fee-charging unit price of the power supply apparatus to which the notified supply identifier is assigned.

CITATION LIST

PATENT LITERATURE

[0003] Patent Literature 1: Japanese Patent No. 4848182.

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] The conventional power supply system described in the Patent Literature 1 performs the charging of power-use fee to the user, in accordance with the power-use time, current value or electric energy when receiving a power supply from the power supply apparatus, and the fee-charging unit price of the power supply apparatus. However, in power supply from a power supply apparatus, various modes of fee-charging such as a fee-charging not to a user but to a power supply target (for example, a battery of an electrically driven vehicle) is desired. The conventional power supply system is not capable of coping with these various modes of fee-charging.

SOLUTION TO PROBLEM

[0005] A power supply system according to an aspect of the present invention is a power supply system of supplying power from a power supply source to a rechargeable battery installed in a vehicle~~power supply target~~ that comprises a power-supply control apparatus of controlling power supply from the power supply source to the battery~~power supply target~~, a fee-charging apparatus of performing a fee-charging process for power supply from the power supply source to the ~~power supply target~~battery, and authentication means for performing an authentication process of determining whether or not to permit the power supply from the power supply source to the battery. The fee-charging apparatus comprises means for memorizing two or more kinds of power-use-side

identification information of a use side using the power supplied via the power-supply control apparatus, the two or more kinds of power-use-side identification information including vehicle identification information unique to a body of the vehicle and battery identification information unique to the battery, two or more kinds of power-supply-side identification information of a supply side supplying the power via the power-supply control apparatus, and fee-charge-target information predetermined to each of two or more combination sets between the two or more kinds of power-use-side identification information and the two or more kinds of power-supply-side identification information; means for receiving ~~at least one of~~ the ~~two or more kinds of~~ power-supply-side identification information of the power supply source that supplies power via the power-supply control apparatus, ~~at least one of~~ the two or more ~~types~~ kinds of power-use-side identification information including the battery identification information of the battery to which the power is supplied via the power-supply control apparatus and the vehicle identification information of the vehicle in which the battery is installed, and power-use information relating to power supplied from the power supply source to the ~~power supply target~~battery via the power-supply control apparatus, from the power-supply control apparatus via a wired or wireless communication line; and means for performing a fee-charging process of charging to the fee-charge-target with respect to the power supplied from the power supply source to the battery via the power-supply control apparatus, based on the ~~at least one kind of~~ power-supply-side identification information, the two or more kinds of~~at least one kind of~~ power-use-side identification information including the vehicle identification information and the battery identification information, ~~and~~ the power-use information and the fee-charge-target information. The power-supply control apparatus comprises switching means for opening and closing a power supply path from the power supply source to the ~~power supply target~~battery; control means for controlling the switching means; means for acquiring the ~~at least one kind of~~ power-supply-side identification information, the two or more kind~~at least one kind~~ of power-use side identification information including the vehicle identification

information and the battery identification information, and the power-use information; and means for transmitting the ~~at least one kind of~~ power-supply-side identification information, the two or more kinds~~at least one kind~~ of power-use-side identification information including the vehicle identification information and the battery identification information, and the power-use information, to the fee-charging apparatus via a wired or wireless communication line. The authentication means comprises means for memorizing the two or more kinds of power-use-side identification information including the vehicle identification information and the battery identification information, the two or more kinds of power-supply-side identification information, and power-supply permission information that is predetermined for each of the two or more combination sets between the two or more kinds of power-use-side identification information and the two or more kinds of power-supply side identification information; and performs the authentication process based on the power-use-side identification information and the two or more kinds of power-use-side identification information including the vehicle identification information and the battery identification information which are acquired by the power-supply control apparatus, and the power-supply permission information. The control means of the power-supply control apparatus controls the switching means, only when the authentication process with respect to each of the vehicle and the battery is succeeded and the power-supply permission information predetermined to the combination set between the power-use-side identification information and the two or more kinds of power-use-side identification information including the vehicle identification information and the battery identification information which are acquired by the power-supply control apparatus is a kind of information permitting the power supply, based on a result of the authentication process by the authentication means.

