Automotive with manual electrical power generation

Batteryless vehicle access - low cost

1. Door handle pulling
2. Authentication
3. Unlocking

Energy storage system charged by vehicle

RF and/or LF wireless communication

Door latch

Wake-up signal

Unlocking

ECU

RF and/or LF

Remote key

Fuel economy

Title: AUTOMOTIVE WITH MANUAL ELECTRICAL POWER GENERATION

Abstract: The present invention relates to an automotive with doors with a remote keyless system to permit or deny access to the automotive. The system comprises means to manually generate electrical power, which can be driven by the door handle.
Automotive with manual electrical power generation

The present invention relates to an automotive with doors with a remote keyless system to permit or deny access to the automotive.

From the state of the art, for example DE 197 24 085 C1 or DE 100 38 152 A1 access systems for automotives are known, which are, however, not remote.

It was therefore the problem of the present invention, to provide an automotive with a convenient and safe access-system.

The problem is solved with an automotive with doors with a remote keyless system to permit or deny access to the automotive, whereas it comprises means to manually generate electrical power.

The inventive automotive comprises a remote keyless system to permit or deny access to automotives (RKE). Remote keyless systems operate by broadcasting radiofrequency waves and/or low frequency waves and in particular a frequency or frequencies, which are received by an RKE-receiver. The functions of a remote keyless entry system are contained on a keyfob or built into the ignition key handle itself. Remote keyless entry broadcasts a radio frequency and/or low frequency with a designated distinct digital identity code. In case, this code is identical with a code stored in the RKE-receiver, the RKE-receiver transmitts a signal to the door latch so that it is unlocked or locked or can be locked or unlocked. The comparison between the sent code and the stored code is done by an electrical control unit (ECU), which is connected to the latch of the car to eventually send a signal to the latch to lock or unlock the latch. The connection between the latch and the ECU can be via wires or wireless. Preferably, the RKE-receiver is part of the ECU. The ECU for the RKE can be part of the general ECU of the car or a separate ECU. In case it is a separate unit, it is preferably located in the door, most preferably near the latch.

The automotive further comprises means to manually generate electrical power. Due to the power generation, electrical energy can be provided to an electronic control unit (ECU) that comprises or is attached to the RKE-receiver and/or the door latch,
so that at the ECU and/or the door latch are operable. This is especially desirable in case of a failure of the battery of the automotive or in other emergency cases in which no electrical energy can be provided to the ECU and/or the latch.

Preferably, the manual electrical power generation works by either manually putting the entire car, or more preferably, only a part of the car into motion. This motion is transferred to an electrical power generator, for example a dynamo, which generates electrical energy. Most preferably, the electrical power generator is actuated by actuating the door handle, preferably, by pulling and/or turning the door handle in and out.

Preferably, pulling and/or turning the door handle once, activates, wakes-up, the ECU, so that it can receive and process the radio frequency- and/or low frequency signal and send, if applicable, a signal to the door latch to open it.

In a preferred embodiment, the door handle is actuated several times so that not only the ECU is initiated (wake-up) but also energy is stored in an energy storage unit, which can be part of the ECU or remote from the ECU.

The storage unit can be connected to the lightning dynamo, that also provides electrical energy for example to the motor and the other electrical energy consumers of the automotive.

The invention is now explained according to figures 1 and 3.

These explanations do not limit the scope of the present invention.

Figure 1 shows one embodiment of the inventive vehicle.

Figure 2 shows the embodiment according to figure 1 with an energy storage system incorporated into the ECU.

Figure 3 shows an embodiment where all the components are incorporated into the car door.
Figure 1 shows parts of the inventive vehicle. This vehicle comprises at least one door 3 with a door latch 1, to lock the door and a handle door 2 to open the door latch 1 manually. Furthermore, the car comprises an electrical control unit (ECU) 4, which comprises a RKE-receiver and an energy storage system charged by the vehicle. Furthermore, the car comprises a Keyfob 7 or any part alike, that is able to wirelessly communicate with the RKE-receiver 5 for example via radio- or low frequency 8. The keyfob 7 sends a signal 8 to the RKE-receiver 5, which transmits this signal to the ECU 6 where it is processed; i.e. where it is analysed whether the transmitted digital signal matches with the stored signal in the ECU.

Based on this comparison, a signal is sent to the door latch 1 via wire 10 to unlock the door or the unlocking of the door is denied; i.e. no signal is sent to the door latch 1.

In case that the energy storage system 6 is empty, an electrical energy generating system, for example a dynamo, (not depicted) is actuated by pulling and/or turning the handle once. The person skilled in the art understands, that preferably the power generator can be actuated each time the handle is activated, regardless of the power status of the battery. This generated energy is transmitted via electrical wire 9 to the ECU and is at least sufficient to process the RF- and/or LF signal received and to send an electrical signal via electrical connection 10 to the door latch, so that the door can be unlocked. Afterwards, the battery can be charged by means known by person skilled in the art.

