



(19) **United States**

(12) **Patent Application Publication**
YAMADA et al.

(10) **Pub. No.: US 2019/0315297 A1**

(43) **Pub. Date: Oct. 17, 2019**

(54) **VEHICLE-MOUNTED TERMINAL DEVICE,
SERVER DEVICE, AND TERMINAL DEVICE**

B60R 25/20 (2006.01)
B60W 50/08 (2006.01)

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(52) **U.S. Cl.**
CPC *B60R 16/037* (2013.01); *B60W 50/08*
(2013.01); *B60R 25/2081* (2013.01); *B60R*
25/246 (2013.01)

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(57) **ABSTRACT**

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In a vehicle-mounted terminal device configured to be mounted on a vehicle and capable of communicating with a server device, a communication unit transmits identification information of a driver of the vehicle to the server device and receives personal setting information, indicating a setting state of a vehicle-mounted apparatus, transmitted from the server device and related to the identification information of the driver. A setting unit makes setting of a vehicle-mounted apparatus on the vehicle based on the personal setting information received at the communication unit. When the authentication of the driver is completed and when a power supply of the vehicle is turned on, the communication unit receives personal setting information for a vehicle-mounted apparatus, transmitted from the server device and related to the identification information of the driver.

(21) Appl. No.: **16/376,244**

(22) Filed: **Apr. 5, 2019**

(30) **Foreign Application Priority Data**

Apr. 11, 2018 (JP) 2018-076124

Publication Classification

(51) **Int. Cl.**
B60R 16/037 (2006.01)
B60R 25/24 (2006.01)

