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Van Winkle

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(54) **INTEGRATED VEHICULAR REMOTE STARTING INTERRUPTER**

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(51) **Int. Cl.**

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B60R 25/045	(2013.01)
B60R 25/20	(2013.01)
H04L 9/40	(2022.01)

(52) **U.S. Cl.**

CPC ***F02N 11/0807*** (2013.01); ***B60R 25/045*** (2013.01); ***B60R 25/209*** (2013.01); ***F02N 11/0862*** (2013.01); ***H04L 63/0435*** (2013.01); *B60R 2325/108* (2013.01); *B60R 2325/205* (2013.01); *F02N 2300/306* (2013.01); *H04L 2463/121* (2013.01)

(58) **Field of Classification Search**

CPC F02N 11/0807; F02N 11/0862; F02N 2300/306; B60R 25/045; B60R 25/209; B60R 2325/108; B60R 2325/205; H04L 63/0435; H04L 2463/121

USPC 701/113

See application file for complete search history.

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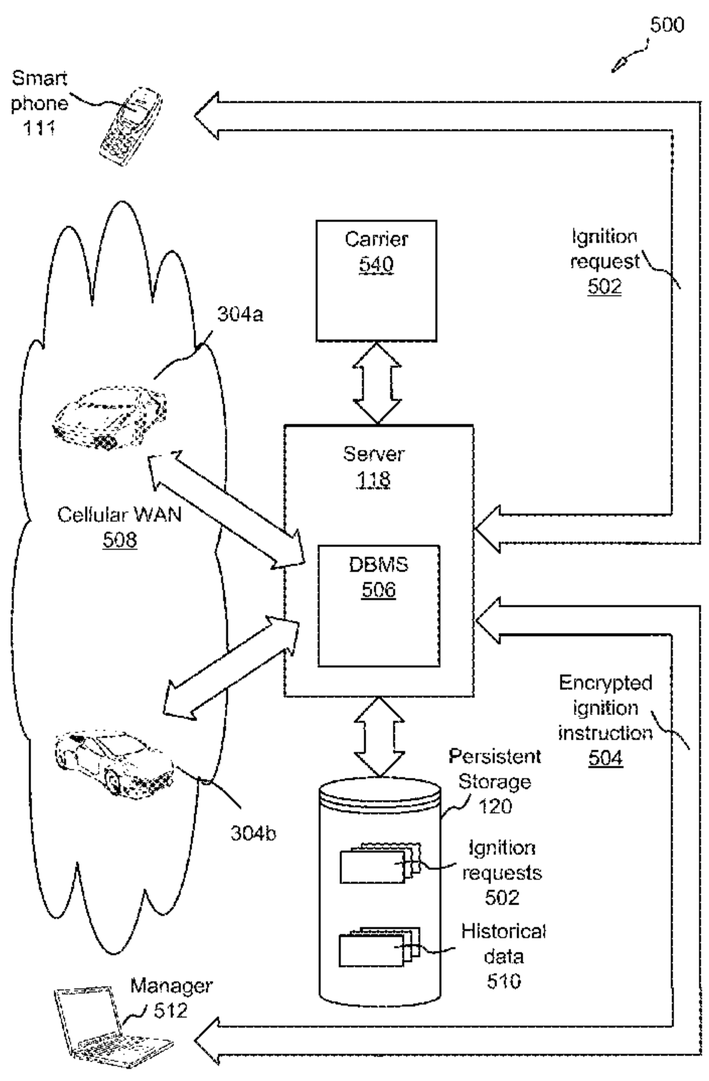
(57) **ABSTRACT**

A system and method of remotely enabling and disabling the starting of one or more vehicles using hardware components installed within a case and a data processing device (DPD), such as a smart phone, in logical communication with one of the vehicle and the case via a WAN, wherein an ignition request is relayed via the WAN to server which parses the ignition request into one or more encrypted ignition instructions, each encrypted ignition instruction sent to a separate vehicle exclusively associated with the encrypted ignition instruction.