In this power supply system, the fee-charging apparatus is capable of determining a fee-charging target corresponding to each of various combination sets between the two or more kinds of power-use-side identification information and the two or more kinds of power-supply-side identification information. Furtheremore, the fee-charging apparatus

is capable of performing a fee-charging process for a fee-charge target corresponding to a combination set of the at least one kind of power-supply-side identification information and the at least one kind of power-use-side identification information, based on the power-use information, when receiving the at least one kind of power-supply-side identification information, the at least one kind of power-use-side identification information and the power-use information, from the power-supply control apparatus via

CLAIMS

1. A power supply system of supplying power from a power supply source to a rechargeable battery installed in a vehicle~~power supply target~~, comprising:

a power-supply control apparatus of controlling power supply from the power supply source to the battery~~power supply target~~; ~~and~~

a fee-charging apparatus of performing a fee-charging process with respect to the power supply from the power supply source to the battery~~power supply target~~; and

authentication means for performing an authentication process of determining whether or not to permit the power supply from the power supply source to the battery, and

wherein the fee-charging apparatus comprises:

means for memorizing two or more kinds of power-use-side identification information of a use side using the power supplied via the power-supply control apparatus, the two or more kinds of power-use-side identification information including vehicle identification information unique to a body of the vehicle and battery identification information unique to the battery, two or more kinds of power-supply-side identification information of a supply side supplying the power via the power-supply control apparatus, and fee-charge-target information predetermined to each of two or more combination sets between the two or more kinds of power-use-side identification information and the two or more kinds of power-supply-side identification information;

means for receiving ~~at least one of~~ the ~~two or more kinds of~~ power-supply-side identification information of the power supply source that supplies power via the power-supply control apparatus, ~~at least one of~~ the two or more kinds~~types~~ of power-use-side identification information including the battery identification information of the battery to which the power is supplied via the power-supply control apparatus and the vehicle identification information of the vehicle in which the battery is installed, and power-use information relating to power supplied from the power supply source to the battery~~power supply target~~ via the power-supply control apparatus, from the

power-supply control apparatus via a wired or wireless communication line; and

means for performing a fee-charging process of charging to the fee-charge-target with respect to the power supplied from the power supply source to the battery via the power-supply control apparatus, based on the ~~at least one kind of~~ power-supply-side identification information, the two or more kinds of ~~at least one kind of~~ power-use-side identification information including the vehicle identification information and the battery identification information, ~~and~~ the power-use information and the fee-charge-target information and, ~~and~~

wherein the power-supply control apparatus comprises:

switching means for opening and closing a power supply path from the power supply source to the battery~~power supply target~~;

control means for controlling the switching means;

means for acquiring the ~~at least one kind of~~ power-supply-side identification information, the two or more kinds~~at least one kind~~ of power-use side identification information including the vehicle identification information and the battery identification information, and the power-use information; and

means for transmitting the ~~at least one kind of~~ power-supply-side identification information, the two or more kinds~~at least one kind~~ of power-use-side identification information including the vehicle identification information and the battery identification information, and the power-use information, to the fee-charging apparatus via a wired or wireless communication line, ~~,~~

wherein the authentication means comprises means for memorizing the two or more kinds of power-use-side identification information including the vehicle identification information and the battery identification information, the two or more kinds of power-supply-side identification information, and power-supply permission information that is predetermined for each of the two or more combination sets between the two or more kinds of power-use-side identification information and the two or more kinds of power-supply side identification information; and performs the authentication process based on the power-use-side identification information and the two or more kinds

of power-use-side identification information including the vehicle identification information and the battery identification information which are acquired by the power-supply control apparatus, and the power-supply permission information, and

wherein the control means of the power-supply control apparatus controls the switching means, only when the authentication process with respect to each of the vehicle and the battery is succeeded and the power-supply permission information predetermined to the combination set between the power-use-side identification information and the two or more kinds of power-use-side identification information including the vehicle identification information and the battery identification information which are acquired by the power-supply control apparatus is a kind of information permitting the power supply, based on a result of the authentication process by the authentication means.