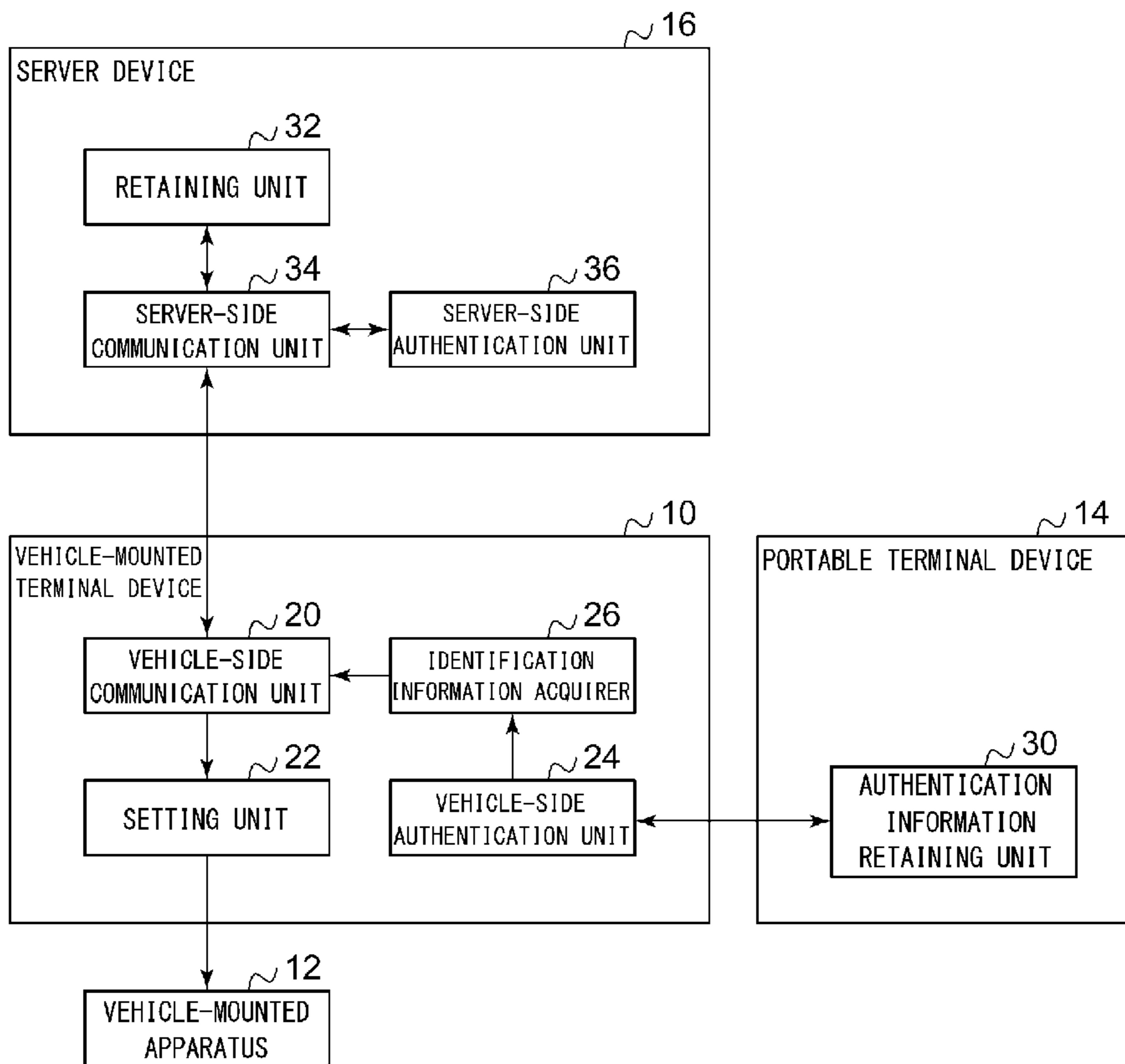


FIG. 1

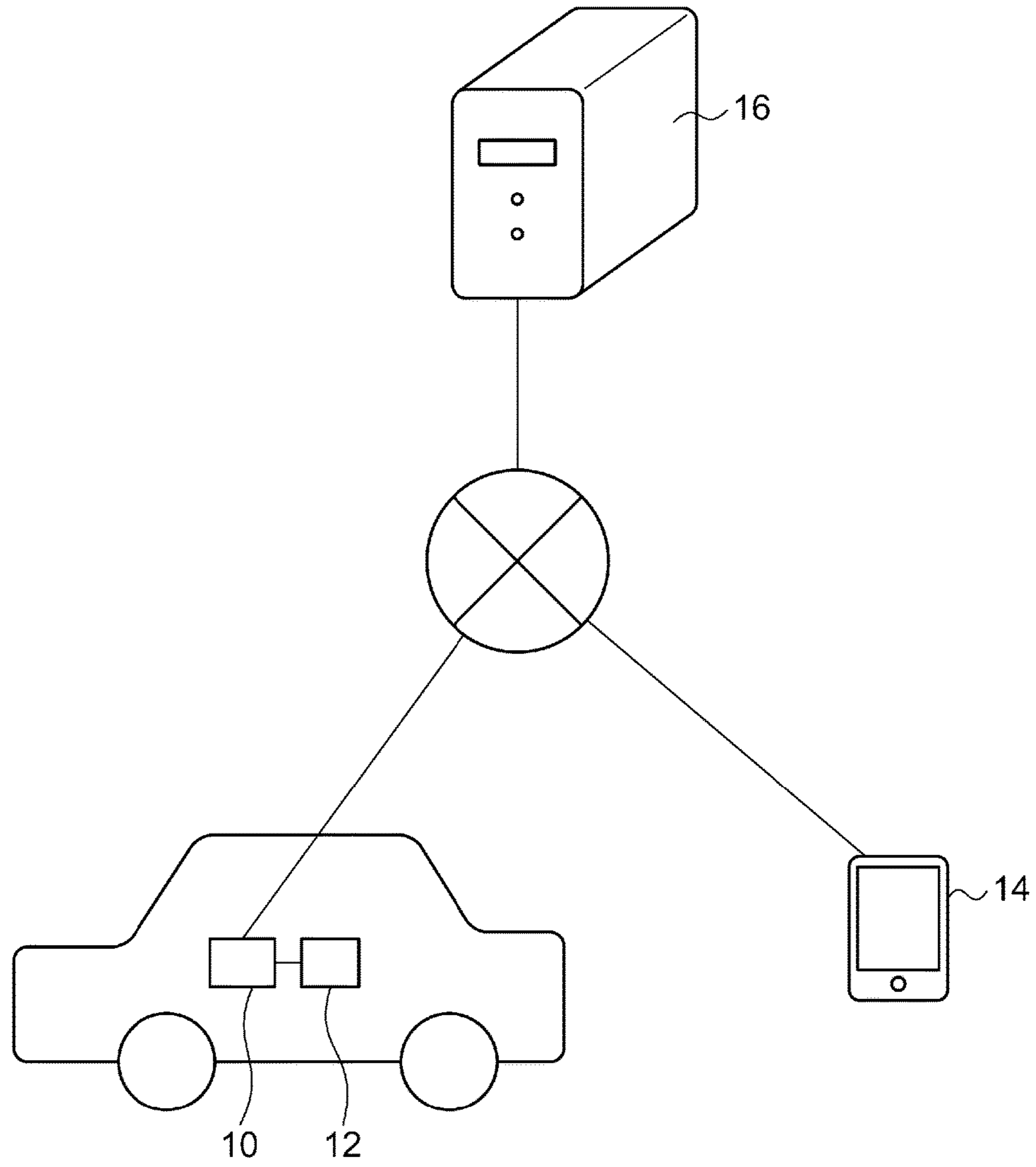