11 Claims, 10 Drawing Sheets



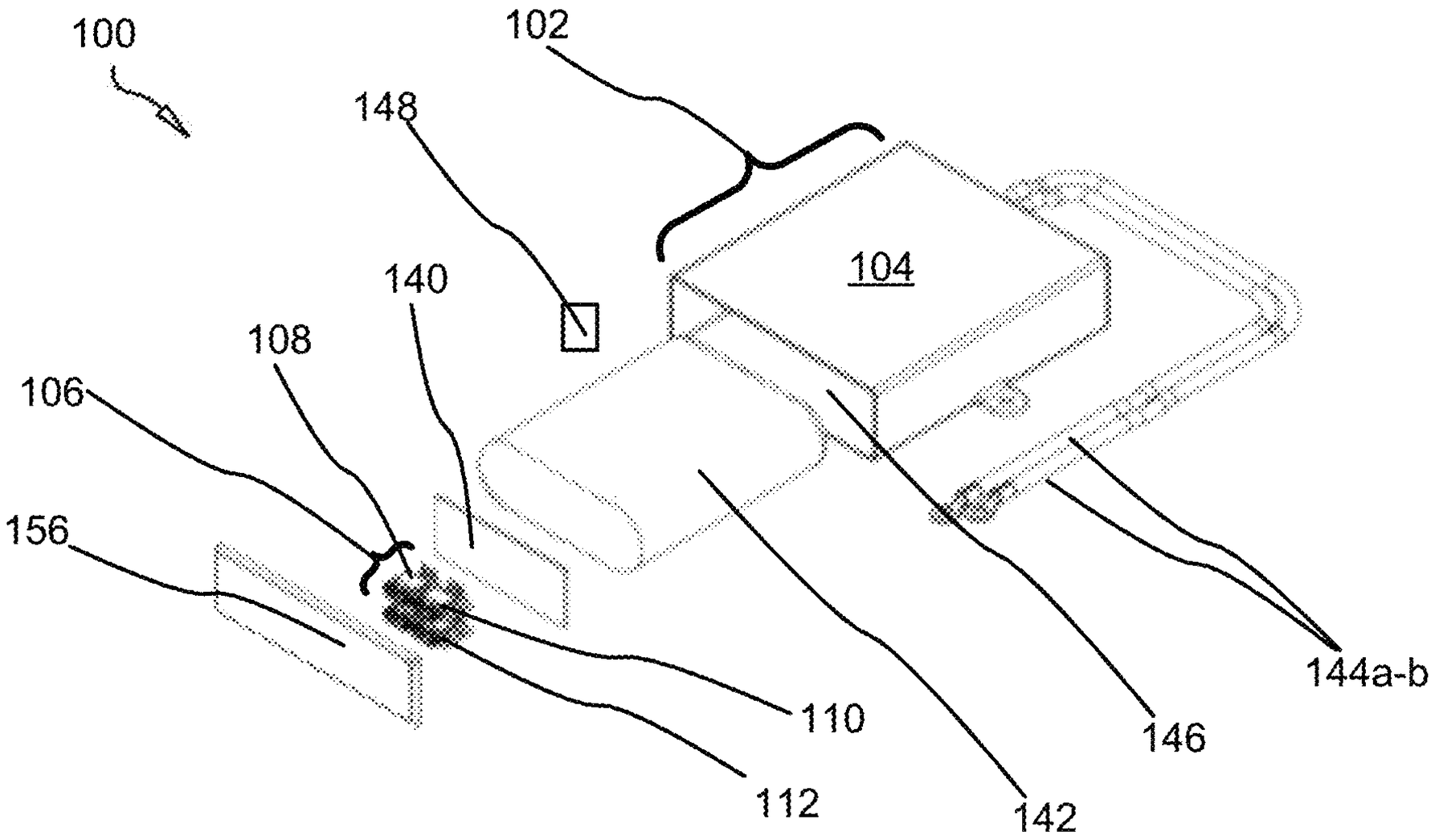

100
102
148
104
140
108
106
156
110
112
142
146
144a-b

FIG. 1

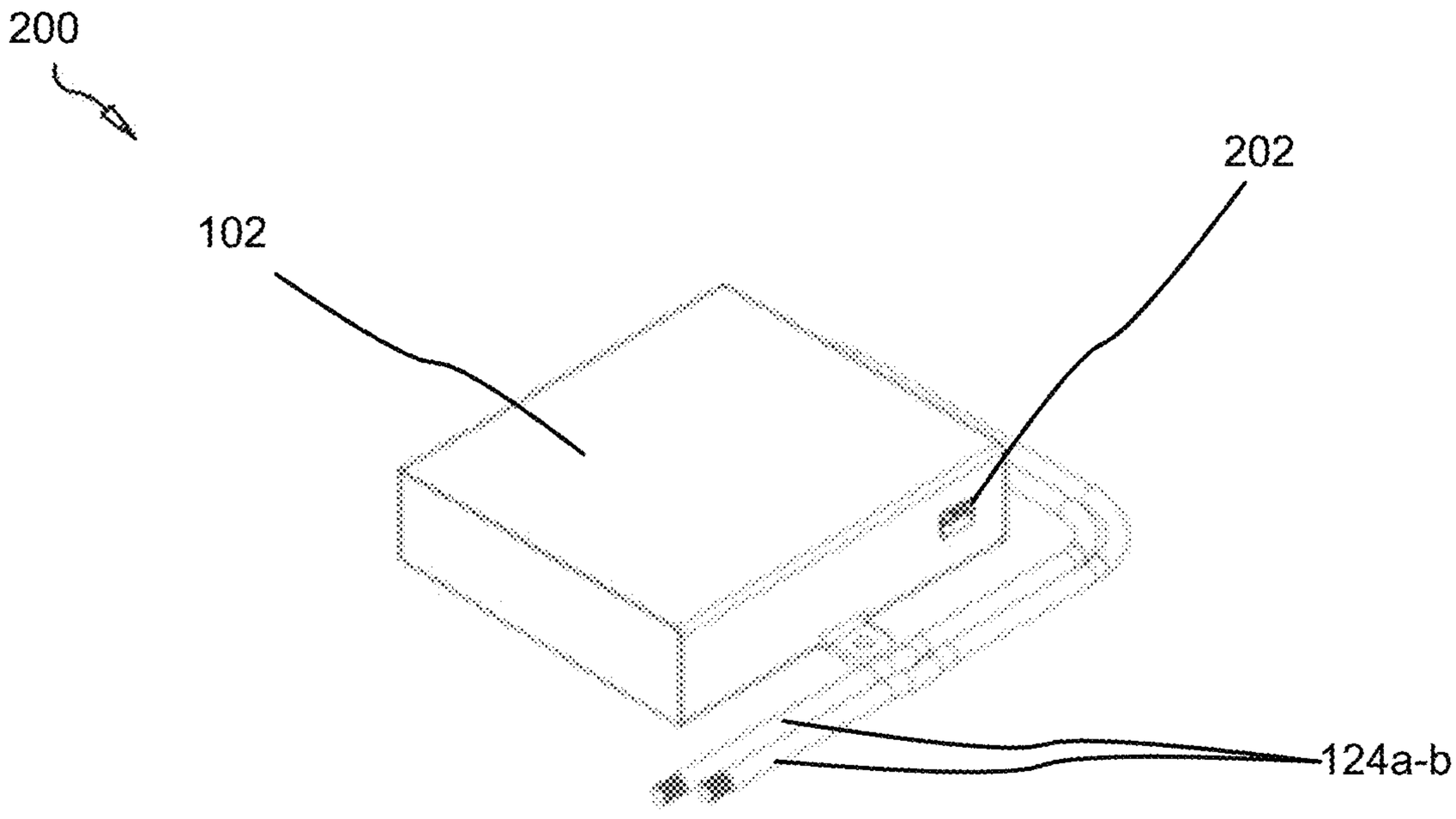

200
202
102
124a-b

FIG. 2

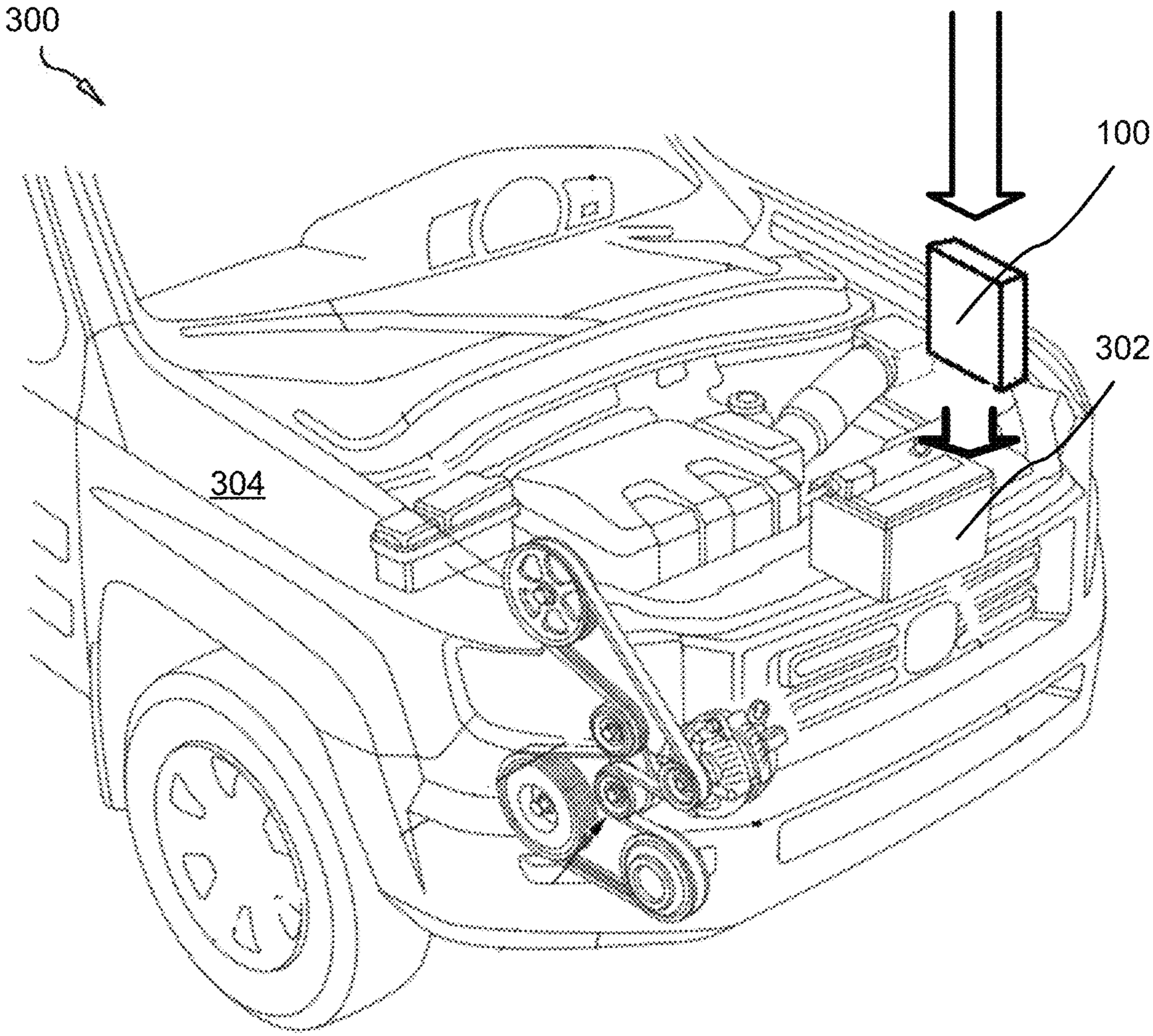


FIG. 3

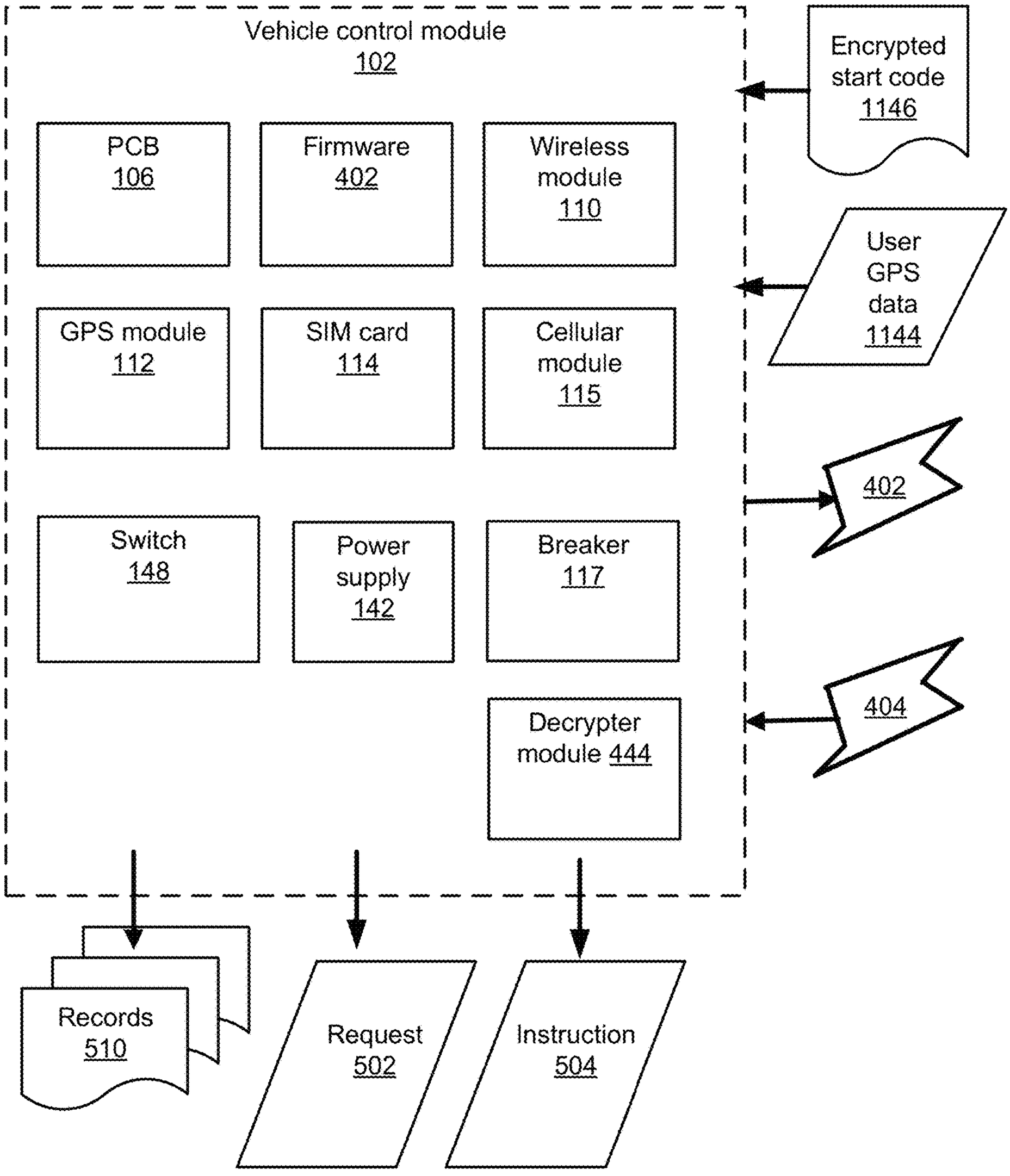

Vehicle control module
102
PCB
106
Firmware
402
Wireless module
110
GPS module
112
SIM card
114
Cellular module
115
Switch
148
Power supply
142
Breaker
117
Decrypter module 444
Encrypted start code
1146
User GPS data
1144
402
404
Records
510
Request
502
Instruction
504

