in a cloud-computing network 260. Mobile device 205 communicates with server 230 and cloud computing network 260 using link 280 and network 255. Network 255 may be a cellular-based network capable of transmitting data. Network 255 may also be the Internet. Link 280 used to access a mobile network and/or the Internet may be wired or wireless. Smart e-cig application 225, 250, 275, 335 can use network 255 in order to share smart e-cig information with online social media accounts 285 of a user.

[0049] FIG. 3 is a block diagram of an exemplary embodiment of a smart e-cig 300. Smart e-cig 300 comprises a processor (CPU) 305, a memory 310 (e.g., random access memory (RAM) and/or read only memory (ROM)), and one or more various input/output devices 315 (e.g., a receiver, a transmitter, and other devices commonly required to transmit and/or receive information over a wireless and/or wired link).

[0050] The receiver and transmitter may comprise a short-range wireless transceiver that communicates using RF transmission, e.g., Wi-Fi, Bluetooth, etc. Input/output device 315 may comprise an infrared transmitter. Input/output device 315 may also comprise a wired circuit board, e.g., a Universal Serial Bus (USB) link. Input/output circuit board 315 may also comprise an indicator used to alert a user of smart e-cig 300 when the smart e-cig is turning on or shutting down due to user settings or pre-set configurations. Input/output device 315 may also comprise an indicator to alert the user to begin cease using the smart e-cig. These indicators can be provided visually (e.g., using one or more indicator lights) and/or audibly (e.g., using one or more speakers).

[0051] Power circuit board 320 may provide power to the smart e-cig using rechargeable batteries, power/fuel cells, or any other suitable measures for providing power to the e-cig. The smart e-cig 300 can be charged through conventional measures. In one exemplary embodiment, the battery/pow er circuit board 320 of smart e-cig 300 can be charged using wireless charging technology.

[0052] Smart e-cig optionally includes a global positioning system (GPS) receiver 330. GPS 330 may be used by application 225, 250, 275 in order to determine the location of a user when the smart e-cig 300 is being used. This data may be used in providing analytics and can also be provided to social media account(s) 285.

[0053] Smart e-cig 300 has stored in memory 310 a smart e-cig software application 335 that allows for the direct upload of information from the smart e-cig to a server application 250 or an application 275 running in a cloud-computing network 260. Connection 270 is used by the smart e-cig 300 to access network 255, which, in turn, allows the smart e-cig 300 to communicate with the application 250 running on server 230 or an application 275 running in the cloud 260. The connection 270 to network 255 can be wired or wireless, e.g., Wi-Fi or other suitable short-range wireless network. Smart e-cig 300 can also upload information to an application 225 running on mobile device 205 using a wired or wireless link, e.g., link 265. The application 335 collects and stores information such as: time of use; location of use; frequency of use; strength of nicotine/odor; pulls per minute/hour/day/ week/month/etc.; vapor volume intake; gender; age; ethnicity; demographic information; and how often a user reaches
maximum daily use. This collected/stored information is provided to application 225, 250, 275, for example, to provide analytics information.

[0054] Information and/or commands can also be received by the smart e-cig 300 from the remote server 225, 250, 275, e.g., over links 265, 270. The received information can be, for example, user setting data, pre-set configuration data, and/or application update data. Received command data can include commands to turn on and/or shut down the smart e-cig 300. The received command data can also include commands to provide an indication to the user to begin or cease smoking under a smoking cessation program of the application 335.

[0055] Smart e-cig 300 optionally includes a clock 325. The clock 325 may be a timing crystal that is used to determine when and how long a user is operating the smart e-cig 300. This timing function may also be provided in software, for example, from the smart e-cig software application 335, which is stored in memory 310 and executed using processor 305.

[0056] FIG. 4 is a block diagram illustrating a method 400 in accordance with an exemplary embodiment. At block 405, a connection is established between the electronic cigarette, e.g., smart e-cig 300, and a remote application 225, 250, 275. At block 410, information is sent from the smart e-cig 300 to the remote application 225, 250, 275. Information and/or commands can also be received by the smart e-cig 300 from the remote server 225, 250, 275.

[0057] An application 335 running on smart e-cig 300 can be used to alert a user of the smart e-cig when to begin using the device and/or stop using the device. This alert can be visual or audible. The alert can be initiated by the device itself. The alert can also be initiated by receiving a remote command from application 225, 250, 275.

[0058] FIG. 5 is a block diagram illustrating a method 500 in accordance with an exemplary embodiment. At block 505, information is received from the electronic cigarette, e.g., smart e-cig 300. At block 510, usage of the smart e-cig 300 is monitored based on the received information. The information includes any information that can be collected regarding the smart e-cig 300. Some non-limiting examples of the types of information that can be collected from the e-cig 300 include: time of use; location of use; frequency of use; strength of nicotine/vapor; type of flavor cartomizer; strength of cartomizer; puffs per minute/hour/day/week/month/etc.; vapor volume intake; gender; age; ethnicity; demographic information; and how often a user reaches maximum daily use.

[0059] The application 225, 250, 275, 335 can be used to monitor and train users of smart e-cig 300 in order to aid in smoking cessation. The user can, using the application 225, 250, 275, create their own training experience for smoking cessation purposes. Default smoking cessation trainer applications can also be provided by the smart e-cig application 225, 250, 275, 335. For example, the default or pre-defined smoking cessation trainer applications can be used to wean users off of cigarettes in 6, 12, or 18 months. In one exemplary embodiment, application 225 runs in the background on mobile device 205 and alerts the user of smart e-cig 300 to use or stop using the device.