FIG. 2

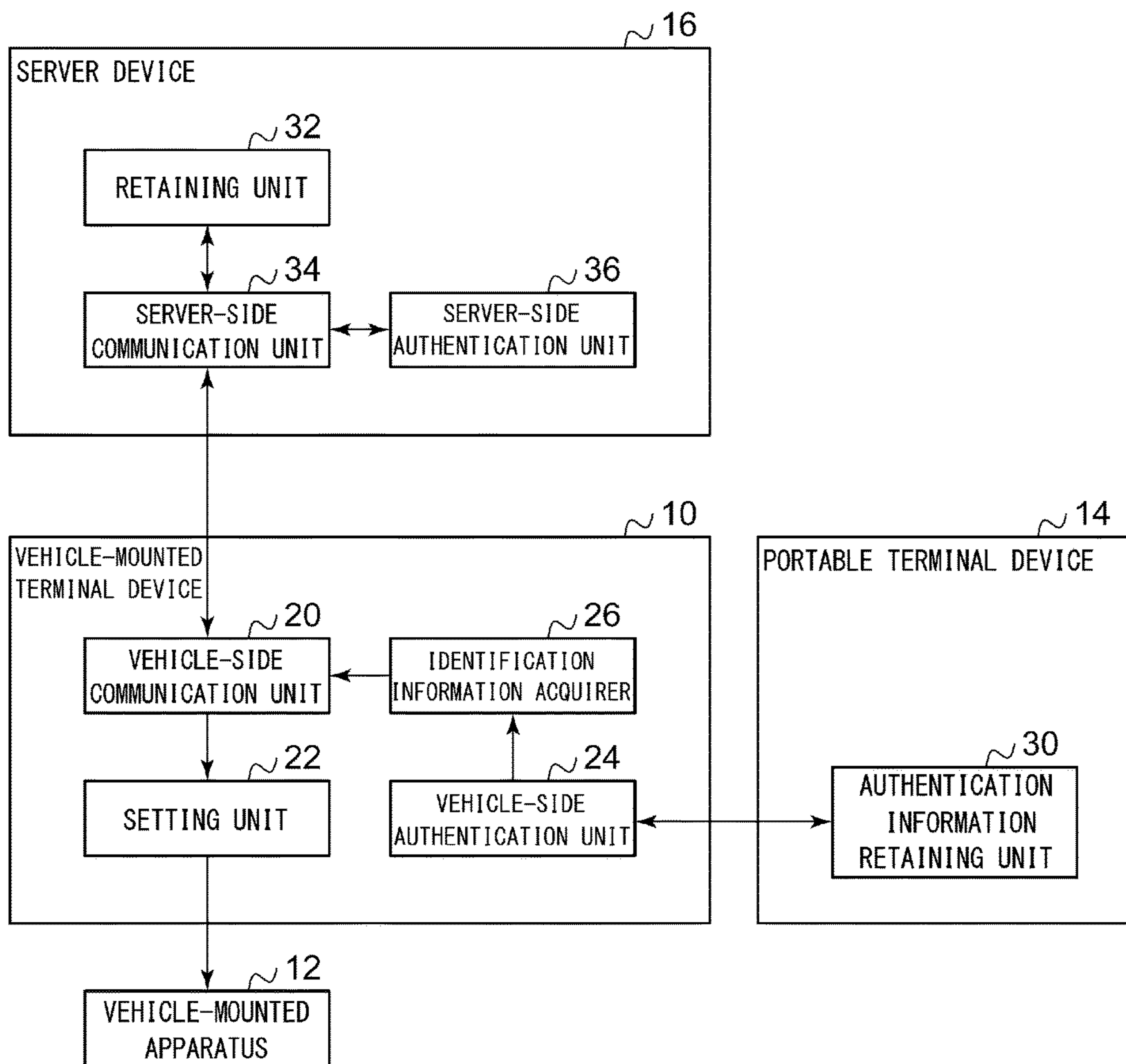
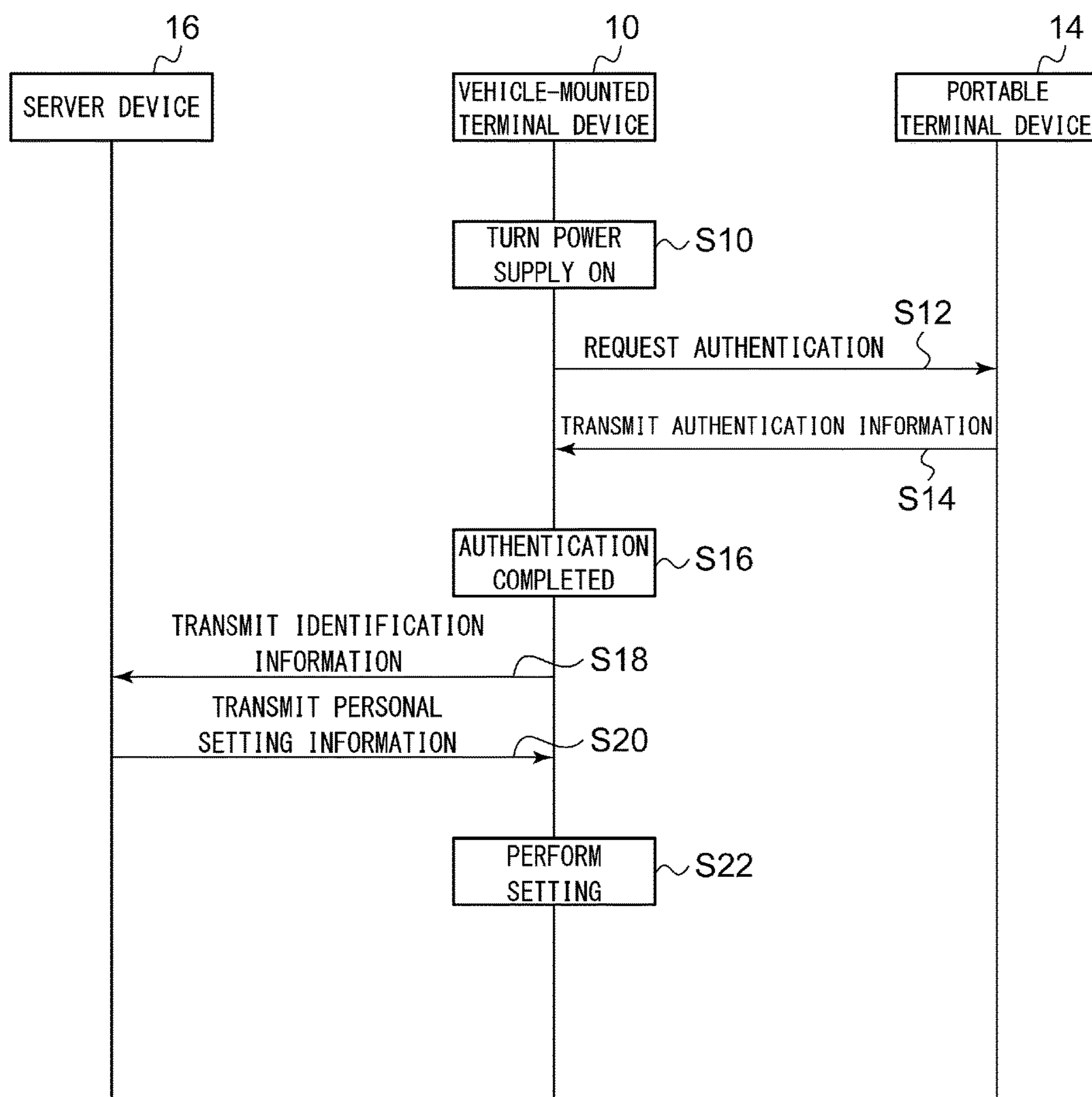