FIG. 4A

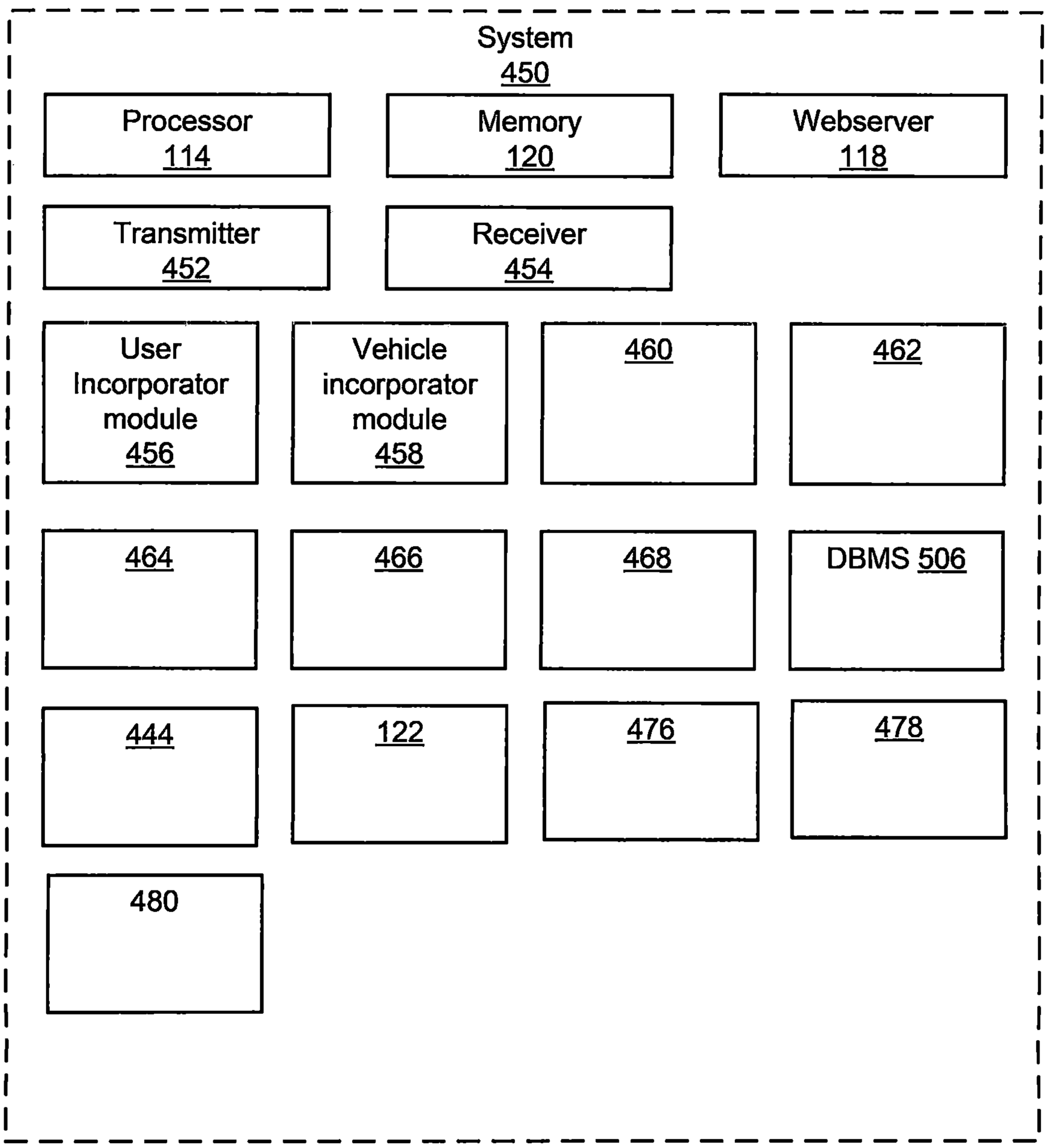

System
450
Processor
114
Memory
120
Webserver
118
Transmitter
452
Receiver
454
User
Incorporator
module
456
Vehicle
incorporator
module
458
460
462
464
466
468
DBMS 506
444
122
476
478
480

FIG. 4B

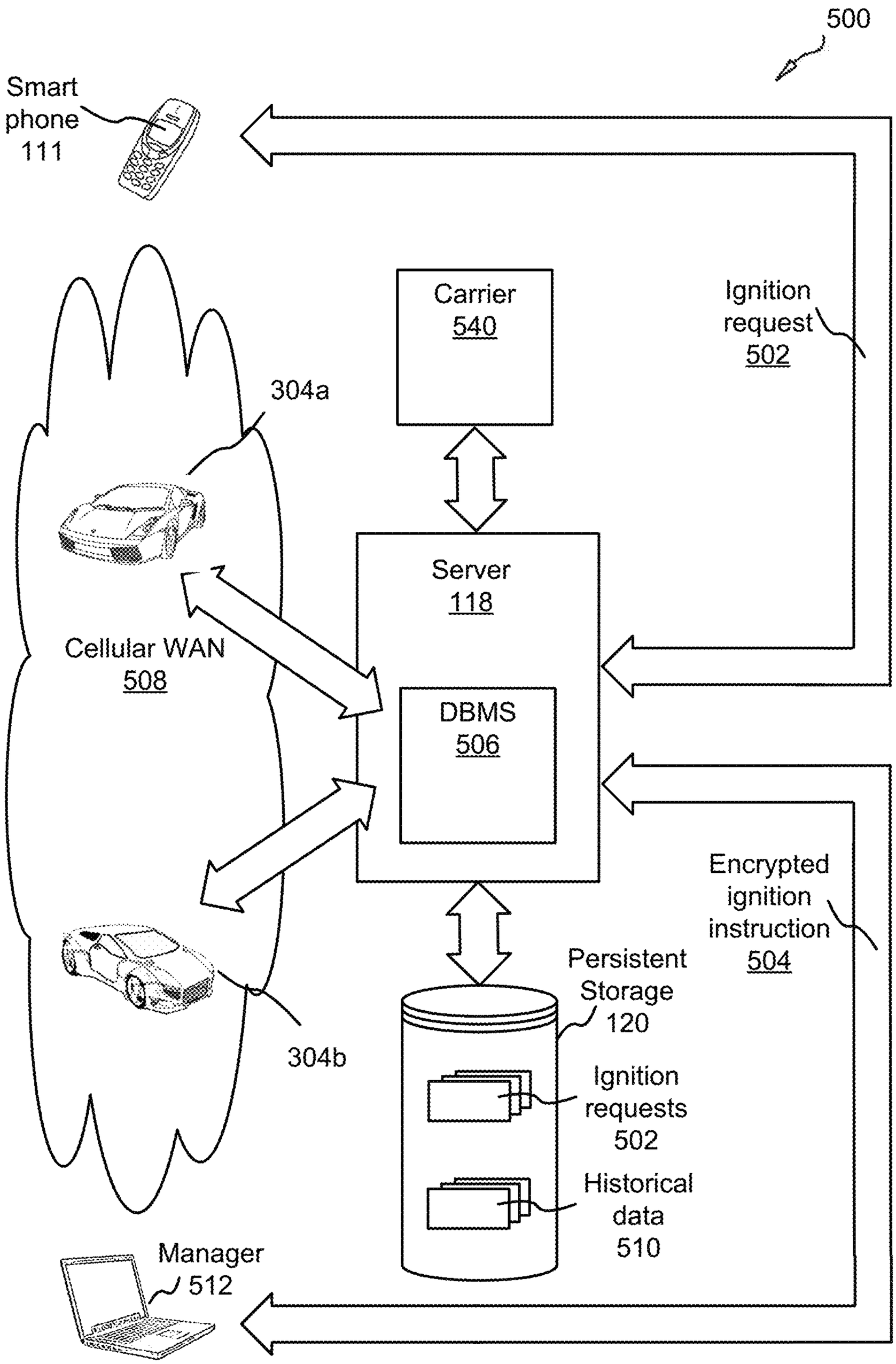

500
Smart phone 111
Carrier 540
Ignition request 502
304a
Server 118
Cellular WAN 508
DBMS 506
Encrypted ignition instruction 504
Persistent Storage 120
Ignition requests 502
Historical data 510
304b
Manager 512