Figure 2 essentially shows the embodiment according to figure 1. However, in this case, the ECU comprises an energy storage system. By pulling and/or turning the handle at least twice, not only a wake-up signal as in the embodiment according to figure 1 is transmitted to the ECU but more energy is generated, so that energy can be stored in the storage system 6. The person skilled in the art understands that the energy storage system can be also charged by the vehicle.

Figure 3 shows another embodiment of the inventive vehicle. In this case, all components are stored in the door of the vehicle, and the energy storage system is
separated from the ECU. The ECU can be part of the entire door ECU. The system works as explained according to figure 2.
Reference sign list:

1. door latch
2. door handle
3. door
4. electrical control unit (ECU)
5. RKE/PASS-Receiver
6. Energy storage system
7. Keyfob, ignition
8. Radio frequency (RF) and/or Low frequency (LF) wireless communication
9. electrical connection between ECU and electrical energy generator
10. electrical connection between ECU and door latch
11. electrical connection between energy storage system and ECU
Claims:

1. Automotive with doors (3) with a remote keyless system to permit or deny access to the automotive, characterized in, that it comprises means (2) to manually generate electrical power.

2. Automotive according to claim 1, characterized in, that it comprises a keyfob and/or an ignition-key (7) and an electronic control unit ECU (4), whereas the keyfob (7) sends a radio frequency- and/or low frequency-signal (8) to the ECU (4).

3. Automotive according to one of the preceding claims, characterized in, that the means (2) is a door handle.

4. Automotive according to one of the preceding claims, characterized in, that the means (2) wakes-up the ECU (4).

5. Automotive according to one of the preceding claims, characterized in, that after activation it receives and processes a radio frequency- and/or low frequency-signal (8) sent from the keyfob (7).

6. Automotive according to claims 4 or 5, characterized in, that pulling the door handle once wakes up the ECU and eventually unlocks the door.

7. Automotive according to one of the preceding claims, characterized in, that it comprises electrical energy storing means (6).

8. Automotive according to claim 7, characterized in that the energy storage means (6) are energized by means (2).

9. Automotive according to claims 7 or 8, characterized in, that the energy storage means (6) are energized by a lightning dynamo.
10. Automotive according to one of the preceding claims, characterized in, that the ECU is part of the general ECU.

11. Automotive according to one of claims 1 - 9, characterized in, that the ECU is separate from the general ECU and/or located in the door of the automotive.

12. Automotive according to one of the preceding claims, characterized in, that the energy transfer between the door handle and the ECU and/or the ECU and a latch is wireless.
Batteryless vehicle access – low cost

1- Door handle pulling   Ok
2- Authentication        Ok
3- Unlocking             Ok

Energy storage System charged By vehicle

RKE/PASS receiver

ECU 4

RF and/or LF Wireless communication

Keyfob 7

Door handle with wake-up signal

1 times opening action

Door latch

Electrical connections
Batteryless vehicle access – medium cost

1- Door handle pulling  Ok
2- Battery charging  Ok
3- Authentication  Ok
4- Unlocking  Ok

- Door handle with electrical Charging system
- N times opening action
- Door latch

Energy storage system
RKE/PASS receiver
ECU
RF and/or LF Wireless communication
Keyfob
Electrical connections
Batteryless vehicle access - premium

1- Door handle pulling Ok
2- Battery charging Ok
3- Authentication Ok
4- Unlocking Ok

Diagram:
- Electrical connection
- Door handle with electrical charging system
- N times opening action
- Door latch
- Keyfob
- Electrical connections
- Door ECU
- LF (transponder based) Wireless communication
INTERNATIONAL SEARCH REPORT

PCT/EP2008/011171

A. CLASSIFICATION OF SUBJECT MATTER

INV. B60R 25/00

According to International Patent Classification (IPC) or to both national classification and IPC.

B. RELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B60R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO—Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>FR 2 770 248 A (VALEO SYSTEMES DE FERMETURES [FR]) 30 April 1999 (1999-04-30) page 4, line 20 - line 25 page 6, line 31 - line 15; figures 2,3</td>
<td>12</td>
</tr>
</tbody>
</table>

☐ Further documents are listed in the continuation of Box C. × See patent family annex.

- Special categories of cited documents:
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Date of the actual completion of the international search

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19/06/2009

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Authorized officer

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<tr>
<th>Patent document cited in search report</th>
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<th>Patent family member(s)</th>
<th>Publication date</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>DE 60303986 T2</td>
<td>17-08-2006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 1400645 A1</td>
<td>24-03-2004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>JP 2004108035 A</td>
<td>08-04-2004</td>
</tr>
<tr>
<td>US 5497641 A</td>
<td>12-03-1996</td>
<td>DE 4228234 A1</td>
<td>03-03-1994</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EP 0584499 A1</td>
<td>02-03-1994</td>
</tr>
<tr>
<td>FR 2770248 A</td>
<td>30-04-1999</td>
<td>NONE</td>
<td></td>
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</table>