FIG. 3

DRIVER ID	VEHICLE TYPE INFORMATION	SEAT POSITION INFORMATION	STEERING POSITION INFORMATION	AIR CONDITIONING SETTING INFORMATION	NAVIGATION SETTING INFORMATION	AUDIO SETTING INFORMATION
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FIG. 4



VEHICLE-MOUNTED TERMINAL DEVICE, SERVER DEVICE, AND TERMINAL DEVICE

BACKGROUND

1. Technical Field

[0001] The present disclosure relates to a technology for enabling setting of vehicle-mounted apparatuses.

2. Description of Related Art

[0002] JP-A-2007-238058 discloses a vehicle-side control system that performs, only when the terminal ID information received from a remote controller coincides with collation ID information stored in the vehicle, processing for unlocking a vehicle door lock mechanism and processing for changing the setting state of vehicle facilities of the vehicle to a stored setting state related to the received personal information.

[0003] [Patent Document 1] Japanese Unexamined Patent Application Publication No. 2007-238058 (JP-A-2007-238058)

[0004] With the technology disclosed in JP-A-2007-238058, if the vehicle-side control system does not retain information indicating setting states of the vehicle facilities, the vehicle-side control system is unable to perform the processing for changing the setting state of the vehicle facilities of the vehicle to a setting state related to the personal information.

SUMMARY

[0005] A general purpose of the present disclosure is to provide a technology for enabling setting of vehicle-mounted apparatuses appropriate for the driver.

[0006] In response to the above issue, one aspect of the present disclosure relates to a vehicle-mounted terminal device configured to be mounted on a vehicle and capable of communicating with a server device. The vehicle-mounted terminal device includes: an identification information acquirer configured to acquire identification information of a driver of the vehicle; a communication unit configured to transmit the identification information of the driver of the vehicle to the server device and to receive personal setting information, indicating a setting state of a vehicle-mounted apparatus, transmitted from the server device and related to the identification information of the driver; and a setting unit configured to make setting of a vehicle-mounted apparatus on the vehicle based on the personal setting information received at the communication unit. When the authentication of the driver is completed and when a power supply of the vehicle is turned on, the communication unit receives personal setting information for a vehicle-mounted apparatus, transmitted from the server device and related to the identification information of the driver.

[0007] According to this aspect, when the authentication of the driver is completed and when a power supply of the vehicle is turned on, setting of a vehicle-mounted apparatus appropriate for the driver of the vehicle can be made based on the personal setting information.

[0008] When personal setting information for a vehicle-mounted apparatus cannot be received from the server device, the setting unit may make setting of the vehicle-mounted apparatus based on personal setting information

stored in a portable terminal device of the driver or in the vehicle-mounted terminal device.

[0009] When vehicle type information related to the personal setting information for a vehicle-mounted apparatus received at the communication unit is different from vehicle type information of the vehicle provided with the vehicle-mounted terminal device, the setting unit may adjust the personal setting information for the vehicle-mounted apparatus according to the vehicle type information of the vehicle provided with the vehicle-mounted terminal device and make setting of the vehicle-mounted apparatus based on the adjusted setting information for the vehicle-mounted apparatus.