FIG. 5

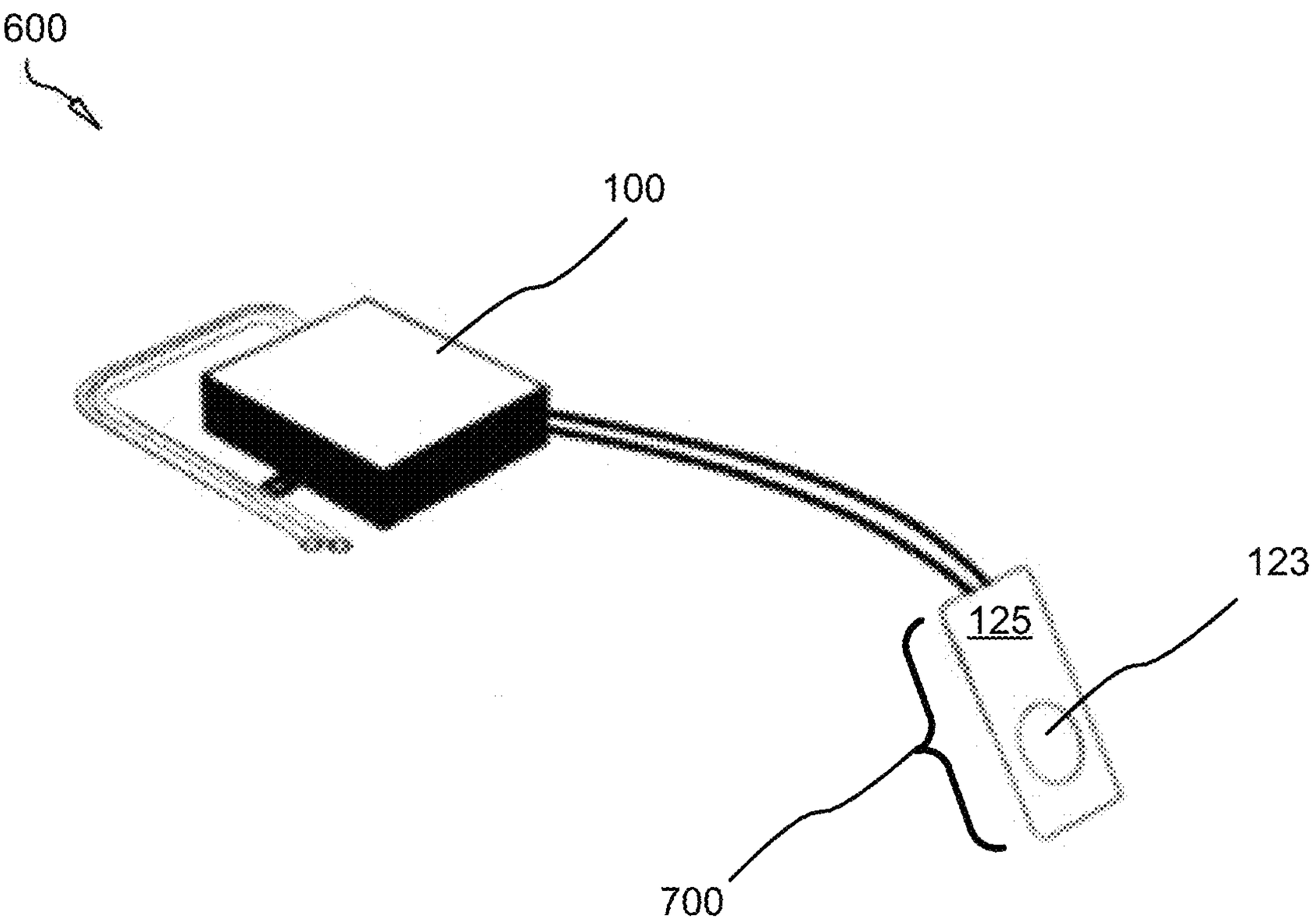


FIG. 6

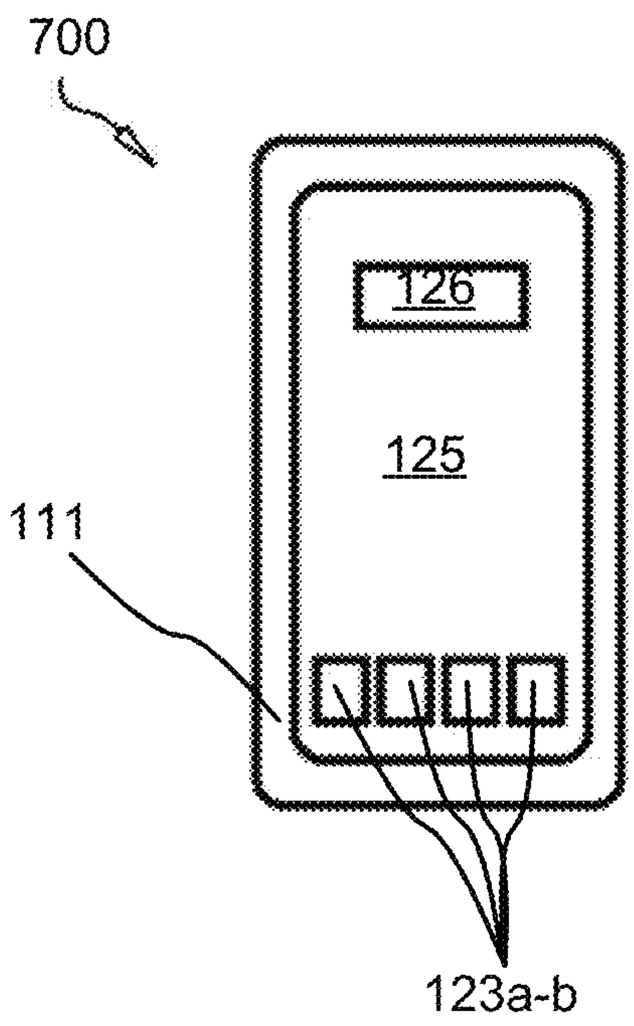


FIG. 7

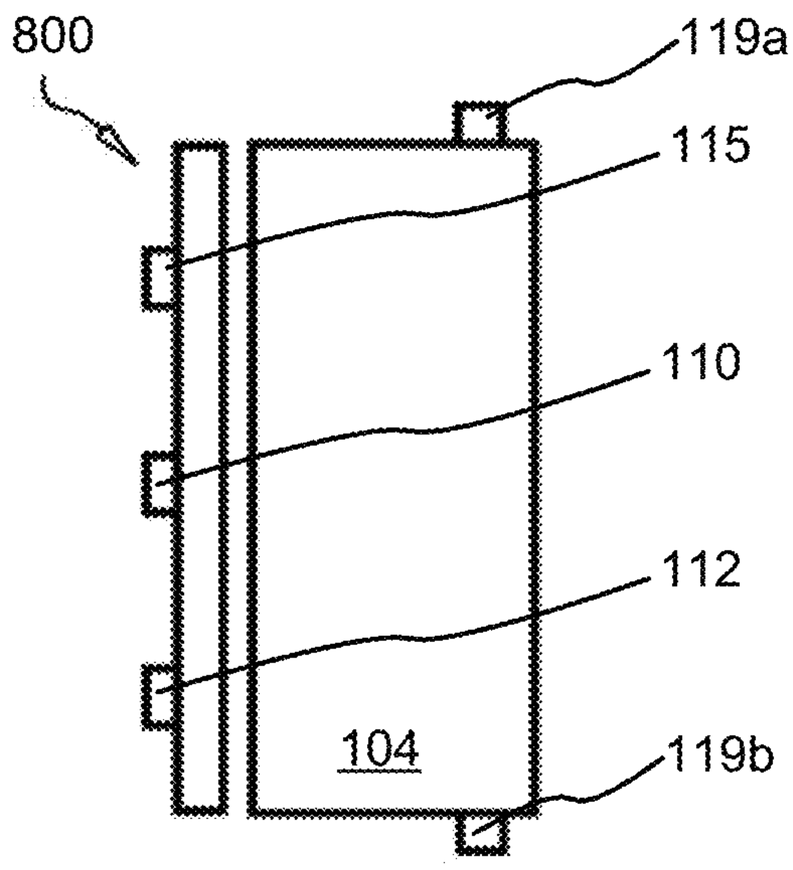


FIG. 8

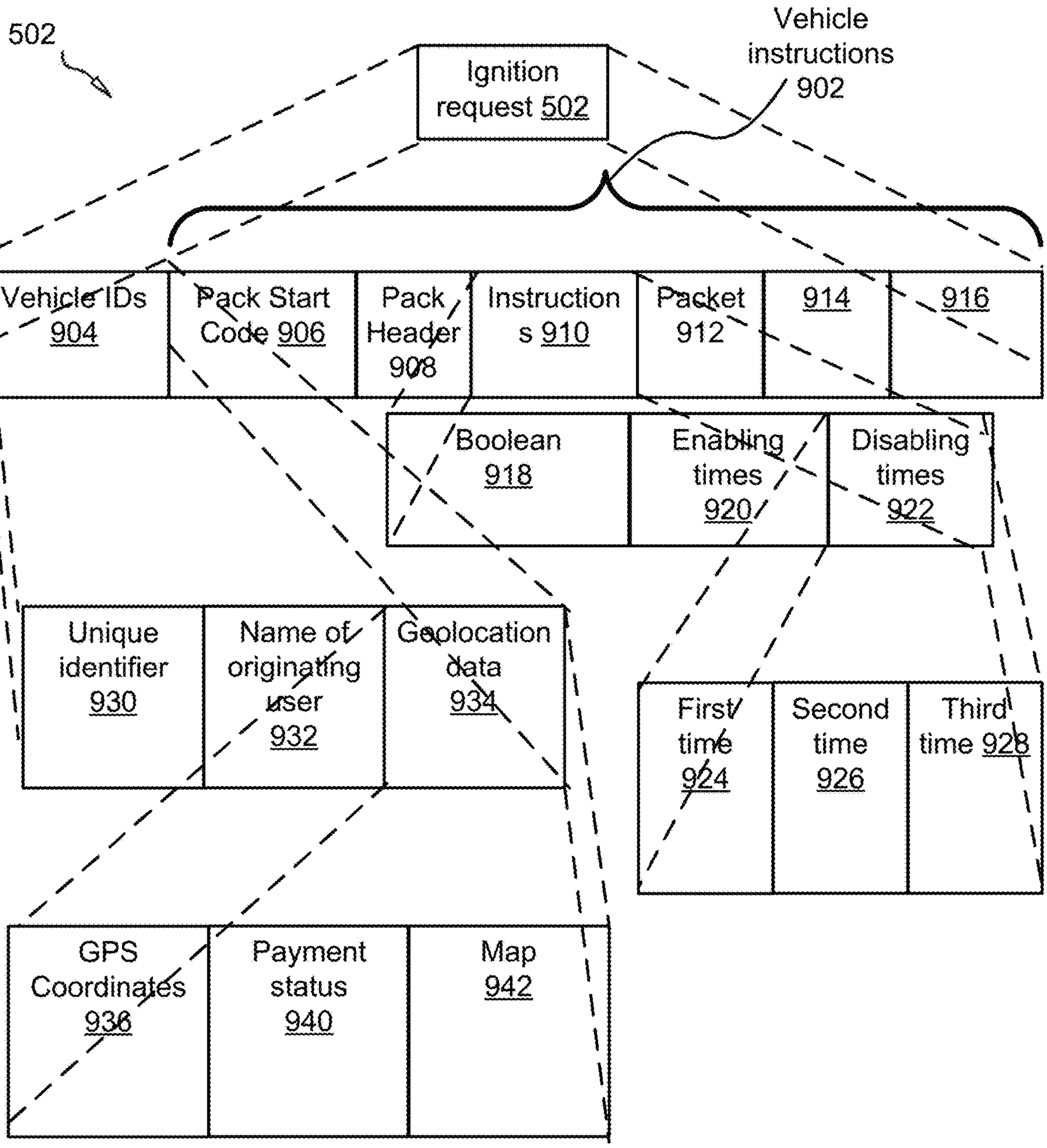

502
Ignition request 502
Vehicle instructions 902
Vehicle IDs 904
Pack Start Code 906
Pack Header 908
Instructions 910
Packet 912
914
916
Boolean 918
Enabling times 920
Disabling times 922
Unique identifier 930
Name of originating user 932
Geolocation data 934
First time 924
Second time 926
Third time 928
GPS Coordinates 936
Payment status 940
Map 942

FIG. 9

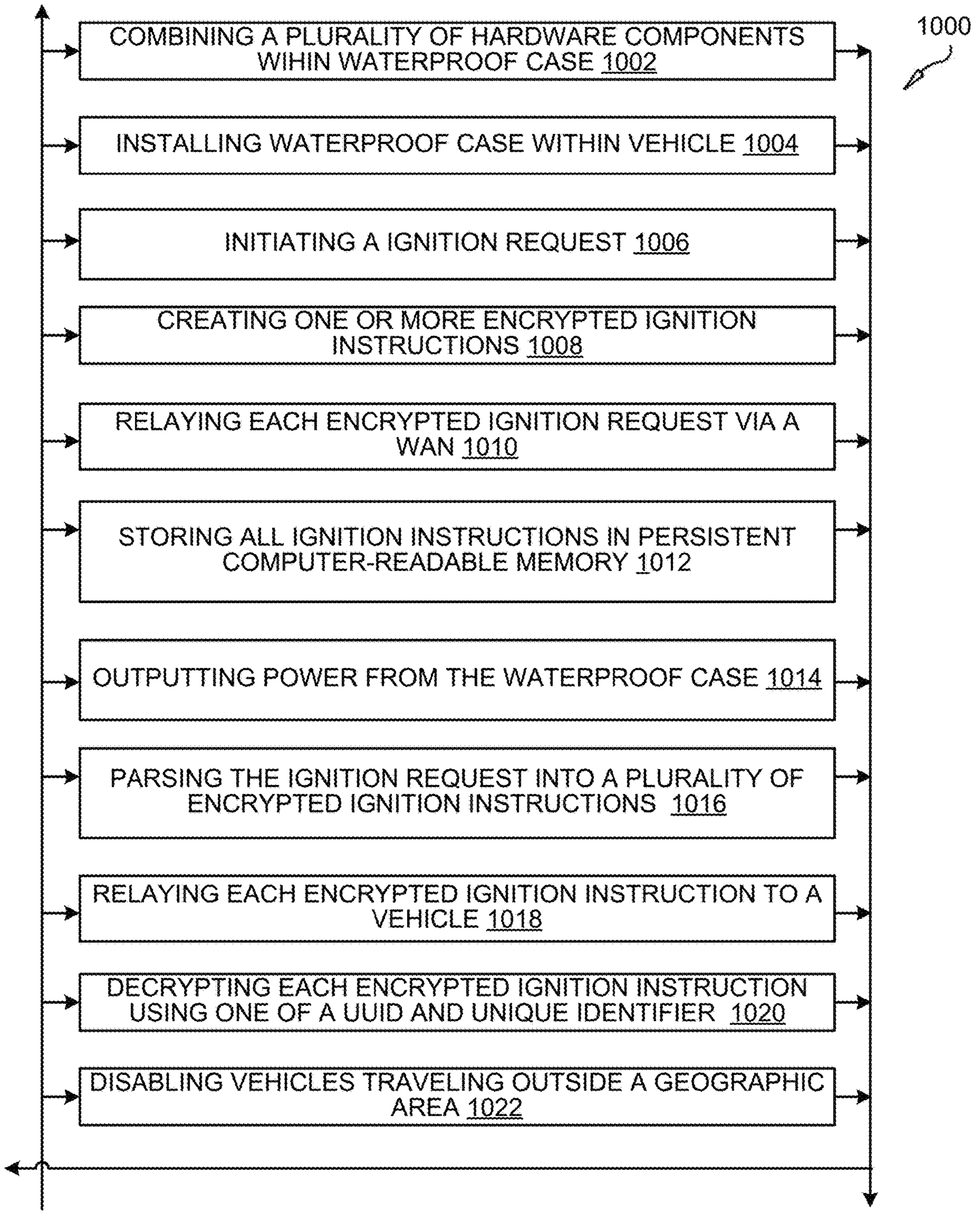

1000
COMBINING A PLURALITY OF HARDWARE COMPONENTS WIHIN WATERPROOF CASE 1002
INSTALLING WATERPROOF CASE WITHIN VEHICLE 1004
INITIATING A IGNITION REQUEST 1006
CREATING ONE OR MORE ENCRYPTED IGNITION INSTRUCTIONS 1008
RELAYING EACH ENCRYPTED IGNITION REQUEST VIA A WAN 1010