~~2. The power supply system according to claim 1, further comprising authentication means for performing an authentication process of determining whether or not to permit the power supply from the power supply source to the power supply target, and~~

~~wherein the authentication means comprises means for memorizing the two or more kinds of power-use-side identification information, the two or more kinds of power-supply-side identification information, and power-supply permission information that is predetermined for each of combination sets between the two or more kinds of power-use-side identification information and the two or more kinds of power-supply side identification information; and performs the authentication process based on the at least one kind of power-use-side identification information acquired by the power-supply control apparatus, and~~

~~wherein the control means of the power-supply control apparatus controls the switching means based on a result of the authentication process by the authentication means.~~

~~3~~2. The power supply system according to claim ~~2~~1, wherein the authentication

means memorizes theft-occurrence information for the batterypower supply target; determines whether the batterypower supply target is stolen or not based on the at least one kind of power-use-side identification information; and performs the authentication process so as not to permit the power supply to the power supply targetbattery when determining that the power supply targetbattery is a stolen one.

43. The power supply system according to claim 32, wherein the authentication means memorizes the theft-occurrence information and a predetermined additional process level when a theft of the power supply targetbattery occurs, with respect to the power supply target battery; and performs an additional process based on the additional process level for the batterypower supply target, together with the authentication process, when determining the power supply targetbattery is stolen.

54. The power supply system according to claim 23 or 34, further comprising means for notifying to a predetermined notification destination when determining that the batterypower supply target is a stolen one.

65. The power supply system according to any one of claims 12 to 45, wherein

the power-supply control apparatus further comprises imaging means for imaging the vehicle in which the battery is installedpower supply target; and

the authentication means acquires image data of the vehiclepower supply target that is imaged by the imaging means.

76. The power supply system according to any one of claims 12 to 56, wherein the authentication means performs the authentication process based on the at least one kind of power-supply-side identification information and the two or more kindsat least one kind of power-use-side identification information that are acquired by the power-supply control apparatus.

87. The power supply system according to any one of claims 2 1 to 76, wherein the authentication means is provided in the power-supply control apparatus.

98. The power supply system according to any one of claims 1 to 87, wherein the authentication means is a server capable of communicating with the power-supply control apparatus via at least one of a mobile communication network, a wireless LAN and a wired LAN.

109. The power supply system according to any one of claims 1 to 98, wherein

~~the power supply target is a rechargeable battery installed in a vehicle,~~

thea body of the vehicle comprises means for transmitting vehicle identification information unique to the vehicle body, and

the battery comprises means for transmitting battery identification information unique to the battery.~~, and~~

~~the at least one kind of power-use-side identification information acquired by the foregoing power-supply control apparatus includes at least one of the vehicle identification information and the battery identification information.~~

1110. The power supply system according to any one of claims 1 to 109, further comprising a transmitting apparatus that transmits user identification information unique to a user of power, and

wherein the two or more kindsat least one kind of power-use-side identification information acquired by the power-supply control apparatus includes the user identification information transmitted from the transmitting apparatus.

1211. The power supply system according to any one of claims 1 to 1110, wherein the two or more kindsat least one kind of power-use-side identification information and the at least one kind of power-supply-side identification information are acquired by receiving a response to the acquisition request or a spontaneous transmission from the

power-supply control apparatus.

~~13~~12. The power supply system according to any one of claims 1 to ~~12~~11, wherein the power-supply control apparatus acquires the two or more kinds~~at least one kind~~ of power-use-side identification information and the at least one kind of power-supply-side identification information by a communication via a power supply cable connecting between the power-supply control apparatus and the battery~~power supply target~~, a near field wireless communication with radio waves or light, an electric field communication, a wireless LAN communication, an NFC superposed on a power line or a communication with sound or vibration.

~~14~~13. The power supply system according to any one of claims 1 to ~~13~~12, wherein the two or more kinds of power-use-side identification information have the same format each other.

~~15. The power supply system according to any one of claims 1 to 14, wherein the two or more kinds of power-supply-side identification information include identification information unique to the power supply source, identification information unique to the power-supply control apparatus, and identification information unique to an electric energy-measurement apparatus that measures an electric energy of power supplied from the power supply source to the power supply target.~~

~~16. The power supply system according to any one of claims 1 to 15, wherein the two or more kinds of power-use-side identification information include identification information unique to a user using a power, identification information unique to a user apparatus used by the user and identification information unique to the power supply target.~~

~~17. The power supply system according to any one of claims 1 to 16, wherein the~~

~~fee-charging target is the user or the power-supply target.~~

~~18. The power-supply system according to any one of claims 1 to 17, wherein the communication between the power-supply control apparatus and the fee-charging apparatus is a communication via at least one of a mobile communication network and a wireless LAN.~~