[0010] Another aspect of the present disclosure relates to a server device capable of communicating with a vehicle-mounted terminal device. The server device includes: a communication unit configured to receive personal setting information indicating a setting state of a vehicle-mounted apparatus and to also receive identification information of a driver; and a retaining unit configured to retain personal setting information, indicating a setting state of a vehicle-mounted apparatus, related to the identification information of a driver. Upon reception of the identification information of a driver from the vehicle-mounted terminal device, the communication unit transmits personal setting information related to the identification information of the driver to the vehicle-mounted terminal device. According to this aspect, personal setting information for a vehicle-mounted apparatus appropriate for the driver can be provided to the vehicle-mounted terminal device.

[0011] Yet another aspect of the present disclosure relates to a terminal device. The terminal device includes: an identification information acquirer configured to acquire identification information of a driver of a vehicle; and a communication unit configured to transmit the identification information of the driver of the vehicle to a server device and to be able to receive personal setting information, indicating a setting state of a vehicle-mounted apparatus, transmitted from the server device and related to the identification information of the driver. When the authentication of the driver is completed and when a power supply of the vehicle is turned on, the communication unit receives personal setting information for a vehicle-mounted apparatus, transmitted from the server device and related to the identification information of the driver.

[0012] According to this aspect, when the authentication of the driver is completed and when a power supply of the vehicle is turned on, personal setting information for a vehicle-mounted apparatus related to the identification information of the driver can be received.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Embodiments will now be described, by way of example only, with reference to the accompanying drawings that are meant to be exemplary, not limiting, and wherein like elements are numbered alike in several figures, in which:

[0014] FIG. 1 is a diagram used to describe a personal setting control system of an embodiment;

[0015] FIG. 2 is a diagram used to describe a functional configuration of the personal setting control system;

[0016] FIG. 3 is a diagram used to describe personal setting information; and

[0017] FIG. 4 is a diagram used to describe a personal setting process for vehicle-mounted apparatuses.

DETAILED DESCRIPTION

[0018] An embodiment will now be described. The embodiment is illustrative and is not intended to be limiting.

[0019] FIG. 1 is a diagram used to describe a personal setting control system 1 of an embodiment. The personal setting control system 1 includes a vehicle-mounted terminal device 10, a portable terminal device 14, and a server device 16, which can communicate with each other via a network. The personal setting control system 1 stores setting information for vehicle-mounted apparatuses 12 entered by a driver and, when the driver gets into the vehicle again, the personal setting control system 1 makes setting of the vehicle-mounted apparatuses 12 based on the stored setting information.

[0020] The vehicle-mounted apparatuses 12 include an apparatus for fixing the driving position of the seat or the steering wheel, an air conditioner for controlling air conditioning within the vehicle, a navigation device for conveying a vehicle position, and an audio device for outputting sound.

[0021] With the personal setting control system 1, even when the setting information for the vehicle-mounted apparatuses 12 on a driver's vehicle is changed by another driver or when a driver drives a sharing car or a rental car, setting of the vehicle-mounted apparatuses 12 can be made based on the setting information appropriate for the driver, thereby saving the driver time and effort.

[0022] The vehicle-mounted terminal device 10 is mounted on a vehicle, and the setting of the vehicle-mounted apparatuses 12 can be made in the vehicle-mounted terminal device 10. The portable terminal device 14 is personally possessed by a driver and used for identification of the driver. The server device 16 retains personal setting information for the vehicle-mounted apparatuses 12 with respect to each driver. When the vehicle-mounted terminal device 10 and the portable terminal device 14 are not differentiated from each other, they may be simply referred to as terminal devices.

[0023] FIG. 2 is a diagram used to describe a functional configuration of the personal setting control system 1. Each of the elements represented by functional blocks for performing various processes shown in FIG. 2 can be implemented by a circuit block, a memory, an LSI or the like in terms of hardware, and by a program loaded into a memory or the like in terms of software. Accordingly, it will be obvious to those skilled in the art that these functional blocks may be implemented in a variety of forms by hardware only, software only, or a combination thereof, and the form is not limited to any of them.

[0024] The vehicle-mounted terminal device 10 is mounted on a vehicle and includes a vehicle-side communication unit 20, a setting unit 22, a vehicle-side authentication unit 24, and an identification information acquirer 26. The portable terminal device 14 includes an authentication information retaining unit 30. The server device 16 includes a retaining unit 32, a server-side communication unit 34, and a server-side authentication unit 36.

[0025] The authentication information retaining unit 30 of the portable terminal device 14 retains authentication information for identifying a driver. When the authentication information of a driver is transmitted from the authentication information retaining unit 30 to the vehicle-side authentication

unit 24 of the vehicle-mounted terminal device 10, the driver can be identified in the vehicle-mounted terminal device 10.