STORING ALL IGNITION INSTRUCTIONS IN PERSISTENT COMPUTER-READABLE MEMORY 1012
OUTPUTTING POWER FROM THE WATERPROOF CASE 1014
PARSING THE IGNITION REQUEST INTO A PLURALITY OF ENCRYPTED IGNITION INSTRUCTIONS 1016
RELAYING EACH ENCRYPTED IGNITION INSTRUCTION TO A VEHICLE 1018
DECRYPTING EACH ENCRYPTED IGNITION INSTRUCTION USING ONE OF A UUID AND UNIQUE IDENTIFIER 1020
DISABLING VEHICLES TRAVELING OUTSIDE A GEOGRAPHIC AREA 1022

FIG. 10

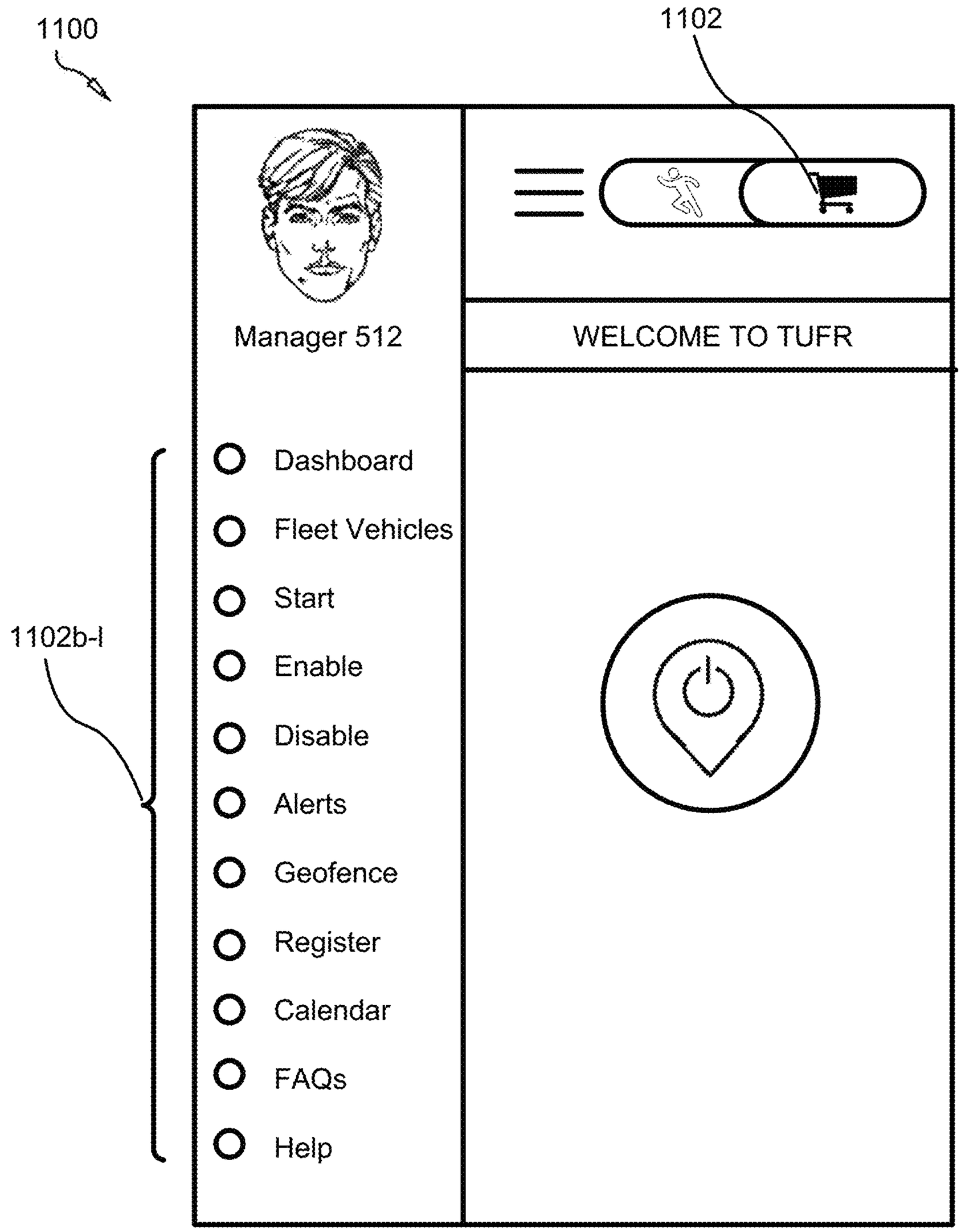

1100
1102
Manager 512
WELCOME TO TUFR
Dashboard
Fleet Vehicles
Start
Enable
Disable
Alerts
Geofence
Register
Calendar
FAQs
Help
1102b-l

FIG. 11

INTEGRATED VEHICULAR REMOTE STARTING INTERRUPTER

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to vehicular starting technologies and more particularly relates to a system and apparatus for interrupting and reenabling the starting of vehicles.