[0060] In one embodiment, analytics for application and user data are provided by application 225, 250, 275. The application collects and stores information, e.g., the information detailed above with respect to item 510. In one exemplary embodiment, a library of the data or information collected from the smart e-cig 300 is stored in memory 215, 240 or in memory associated with cloud application 275.

[0061] In one exemplary embodiment, predictive, habit, and emotional data analysis based on a user's life habits can be determined by the application 225, 250, 275. This data analysis can be used to market the smart e-cig 300, accessories, and/or other products.

[0062] The application 225, 250, 275, 335 can also be used to share information with social media accounts 285 of a user. The information may be selected analytics information or usage information.

[0063] The processes described above, including but not limited to those presented in connection with FIGS. 2 to 5, may be implemented in general, multi-purpose, or single purpose processors. Such a processor, e.g., processor 210, 235, 305, will execute instructions, either at the assembly, compiled, or machine-level, to perform that process. Those instructions can be written by one of ordinary skill in the art following the description of presented above and stored or transmitted on a computer readable medium, e.g., a non-transitory computer-readable medium. The instructions may also be created using source code or any other known computer-aided design tool. A computer readable medium may be any medium capable of carrying those instructions and include a CD-ROM, DVD, magnetic or other optical disc, tape, silicon memory (e.g., removable, non-removable, volatile or non-volatile), and/or packetized or non-packetized wireline or wireless transmission signals.

[0064] It is noted that various individual features of the inventive processes and systems may be described only in one exemplary embodiment herein. The particular choice for description herein with regard to a single exemplary embodiment is not to be taken as a limitation that the particular feature is only applicable to the embodiment in which it is described. All features described herein are equally applicable to, additive, or interchangeable with any or all of the other exemplary embodiments described herein and in any combination or grouping or arrangement. In particular, use of a single reference numeral herein to illustrate, define, or describe a particular feature does not mean that the feature cannot be associated or equated to another feature in another drawing figure or description. Further, where two or more reference numerals are used in the figures or in the drawings, this should not be construed as being limited to only those embodiments or features, they are equally applicable to similar features or not a reference numeral is used or another reference numeral is omitted.

[0065] The phrase “at least one of A and B” is used herein and/or in the following claims, where A and B are variables indicating a particular object or attribute. When used, this phrase is intended to and is hereby defined as a choice of A or B or both A and B, which is similar to the phrase “and/or”. Where more than two variables are present in such a phrase, this phrase is hereby defined as including only one of the variables, any one of the variables, any combination of any of the variables, and all of the variables.

[0066] The foregoing description and accompanying drawings illustrate the principles, exemplary embodiments, and modes of operation of the invention. However, the invention should not be construed as being limited to the particular embodiments discussed above. Additional variations of the embodiments discussed above will be appreciated by those skilled in the art and the above-described embodiments should be regarded as illustrative rather than restrictive.
Accordingly, it should be appreciated that variations to those embodiments can be made by those skilled in the art without departing from the scope of the invention as defined by the following claims.

What is claimed is:
1. An electronic cigarette, comprising:
   a memory;
   a processor communicatively coupled to the memory and
   configured to run an electronic cigarette application
   stored in the memory; and
   an output circuit that transfers information from the elec-
   tronic cigarette application to a remote electronic cig-
   arette application separate from the electronic cigarette.
2. The electronic cigarette according to claim 1, further
   comprising at least one indicator.
3. The electronic cigarette according to claim 2, wherein
   the at least one indicator comprises at least one of an audible
   indicator and a visual indicator.
4. The electronic cigarette according to claim 2, wherein
   the at least one indicator provides an indication that the elec-
   tronic cigarette needs recharging.
5. The electronic cigarette according to claim 2, wherein
   the at least one indicator provides at least one indication to a
   user implementing a smoking cessation program.
6. The electronic cigarette according to claim 1, wherein
   the remote electronic cigarette application separate from the
   electronic cigarette is a remote server-based application.
7. The electronic cigarette according to claim 1, wherein
   the remote electronic cigarette application separate from the
   electronic cigarette is a remote cloud-based application.
8. The electronic cigarette according to claim 1, wherein
   the remote electronic cigarette application separate from the
   electronic cigarette is a mobile-device-based application.
9. The electronic cigarette according to claim 1, wherein
   the remote electronic cigarette application shares the trans-
   ferred information with a social media account.
10. The electronic cigarette according to claim 1, further
    comprising an input circuit.
11. The electronic cigarette according to claim 10, wherein
    the input circuit and the output circuit comprise a transceiver
    circuit.
12. The electronic cigarette according to claim 10, wherein
    the input circuit receives from the remote electronic cigarette
    application at least one of remote information and remote
    commands.
13. The electronic cigarette according to claim 12, wherein,
    based on the received remote commands, the processor
    causes the electronic cigarette to turn on or shut down.
14. The electronic cigarette according to claim 12, wherein:
    the electronic cigarette application comprises a smoking
    cessation program; and
    based on the received remote commands, the processor
    causes the electronic cigarette to implement the smoking
    cessation program.
15. The electronic cigarette according to claim 12, wherein
    the received remote information comprises user setting data.
16. The electronic cigarette according to claim 12, wherein
    the received remote information comprises pre-set configu-
    ration data.
17. The electronic cigarette according to claim 12, wherein
    the received remote information comprises electronic cig-
    arette application update data.
18. The electronic cigarette according to claim 1, further
    comprising a clock used by the electronic cigarette applica-
    tion to determine at least one of when and how long the
    electronic cigarette is operated.
19. The electronic cigarette according to claim 1, further
    comprising a global positioning system receiver that provides
    location information of the electronic cigarette.
20. The electronic cigarette according to claim 19, wherein
    the electronic cigarette application provides the location
    information to the remote electronic cigarette application.