[0026] When a vehicle-mounted power supply is turned on, the vehicle-side authentication unit 24 of the vehicle-mounted terminal device 10 requests authentication from the portable terminal device 14 via near field communication, for example. The vehicle-mounted power supply serving as the impetus may be an accessory power supply or a main power supply, for example. The near field communication enables communication between the vehicle-mounted terminal device 10 and the portable terminal device 14 within a range of several meters, which means enabling communication therebetween when the portable terminal device 14 is brought into or closer to the vehicle. The vehicle-side authentication unit 24 receives authentication information from the portable terminal device 14 and performs matching with authentication information stored in advance so as to identify the driver. The vehicle-side authentication unit 24 may be capable of communicating with the portable terminal device 14 before the vehicle-mounted power supply is turned on, and may also receive authentication information from the portable terminal device 14 before the vehicle-mounted power supply is turned on.

[0027] When the vehicle-mounted power supply is turned on and when the vehicle-side authentication unit 24 completes the authentication of the driver, the vehicle-side communication unit 20 transmits the identification information of the identified driver to the server-side communication unit 34 of the server device 16. The identification information of the driver is stored in advance in the identification information acquirer 26. Each of the authentication information of the driver transmitted from the portable terminal device 14 to the vehicle-mounted apparatuses 12 and the identification information of the driver transmitted from the vehicle-mounted terminal device 10 to the server device 16 is information for identifying the driver, and the authentication information and the identification information may be the same or different from each other. In other words, the identification information of the driver acquired by the identification information acquirer 26 may be the identification information transmitted from the portable terminal device 14 or the identification information stored in advance.

[0028] The vehicle-side communication unit 20 receives, from the server device 16, personal setting information indicating a setting state of each vehicle-mounted apparatus 12. Based on the personal setting information thus received, the setting unit 22 makes setting of the vehicle-mounted apparatus 12.

[0029] Based on the personal setting information, the setting unit 22 sets the seat position, sets the steering wheel position, sets the temperature or air flow strength of the air conditioner, sets the map display mode or the like of the navigation device, and sets the sound volume or the like of the audio device. On the navigation device, the map can be displayed based on the bearings or the traveling direction of the vehicle.

[0030] When the ignition switch is turned off, the vehicle-side communication unit 20 acquires personal setting information for the vehicle-mounted apparatuses 12 from the setting unit 22 and transmits the personal setting information for the vehicle-mounted apparatuses 12 and the identification information of the driver to the server-side communi-

cation unit **34** of the server device **16**. Accordingly, when the driver gets out of the vehicle, the personal setting information for the vehicle-mounted apparatuses **12** can be stored in the server device **16**. The vehicle-side communication unit **20** may also transmit, to the server-side communication unit **34**, vehicle type information for the vehicle-mounted apparatuses **12** together with the personal setting information for the vehicle-mounted apparatuses **12** and the identification information of the driver.

[0031] The retaining unit **32** of the server device **16** receives the personal setting information for the vehicle-mounted apparatuses **12** and the identification information of the driver from the vehicle-side communication unit **20** and stores the personal setting information for the vehicle-mounted apparatuses **12** and the identification information of the driver related to each other. With regard to the personal setting information, FIG. 3 will be referred to.

[0032] FIG. 3 is a diagram used to describe personal setting information for the vehicle-mounted apparatuses **12**. The personal setting information for the vehicle-mounted apparatuses **12** is related to the identification information of the driver and the vehicle type information and includes seat position information, steering position information, air conditioning setting information, navigation setting information, and audio setting information. The retaining unit **32** retains those pieces of personal setting information for the vehicle-mounted apparatuses **12** with respect to each driver. The retaining unit **32** may also retain update date and time on which the personal setting information is acquired.

[0033] Since the retaining unit **32** retains the personal setting information for the vehicle-mounted apparatuses **12** with respect to each driver, when a driver drives a sharing car or a rental car, the driver can make setting of the vehicle-mounted apparatuses **12** using the personal setting information.

[0034] The description will now return to FIG. 2. Upon reception of the identification information of the driver from the vehicle-side communication unit **20**, the server-side communication unit **34** acquires the personal setting information related to the identification information from the retaining unit **32** and transmits the personal setting information related to the identification information to the vehicle-side communication unit **20**.

[0035] The server-side authentication unit **36** performs authentication processing for a driver to enable identification of the driver in the server device **16**. The authentication information retaining unit **30** of the portable terminal device **14** functions as an identification information acquirer and retains the identification information of the driver. The portable terminal device **14** acquires vehicle identification information from the vehicle-mounted terminal device **10** after the vehicle-mounted power supply is turned on, and transmits the identification information of the driver and the vehicle identification information to the server device **16**. When the server-side authentication unit **36** receives the identification information of the driver from the portable terminal device **14** and the authentication of the driver is completed, the server-side communication unit **34** transmits, to the vehicle-side communication unit **20** or the portable terminal device **14**, the personal setting information for the vehicle-mounted apparatuses **12** related to the identification information of the driver. When the portable terminal device **14** receives the personal setting information for the vehicle-mounted apparatuses **12**, the portable terminal device **14**

transmits the personal setting information to the vehicle-mounted terminal device **10** and allows the vehicle-mounted terminal device **10** to make setting of the vehicle-mounted apparatuses **12** based thereon.