Description of the Related Art

Automobiles are typically powered by a lead battery or a lithium ion battery as known to those of skill in the art. Starting the engines in vehicles requires a starter which drains current from the battery, which starter is typically activated simply by turning a key. The battery is connected to the starter via the ignition switch inside the vehicle. The vehicle is disabled, or turned off, typically only by manually rotating a key, and there exists no efficient means in the art of disabling a vehicle remotely so that it cannot be started.

Rudimentary remotely-activated starters are known in the art, but these systems typically require a user keep in his possession a battery-powered key FOB with a range limited to a few dozen yards. These systems enable a vehicle to be started remotely from a limited range, but do not enable remote disabling of the starter. As increasingly numerous devices in users' lives interface with various radio-controlled devices, including garage doors, homes, cars, televisions, and even climate controls, the amount of radio controls which a user must maintain and keep in the user's possession compounds. It would be desirable in the art to have a means of starting and disabling a vehicle remotely from a distance not limited by the range of a typical radio-control such as a key FOB. It would desirable to have means in the art of disabling the starting of a plurality of vehicles remotely, such as a fleets of automobiles, boats, tractors, boats, motorhomes, motorcycles, electric bicycles, off-highway, vehicles, four-wheelers, tractors and equipment.

It is an object of the present invention is to provide a device which interfaces with specifically-engineered hardware components remotely to disable the starting of a plurality of vehicles from a single data-processing device, or to enable use and starting of the vehicle.

SUMMARY OF THE INVENTION

From the foregoing discussion, it should be apparent that a need exists for an integrated vehicular interrupter. Beneficially, such a system would overcome many of the difficulties of the prior art by providing a method of remotely enabling or disabling a vehicle to be started, the steps of the method comprising: combining a plurality of hardware components into a waterproof case, the plurality of hardware components including a battery, a switch, a PCB, a wireless module having a universally unique identifier (UUID), service wires, and a GPS module; installing the waterproof case within the vehicle within the electrical circuit providing power to operate said vehicle; initiating an ignition request using a mobile software application on a data processing device (DPD) in logical communication with the hardware components via a WAN, or BLE connection, the ignition request comprising: a unique identifier exclusively associated with the vehicle, one or more enabling timestamps and one or disabling timestamps, and the name of a user originating the ignition request; creating one or more encrypted ignition instructions consisting of less than all of the information contained in a corresponding ignition request; relaying each encrypted ignition instruction to a vehicle exclusively-associated with a single encrypted ignition instruction; storing all ignition requests and encrypted ignition instructions in persistent computer-readable memory; and outputting power from the waterproof case to a vehicle in response to one or more of the hardware components decrypting and an encrypted ignition instruction, said output power enabling the vehicle to be started and used.

The hardware components may further comprise a breaker. The waterproof case may be installed in one of an ignition system wiring and ignitions relays or starter solenoid, or electric motor wiring for electric vehicles. The ignition request may further comprise a map within use of the vehicle is authorized, and GPS coordinates of one of the user and the vehicle. The switch may be installed at any installation point where a completed circuit enables operation of the vehicle.

The vehicle control module may be configured to disable the vehicle by cutting power emanating from the waterproof case in response to one or more of: the vehicle traveling outside the boundaries of the map and expiration of a disabling timestamp.

In some embodiments, the ignition request further comprises a Boolean expressing as true to indicate power should be supplied by the switch to the starter of the vehicle. The ignition request may further comprises a plurality of packets, each packet exclusively associated with unique identifier, each unique identifier exclusively associated with a separate vehicle.

The steps of the method may further comprise: parsing, by means of a mobile software application on the server, the ignition request into a plurality of encrypted ignition instructions, each encrypted ignition instruction exclusively-associated with a separate vehicle; and relaying via the WAN each encrypted ignition instruction to a single vehicle exclusively associated with the encrypted ignition instruction.

The encrypted ignition instruction may be decrypted using a key comprising one or more of the UUID and the unique identifier exclusively-associated with the vehicle.

The method may further comprise two or more PCB boards and the steps of the method may further comprise connecting service cables directly to the starter.

The battery may comprise one or more lithium-ion cells.

These features and advantages of the present invention will become more fully apparent from the following description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the advantages of the invention will be readily understood, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments that are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings, in which:

FIG. **1** is an exploded isometric view of an apparatus and system of remotely disabling and reenabling the starting of a vehicle in accordance with the present invention; and

FIG. **2** is an isometric view of an apparatus and system of remotely disabling and reenabling the starting of a vehicle in accordance with the present invention;

FIG. **3** is an environmental view of an apparatus and system of remotely disabling and reenabling the starting of a vehicle in accordance with the present invention;

FIG. **4**A is a block diagram illustrating one embodiment of a system for remotely disabling and reenabling the starting of a vehicle in accordance with the present invention;

FIG. **4**B is a block diagram illustrating one embodiment of a system for remotely disabling and reenabling the starting of a vehicle in accordance with the present invention;

FIG. **5** is a data entity flow diagram illustrating one embodiment of a system for remotely disabling and reenabling the starting of a vehicle in accordance with the present invention;

FIG. **6** is an isometric view of an apparatus and system of remotely disabling and reenabling the starting of a vehicle in accordance with the present invention;

FIG. **7** is a graphical user interface of a mobile application of a system and method of remotely disabling and reenabling the starting of a vehicle on a smart phone in accordance with the present invention;

FIG. **8** depicts a vehicle control module of a system and method of remotely disabling and reenabling the starting of a vehicle in accordance with embodiments of the present invention; and

FIG. **9** illustrates a data layout diagram of an ignition request of a system and method of remotely disabling and reenabling the starting of a vehicle in accordance with embodiments of the present invention;

FIG. **10** illustrates the steps of a method **1000** of remotely disabling and reenabling the starting of a vehicle in accordance with embodiments of the present invention; and

FIG. **11** illustrates an exemplary graphic user interface of a mobile phone application for remotely disabling and reenabling the starting and use of a vehicle in accordance with embodiments of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Reference throughout this specification to "one embodiment," "an embodiment," or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, appearances of the phrases "in one embodiment," "in an embodiment," and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

Furthermore, the described features, structures, or characteristics of the invention may be combined in any suitable manner in one or more embodiments. In the following description, numerous specific details are provided to provide a thorough understanding of embodiments of the invention. One skilled in the relevant art will recognize, however, that the invention may be practiced without one or more of the specific details, or with other methods, components, materials, and so forth. In other instances, well-known structures, materials, or operations are not shown or described in detail to avoid obscuring aspects of the invention.

FIG. **1** is an exploded isometric view of an apparatus and system of remotely disabling and reenabling the starting of a vehicle **100** in accordance with the present invention.

The apparatus **100** comprises a housing **104** which may receive a power supply such as a lithium-based battery **142**. The battery **142** may comprise a plurality of cells connected in series, or in parallel, within the housing **102**, such that battery may power the device/apparatus **100** when the vehicle **304** is switched off. The housing **104** may be ovoid, cubic, rectangular, or square. In some embodiments, the housing **104** affixes within a steering column of the vehicle **304** and may be adapted to affix over the keyhole of the vehicle **304**.

In various embodiments, the housing **104** comprises an open forward end **146** through which the cells **142** are inserted into the housing **104**. A forward plate **140** may dispose over the open forward end **146**. The forward plate **142** may slide into a track defined on, or by, the open forward end **146**.

The faceplate **146** positions over the forward plate **140**.

The apparatus **100** may also comprise one or more PCB boards **108** adapted to impart remote control over the switch **108** from a remote data-processing device (DPD) such as a smart phone in logical connectivity with the apparatus **100** via cellular network or WAN.

In accordance with embodiments of the invention, a system of remotely tracking and controlling vehicles **100** is provided. The system **100** includes a vehicle control module **102** operable to control an ignition system of a vehicle **101**. The vehicle control module **102** includes a waterproof case **104**, such as an injection molded case, operable to protect internal components of the vehicle control module **102**. A printed circuit board **106** is contained within the vehicle control module **102**. A microprocessor **108** is disposed on the printed circuit board **106**.

A wireless module **110**, such as a Bluetooth® module, may be disposed on the printed circuit board **106**.

The apparati **100-300** may comprise means for relaying and receiving electrical signals enabling device-to-device communication between the DPD **111** and the module **102**. The module **102** may be configured to make use of the Bluetooth® protocols and procedures enabling device-to-device intercommunication connectivity in lieu of making use of a WAN. This functionality may be provided by incorporating the Bluetooth Intercom Profile® and/or the Bluetooth Telephony Profile®, or other wireless technologies known to those of skill in the art.

This communication may be in accordance with core specifications of one or more subsets of Bluetooth® profiles, wherein the core specifications comprise one or more of: the Cordless Telephony Profile (CTP), the Device ID Profile (DIP), the Dial-up Networking Profile (DUN), the File Transfer Profile (FTP), the Hands-Free Profile (HFP), the Human Interface Device Profile (HID), the Headset Profile (HSP), and the Intercom Profile (ICP), the Proximity Profile (PXP).

The secondary cables **144***a-b* (or service cables) are adapted to be semi-permanently affixed to the internal battery **142** within the housing **104**. In a default position, the switch **148** is spring-biased to return to a default position in which current to the power systems of the automobile **304** is disabled. The switch **148** may comprise a four-way switch or logic within the PCB enabling only virtual activation of the switch. When the switch is activated to an "on" position, operation and starting of the vehicle using standard means, such as a key are possible.

The apparatus **100** may be positioned in, spliced in, inserted into, or otherwise incorporated into the ignition system wiring, the ignition relays, and the starter solenoid, and/or starter motor or electric motor of an electric vehicle.

FIG. **2** is an isometric view of an apparatus and system of remotely disabling and reenabling the starting of a vehicle **200** in accordance with the present invention.

The apparatus **100** may comprise a faceplate **156**, which may have a plurality of controls, including a USB port for enabling direct interface with the apparatus **100**, **200**. The faceplate **146** may comprise a plurality of ports **202** for directing power to devices external to the apparatus **200**, including, in some embodiments, USB ports as shown.

FIG. **3** is an environmental view of an apparatus and system of remotely disabling and reenabling the starting of a vehicle in accordance with the present invention.

In various embodiments, the apparatus **100** positions at any installation point in the engine compartment, dashboard, steering column, or elsewhere where the device **100** may be spliced into a circuit whose completion enables operation of the power train of the vehicle **304**.

FIGS. **4**A-**4**B illustrate block diagrams illustrating embodiments of a system for controlling and tracking vehicles in accordance with the present invention.

The system **450** includes a centralized data processing server **118**. A cloud database **120** is hosted on the centralized data processing server. The cloud database **120** hosted on the centralized data processing server **118** may include username, passwords, user contact information, vehicle identification number, and can be used to remote look up vehicle location via GPS or provide service to user reported problems. The system **100** includes a mobile software application **122** operable to communicate with the centralized data processing server **118**.

The mobile software application **122** is operable to unlock upon verification an identity of a user through password or biometrics, such as fingerprints or facial recognition, for example. The mobile software application **122** is operable to wirelessly control the vehicle control module **102** to control an ignition system of a vehicle via a wireless connection between the wireless module **110** and a wireless module of mobile computing device.

The wireless module **110** is operable to communicate wirelessly with a mobile computing device, such as a smart phone **111**. The wireless module **110** may include a universally unique identifier (UUID).

A GPS module **112** may be disposed on the printed circuit board **106**. A SIM card **114** is disposed on the printed circuit board **106**. A cellular module **115** may be disposed on the printed circuit board **106**. The cellular module **115** and the SIM card **114** are operable to communicate a signal of the location of the GPS module **112** through a wireless telephone carrier network. A wiring harness **116** is operable to connect the printed circuit board **106** to a vehicle ignition system. For example, the wiring harness **116** includes CAN bus communication protocol, with wiring, plugs, and adapters to connect directly and communicate directly to vehicle ECU. An automatic breaker **117**, such as a 20-amp breaker or higher, may be included in the vehicle control module **102**.

The system **450** comprises a user incorporation module **456**.

The user and manager **512** may comprise any person, company, or organization that is an owner or controller of a plurality of vehicles, tractors, boats or other machines, including electric vehicles and machines, including electrical bicycles, scooters, aircraft. Each user and/or manager **512** are incorporated into a management network comprising vehicles and users who have registered with the server **118**. For the purposes of this patent, the terms "incorporate" and "incorporation" denote the act of formally enrolling a vehicle **304** and a user or manager **512** into the management network.

Managers **512** become incorporated when they create accounts with the server **118** by uploading personal identifying information, including one or more of: an address, a VIN of a vehicle, an email address, a telephone number, definition of purchasing practices, and the like. In typical embodiments, the registration takes place via a browser, but may also be sent to the server **118** using programs well-known to those of skill in the art, such as Microsoft Outlook, Thunderbird, Yahoo! Mail, and the like. In other embodiments, the users and/or managers **512** are incorporated by receiving personal information via an API from a social media provider such as Google®, Facebook®, Twitter®, Instagram®, Snapchat®, or other social media providers known to those of skill in the art.

The user incorporation module **456** is configured to incorporate the user or manager **512**, who then incorporates the vehicle **304** using the vehicle incorporator module **458** which is configured to create unique identifiers in memory **120** exclusively associated with the vehicle **304**, which identifiers may be encrypted.

In various embodiments, the module **102** includes GPS components to facilitate tracking of the vehicle **304**. The device **100** may comprise motion sensors for detecting motion of the vehicle **304** and then relaying alerts to the server **118** or DPD **111**. These motion sensors may be adapted to detect crashes, airbag deployments, and the like.

The system **450** includes a transmitter **452** for transmitting a wireless signal as well as receiver or transceiver **454** for receiving a wireless signal. In various other embodiments, the module **450** may comprise a geofencing module **460** adapted to disable the vehicle **304** in response to the vehicle traveling outside a predetermined geographic area or map, an alert module **462** adapted to send alerts to the technology provider and server **118** via the WAN or Bluetooth when a motion detector is triggered, a clock **464** for maintaining track of predetermined periods of time and cross referencing timestamps, an alarm module **466** for emitting a high frequency pitched sound in response to receiving an SOS alter from the DPD **111** or server **118**, an appointment module **468** for receiving the locations service providers and scheduling appointments, and a decrypter module **444** for decrypting instructions **504** received from the user using various protocols such as BLE standard, manager **512** or server **118**.

The mobile phone application **122** may be coded in C#, .NET or .NET 7, and may make use of SQL, mySQL, Oracle or other databases and RDBMSs **506**. The mobile phone application include biometric recognition functions on the DPD **111** using means known to those of skill in the art, including fingerprint, facial recognition, retina scan, and the like.

FIG. **5** is a data entity flow diagram illustrating one embodiment of a system **500** for controlling and tracking vehicles in accordance with the present invention. Other leveraged programs and coding schemes may include Apple Xcode 14, JAVA, HTML and CSS.

In various embodiments, a user controlling a smart phone **111** initiates an ignition request **502** through a mobile software application **122** comprising a set of computer-readable instructions stored in persistent computer-readable memory on the phone **111**.

This ignition request **502** may be encrypted using means known to those of skill in the art, and may comprise a computer-readable file stores in database memory which is

uploaded via a WAN **508** such as a cellular network having a service area in which the phone **111** may be found.

The system **500** comprises a server **118**, a database management system (DBMS) **506**, persistent storage **120**, stored ignition requests **502**, and stored historical data **510**.

Typically, the server **118** comprises one or more central processing units executing software and/or firmware to control and manage the other components within the system **500**. In one embodiment, the server **118** comprises hardware and/or software more commonly referred to as a Multiple Virtual Storage (MVS), OS/390, zSeries/Operating System (z/OS), UNIX, Linux, or Windows system.

The server may comprise a server cluster with firewalls, load balancer, and database servers having Apache® and/or other software applications well-known to those of skill in the art. The server **118**, in the shown embodiment, comprises a database management system (DBMS) **506** or relational database management system (RDBMS), such as Oracle, MySQL, SQL, FireBird, IBM DB2®, or the like.

The server **118** is in logical communication with one or more phone **111** and/or one or more managers **512** through a networked environment **508**, such as local area network (LAN) or wide area network (WAN). The server **118** may communicate with phones **111** and/or managers **512**, sending queues, ignition requests **502**, and encrypted ignition instructions **504** using variations of the Simple Mail Transfer Protocol (SMTP), Internet Message Access Protocol (IMAP), BlueTooth, Post Office Protocol (POP), or other protocols well-known to those of skill in the art.

The manager **512** may comprise a smartphone or any DPD which, internally or externally, can communicate with the server **118**.

In the present invention, the server **118** routes information between phones **111** and the manager **512**.

In the present invention, as further described in detail above and below, users create ignition requests **502** on their phones **111** which are then relayed to the server **118**. In alternative embodiments, the ignition requests **502** are created by the managers **512**.

As shown, in various embodiments, a plurality of vehicles **304***a-b*, having vehicle control modules **102**, are in logical communication with server **118**.

These ignition requests **502** may comprise information about the vehicle **304** to be activated, including a Boolean indicating as true when a specified vehicle **304** is intended to enabled (or started) or disabled, a unique identifier exclusively associated with either the vehicle **304** or the vehicle control module **102** installed on the vehicle **304**, a first timestamp indicating a time when the vehicle **304** will be activated and a second timestamp indicated when the vehicle **304** will be disabled. The various embodiments, the ignition request **502** comprises a plurality of unique identifiers exclusively associated with different vehicles **304***a-b* within a fleet or under the common control of a manager **512**.

The ignition request **502** may be parsed into a plurality of encrypted ignition instructions **504**, each ignition instruction relayed via the WAN **508** to a single vehicle **304**. The vehicles' **304** vehicle control modules **102** may be adapted to start a vehicle **304** at a time indicated by the first timestamp and disable the vehicle at a time indicated by the second timestamp.