[0036] FIG. 4 is a diagram used to describe a personal setting process for the vehicle-mounted apparatuses **12**. A driver carrying the portable terminal device **14** gets into a vehicle and turns on the vehicle-mounted power supply (**S10**). Accordingly, it is recognized in the vehicle-mounted terminal device **10** that the driver is present within the vehicle. The vehicle-side authentication unit **24** transmits a signal for requesting authentication to the portable terminal device **14** via near field communication (**S12**), and the portable terminal device **14** transmits the authentication information of the driver to the vehicle-side authentication unit **24** (**S14**). The authentication by the portable terminal device **14** may be completed before the vehicle-mounted power supply is turned on.

[0037] When the vehicle-side authentication unit **24** completes the authentication of the driver (**S16**), the vehicle-side communication unit **20** transmits the identification information of the driver to the server-side communication unit **34** and requests the personal setting information (**S18**). Accordingly, the server-side communication unit **34** transmits to the vehicle-side communication unit **20** the personal setting information related to the identification information of the driver (**S20**). Based on the personal setting information received at the vehicle-side communication unit **20**, the setting unit **22** makes setting of the vehicle-mounted apparatuses **12** (**S22**). Thus, the personal setting process for making setting of the vehicle-mounted apparatuses **12** appropriate for the driver is completed. Since setting of the vehicle-mounted apparatuses **12** is automatically performed, the driver's time and effort can be saved.

[0038] When the vehicle-side communication unit **20** is unable to receive the personal setting information for the vehicle-mounted apparatuses **12** from the server device **16**, the setting unit **22** may make setting of the vehicle-mounted apparatuses **12** based on the personal setting information for the vehicle-mounted apparatuses **12** stored in the portable terminal device **14** of the driver. For example, when the vehicle-mounted terminal device **10** is present underground and unable to communicate with the server device **16**, the vehicle-mounted terminal device **10** may acquire the personal setting information for the vehicle-mounted apparatuses **12** from the portable terminal device **14** via near field communication. To the portable terminal device **14**, the personal setting information for the vehicle-mounted apparatuses **12** may be regularly transmitted from the server device **16**.

[0039] When the vehicle-side communication unit **20** is unable to receive the personal setting information for the vehicle-mounted apparatuses **12** from the server device **16**, the setting unit **22** may make setting of the vehicle-mounted apparatuses **12** based on the personal setting information for the vehicle-mounted apparatuses **12** stored in the vehicle-mounted terminal device **10**. The vehicle-mounted terminal device **10** may retain the personal setting information for the vehicle-mounted apparatuses **12** together with the identification information of the driver of the time when the driver drove the vehicle in the past, and, when the driver is identified, the personal setting information for the vehicle-mounted apparatuses **12** may be transmitted to the setting unit **22**.

[0040] The retaining unit 32 may retain the update date and time of the personal setting information, and the portable terminal device 14 may also retain the update date and time of the personal setting information acquired from the server device 16. The setting unit 22 may compare the update date and time of the personal setting information retained in the server device 16 and the update date and time of the personal setting information retained in the portable terminal device 14 and may make setting of the vehicle-mounted apparatuses 12 based on the newer personal setting information.

[0041] When the vehicle-side communication unit 20 is unable to receive the personal setting information for the vehicle-mounted apparatuses 12 from the server device 16, the setting unit 22 may leave the task of the personal setting process and wait until the vehicle-side communication unit 20 becomes able to communicate with the server device 16. When the vehicle is moved to a position where communication is possible and the vehicle-side communication unit 20 receives the personal setting information from the server device 16, the setting unit 22 checks with the driver whether or not the setting of the vehicle-mounted apparatuses 12 based on the personal setting information may be performed. Upon reception of approval from the driver, the setting unit 22 performs setting of the vehicle-mounted apparatuses 12 based on the personal setting information. While the vehicle is moving, the setting unit 22 may be forbidden to change the settings on the vehicle-mounted apparatuses 12. Also, there may be both vehicle-mounted apparatuses 12 on which changing the settings is forbidden while the vehicle is moving, and vehicle-mounted apparatuses 12 on which the settings can be changed even while the vehicle is moving. For example, although changing the settings on the seat position and the steering wheel position may be forbidden while the vehicle is moving, the settings on the air conditioning and the audio may be changed even while the vehicle is moving.

[0042] When the vehicle type related to previous personal setting information for the vehicle-mounted apparatuses 12 received at the vehicle-side communication unit 20 is different from the vehicle type of the vehicle provided with the vehicle-mounted terminal device 10, the setting unit 22 may adjust the previous personal setting information according to the vehicle type of the vehicle provided with the vehicle-mounted terminal device 10 and make setting of the vehicle-mounted apparatuses 12 based on the adjusted setting information. In other words, when the vehicle type information related to the personal setting information retained in the server device 16 does not coincide with the vehicle type information for identifying the vehicle provided with the vehicle-mounted terminal device 10, the personal setting information may be amended according to the vehicle type and applied to the vehicle-mounted apparatuses 12. Accordingly, even when the driving position of the seat or the like is different depending on the vehicle type, the personal setting information can be adjusted and adapted to the vehicle type. In this case, the setting unit 22 may store in advance a conversion table with which the personal setting information can be adjusted according to the vehicle type.