In some embodiments, the server **118** collects payment from a user before relaying an encrypted ignition instruction **504** to a vehicle **304** in accordance with a predetermined payment schedule mutually agreed upon by the user or a manager **512** and one or more of: an organization managing the server **118** and mobile software application **122**.

In various embodiments, the WAN **508** is administered and under the control of a carrier **540**.

The encrypted ignition instruction **504** may contain all of the information in the ignition request **502** which is exclusively associated with a single vehicle **304**.

FIG. **6** is an isometric view of an apparatus and system of remotely tracking and controlling vehicles in accordance with the present invention.

In various embodiments, the apparatus/system **100** is in logical communication with a graphical user interface **700**.

FIG. **7** is a graphical user interface of a mobile application of a system and method of remotely tracking and controlling vehicles on a smart phone in accordance with the present invention.

The mobile software application **122** is operable to display the location of the GPS module **112** that has been communicated from the vehicle control module **102**. If a vehicle equipped with the vehicle control module **102** is outside of the range of a short field wireless connection between a mobile computing device and the wireless module **110**, the mobile software application **122** is operable to control the vehicle control module **102** through the cellular module **115**. The mobile software application **122** may be operable for Apple iOS and Google Android systems, for example.

Various buttons **123** and informational displays can be programmed into a graphical user interface **125** of the mobile software application **122**, such as an unlock button **126** which can be triggered by facial recognition, pin code, or thumb print, a GPS location and map, login, and account setup. The mobile software application **122** may be operable for multiple users and multiple vehicles, such as a family that owns multiple cars or fleet rentals. A time out feature may be included to allow users to close the circuit for a period of time. For example, a user has the ability to start a vehicle open allowing the vehicle to turn on and off during this process. Once the time expires, the user will be required to once again authenticate through the application via facial recognition, thumb print, or pin ID to start the vehicle.

In an exemplary operation, once the vehicle control module **102** is wired into an ignition, a user will create an account using the mobile software application **122** and connect to the vehicle control module **102** via a Bluetooth connection and a specific unique ID code and/or through CAN bus communication protocol to allow only one account to be associated with the vehicle control module **102**. Once paired, the ignition key can be placed into an on position. The user will then login into the mobile software application **122** and select vehicle. Once the vehicle is selected the user, can hit the unlock button to unlock mobile software application **122**. An unlock sequence will begin with facial recognition, thumbprint scan, or a pin code. Once unlocked, the mobile software application **122** will send communication through a Bluetooth connection to the wireless module **110** and the microprocessor **108** will send communication to allow the ignition circuit to be used, thereby starting the vehicle.

FIG. **8** depicts a vehicle control module of a system and method of remotely tracking and controlling vehicles in accordance with embodiments of the present invention.

A pigtail connection **119** may be used to wire the vehicle control module **102** into a vehicle. The pigtail connection **119** includes 4 wires—hot, ground, ignition in **404**, and ignition out **402**. In one embodiment, the vehicle control module **102** includes functionality operable to serve as a key

fob, which is frequently required to be detected by a vehicle as a condition to start the ignition.

FIG. **9** illustrates a data layout diagram of an ignition request **502** of a system and method of remotely tracking and controlling vehicles in accordance with embodiments of the present invention.

The ignition request **502** comprises one or more packets **904** of vehicle identifying information. This packet **904** may comprise a unique identifier **930** exclusively associated with a vehicle, the name of a user **932** controlling a DPD **111**, and geolocation data **934** of the phone **111** and/or the vehicle **304**, including GPS coordinates **932**, and a map **942** defining a predetermined geographic area within which use of the vehicle **304** is authorized. Should the vehicle **304** exit the geographic area defined by the map **942**, the module **102** is adapted to automatically disable the vehicle **304**. In this manner, the vehicle **304** is geofenced within a predetermined geographic area. The ignition request **502** may comprise a plurality of packets **904** which are parsed by the server **118** into smaller encrypted instructions **504** relayed to individual vehicles **304**.

The ignition request **502** may comprise packet headers **908** and packet codes **914**, **916**, including HTML instructions. Each ignition request **502** comprises instructions **910**, which is a packet or list of information containing instructions about when to activate, start or disable a vehicle **304**, including a Boolean expressing as true or false indicating a start command for the vehicle and one or enabling times **920** indicated times of day (or a date and time) when the vehicle **304** may be started as well as one or more disabling times indicated a time of day **924**, **926**, **928** (or a date and time) when the vehicle **304** should be disabled. In various embodiments, a timeframe may be relayed to the vehicle **304** specifying a predetermined period of time within which the starter of the vehicle **304** should be disabled, such as 48 hours, ten days, and the like. All ignition requests **502** are stored as historical data in persistent storage **120** by the server **118**.

FIG. **10** illustrates the steps of a method **1000** of remotely tracking and controlling vehicles in accordance with embodiments of the present invention.

The method **100** comprises a step of combining **1002** a plurality of hardware components into a waterproof case, the plurality of hardware components including a battery, a switch, a PCB, a wireless module having a universally unique identifier (UUID), service wires, and a GPS module.

The waterproof case **102** is installed **1004** within the vehicle within the electrical circuit providing power to operate said vehicle. A DPD **111**, operated by a user, initiates **1006** an ignition request **502** using a mobile software application on a data processing device (DPD) **111** in logical communication with the hardware components via a WAN, the ignition request **502** comprising: a unique identifier exclusively associated with the vehicle **304**, one or more enabling timestamps **902** and one or disabling timestamps **922**, and the name of a user originating the ignition request **502**.

The server **118** creates **1008** one or more encrypted ignition instructions consisting of less than all of the information contained in a corresponding ignition request.

An encrypted ignition instruction **504** is relayed **1010** to a vehicle **304** exclusively-associated with a single encrypted ignition instruction, and all ignition requests and encrypted ignition instructions are stored **1012** in persistent computer-readable memory.

Power is output **1014** from the waterproof case **102** to a vehicle starter in response to one or more of the hardware components decrypting and an encrypted ignition instruction, said output power starting the vehicle.

In various embodiments, the request **502** is parsed **1016** into the instruction **504** which is relayed **1018** to the vehicle **304**. The vehicle **304** may decrypt **1020** the instruction **504**, and the vehicle **304** may disable itself in response to expiration of a timestamp **922** or the vehicle traveling outside a predetermined geographic area.

FIG. **11** illustrates an exemplary graphic user interface **1100** of a mobile phone application **122** for remotely disabling and reenabling the starting of a vehicle **304** in accordance with embodiments of the present invention.

Various tactile controls **1102**, or virtual controls **1102**, position on the face of the interface **1100**, each adapted to instruction the mobile phone application **122** to perform certain functions, including registering a vehicle using a registration module, seeing tables of vehicles **304** exclusively associated with a manager **512**, starting a vehicle **304**, disabling a vehicle **304**, viewing itemized lists of alerts received from a vehicle including motion alerts, setting a map within which a vehicle **304** should be geofenced, registering a vehicle **304**, and viewing a calendar of timeframes within which vehicles **304** may be active.

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed is:

1. A method of remotely enabling a vehicle to be started, the steps of the method comprising:

combining a plurality of hardware components into a waterproof case, the plurality of hardware components including a battery, a switch, a PCB, a wireless module having a universally unique identifier (UUID), service wires, and a GPS module;

installing the waterproof case within the vehicle within the electrical circuit providing power to operate said vehicle;

initiating an ignition request using a mobile software application on a data processing device (DPD) in logical communication with the hardware components via a WAN, the ignition request comprising: a unique identifier exclusively associated with the vehicle, one or more enabling timestamps and one or disabling timestamps, and the name of a user originating the ignition request;

creating one or more encrypted ignition instructions consisting of less than all of the information contained in a corresponding ignition request;

relaying each encrypted ignition instruction to a vehicle exclusively-associated with a single encrypted ignition instruction;

storing all ignition requests and encrypted ignition instructions in persistent computer-readable memory; and

outputting power from the waterproof case to a vehicle in response to one or more of the hardware components decrypting and an encrypted ignition instruction, said output power enabling the vehicle to be started and used;

wherein the vehicle control module is configured to disable the vehicle by cutting power emanating from the waterproof case in response to one or more of:

the vehicle traveling outside the boundaries of the map and expiration of a disabling timestamp.

2. The method of claim **1**, wherein the hardware components further comprise a breaker.

3. The method of claim **1**, wherein the waterproof case is installed in one of an ignition system wiring and ignitions relays.

4. The method of claim **1**, wherein the ignition request further comprises a map within use of the vehicle is authorized, and GPS coordinates of one of the user and the vehicle.

5. The method of claim **1**, wherein the ignition request further comprises a Boolean expressing as true to indicate power should be supplied by the switch to the starter of the vehicle.

6. The method of claim **1**, wherein the ignition request further comprises a plurality of packets, each packet exclusively associated with unique identifier, each unique identifier exclusively associated with a separate vehicle.

7. The method of claim **1**, further comprising:

parsing, by means of a mobile software application on the server, the ignition request into a plurality of encrypted ignition instructions, each encrypted ignition instruction exclusively-associated with a separate vehicle; and

relaying via the WAN each encrypted ignition instruction to a single vehicle exclusively associated with the encrypted ignition instruction.

8. The method of claim **1**, wherein the encrypted ignition instruction is decrypted using a key comprising one or more of the UUID and the unique identifier exclusively-associated with the vehicle.

9. The method of claim **1**, further comprising two or more PCB boards.

10. The method of claim **1**, further comprising service cables connected directly to the starter.

11. The method of claim **1**, wherein the battery comprises one or more lithium-ion cells.

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