[0043] With regard to the settings on the driving positions, such as the seat position and the steering position, the setting unit 22 may be forbidden to adjust or change the settings when the vehicle type is different, and, with regard to the settings on vehicle-mounted apparatuses 12 that do not

directly affect the driving, such as the air conditioning settings, navigation settings, and audio settings, the setting unit 22 may be allowed to adjust the personal setting information according to the vehicle type and make setting of the vehicle-mounted apparatuses 12 based on the adjusted personal setting information. In this way, the setting unit 22 may perform adjustment of the personal setting information according to the vehicle type only for part of the vehicle-mounted apparatuses 12. In any case, the setting unit 22 can automatically make setting of the vehicle-mounted apparatuses 12 based on the personal setting information adjusted according to the vehicle type.

[0044] The embodiment is intended to be illustrative only, and it will be obvious to those skilled in the art that various modifications to a combination of constituting elements could be developed and that such modifications also fall within the scope of the present disclosure.

[0045] Although the embodiment describes a mode in which the identification of the driver is performed in the portable terminal device 14 and the vehicle-mounted terminal device 10, the mode is not limited thereto. For example, the vehicle-side authentication unit 24 may identify the driver by receiving authentication information entered by the driver, or by analyzing an image captured within the vehicle acquired from an in-vehicle camera and performing face identification processing. In any case, the vehicle-side authentication unit 24 retains the authentication information for identifying the driver.

[0046] In another mode of authentication processing, another server device, different from the server device 16, may perform authentication processing for the driver. Accordingly, the portable terminal device 14 may transmit the authentication information to the another server device different from the server device 16, and, when the another server device completes the authentication of the portable terminal device 14, the another server device may issue the identification information of the driver, which proves the completion of the authentication, to the portable terminal device 14. When the vehicle-mounted power supply is turned on and the portable terminal device 14 and the vehicle-mounted terminal device 10 become able to communicate with each other via near field communication, the portable terminal device 14 may transmit to the vehicle-mounted terminal device 10 the identification information of the driver issued by the another server device, or the another server device may transmit to the vehicle-mounted terminal device 10 the identification information of the driver upon reception of a request for the identification information from the portable terminal device 14.

1. A vehicle-mounted terminal device configured to be mounted on a vehicle and capable of communicating with a server device, the vehicle-mounted terminal device comprising:

- an identification information acquirer configured to acquire identification information of a driver of the vehicle;
- a communication unit configured to transmit the identification information of the driver of the vehicle to the server device and to receive personal setting information, indicating a setting state of a vehicle-mounted apparatus, transmitted from the server device and related to the identification information of the driver; and

a setting unit configured to make setting of a vehicle-mounted apparatus on the vehicle on the basis of the personal setting information received at the communication unit, wherein,

when the authentication of the driver is completed and when a power supply of the vehicle is turned on, the communication unit transmits the identification information of the driver of the vehicle to the server device and receives personal setting information for a vehicle-mounted apparatus, transmitted from the server device and related to the identification information of the driver.

2. The vehicle-mounted terminal device of claim 1, wherein, when personal setting information for a vehicle-mounted apparatus cannot be received from the server device, the setting unit makes setting of the vehicle-mounted apparatus on the basis of personal setting information stored in a portable terminal device of the driver or in the vehicle-mounted terminal device.

3. The vehicle-mounted terminal device of claim 1, wherein, when the vehicle type related to personal setting information for a vehicle-mounted apparatus received at the communication unit is different from the vehicle type of the vehicle provided with the vehicle-mounted terminal device, the setting unit adjusts the personal setting information according to the vehicle type of the vehicle provided with the vehicle-mounted terminal device and makes setting of the vehicle-mounted apparatus on the basis of the adjusted setting information for the vehicle-mounted apparatus.

4. A server device capable of communicating with a vehicle-mounted terminal device, the server device comprising:

a communication unit configured to receive personal setting information indicating a setting state of a vehicle-mounted apparatus and to also receive identification information of a driver; and

a retaining unit configured to retain personal setting information, indicating a setting state of a vehicle-mounted apparatus, related to the identification information of the driver, wherein,

upon reception of the identification information of the driver from the vehicle-mounted terminal device, the communication unit transmits personal setting information related to the identification information of the driver to the vehicle-mounted terminal device.

5. A terminal device capable of communicating with a server device, the terminal device comprising:

an identification information acquirer configured to acquire identification information of a driver of a vehicle; and

a communication unit configured to transmit the identification information of the driver of the vehicle to the server device and to be able to receive, when the authentication of the driver is completed and when a power supply of the vehicle is turned on, personal setting information, indicating a setting state of a vehicle-mounted apparatus, transmitted from the server device and related to the identification information of the driver.

6. The vehicle-mounted terminal device of claim 2, wherein, when the vehicle type related to personal setting information for a vehicle-mounted apparatus received at the communication unit is different from the vehicle type of the vehicle provided with the vehicle-mounted terminal device, the setting unit adjusts the personal setting information according to the vehicle type of the vehicle provided with the vehicle-mounted terminal device and makes setting of the vehicle-mounted apparatus on the basis of the adjusted setting information for the vehicle-mounted apparatus.

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