

Re: Patent Application No. PCT/EP97/01118

I, Malin Müller, Lämmerstieg 1, 23562 Lübeck, hereby declare that I am conversant with the German and English languages and that I am the translator of the document attached and certify that to the best of my knowledge and belief the following is a true and correct translation of the PCT International application No. PCT/EP97/01118 dated 6 March 1997 in the name of Hahn, G. Uwe, Büttner, Manfred and Brockmann, Stefan.

Malin Müller

Signature of Translator

98-08-31

Date

Securing system for vehicles, particularly for motor vehicles

The invention relates to a securing system for vehicles, particularly for motor vehicles, against unauthorized use by means of a radio receiver built into the vehicle in order to receive a wide area transmitted radio signal and to produce a switchsignal on receipt of a radio signal coded to the radio receiver and by means of a control unit which triggers an alarm and/or interrupts at least one of the vehicle's operational functions. The invention further relates to a method of securing of vehicles.

A securing system for vehicles against unauthorized use is known from DE 43 35 641 which system is based on using a wide area radio control system in a long-wave frequency range. The vehicle is provided with a radio receiving system effecting the driving mechanism which receiving system is controlled by radio addresses individually assigned to a vehicle. The radio receiving system consists of a radio receiving element, a generator and a coder. The coder comprises an electronic key initiated by the generator.

The known securing system effects the blocking of the functions of the driving mechanism or the electrical or electronical control components thereof respectively by a radio signal. The constructive unit of the radio receiving element, generator and coder is built in such a way, that

an intervention leads to destruction and to functional inability.

During unauthorized use of the vehicle and after an authorized request a company running the radio control system transmits a radio telegram addressed to the particular vehicle. This radio telegram then interrupts the initiation of the electronic key, whereupon the driving control system is switched off after a predetermined time. A renewed initiation of the electronic key and with that a release of the driving control can only be effected by a further radio telegram to the vehicle, and then an appropriate reset is started.

Since the radio receiving system is connected to the driving control system by an interface, the code information can be read and be forwarded to the decoder without an extern initiation so that the driving control is active even when the vehicle is used without authorization. Due to the various components the radio receiving system takes up a not insignificant space which complicates its installation at possible inaccessible places within the vehicle whereby the desired securing function is further reduced.

The DE 43 18 596 A1 shows a theft protection for motor vehicles by means of a radio receiver which in case of theft interacts with the motor control electronic system such that its switching off upon receiving an identification code of the respective vehicle is enabled. According to this shown solution, a re-starting is only

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possible with a new component storing an actual identification code.

In order to protect this proposed securing system against manipulation the programmed identification code has to be stored in further electronic components of the vehicle and be cyclically interrogated by a micro computer or a similar device of the system for preventing an unauthorized exchange of a disabled motor control electronics or the radio receiver itself. However, this means an extensive intervention in the existent motor vehicle electronics of the vehicle so that a retrofitting of motor vehicles can not be effected or only with difficulties and high expenses.

In summary, it is known that an already stolen vehicle substantially independent of its position can be secured later by a radio signal and a radio receiver switching off essential operational components of the motor vehicle. The existent radio respective mobile telephone networks can be used as communication medium.

However, difficulties arise when a retrofitting of vehicles should be effected for the purpose of increasing theft protection without interfering in the electronic components of the vehicle in an inadmissible manner. Moreover, due to their complexity known securing systems can be recognized easily and removed completely whereby the desired purpose is failed.

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Therefore, it is the object of the invention to provide a securing system for vehicles, particularly for motor vehicles, against unauthorized use which, on the one hand, enables an easy retrofitting of existing motor vehicles without intervening in certain sensitive areas of the vehicle electronics and, on the other hand, enables a higher safety against recognition and deactivation of the system components installed within the vehicle.

The solution of the object of the invention is given by a subject according to the features of the patent claims 1 and 7 respectively, wherein the subclaims comprise at least practical embodiments and developments.

Basing on a known securing system using a wide area transmitted radio signal it is the basic idea of the invention to provide a decentral assembly. For this purpose a radio receiver with a transmitting module forming a first assembly group is built into a substantial inaccessible place within the vehicle. This inaccessibly located radio receiver responds to the wide area transmitted signal and activates the transmitting module for broadcasting wireless transmittable impulses.

A second assembly group comprising a receiving module for receiving the impulses of the transmitting module is located at at least one preferably at several places each separately from the radio receiver with the transmitting module. The respective receiving module then generates an output signal which is forwarded to the control unit arranged in each second assembly group in order to trigger

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an alarm and/or to switch off at least one operational function of the vehicle.

By the fact that there are provided several second assembly groups including a receiving module and a control unit for switching off at least one operational function of the vehicle it is highly secured that the vehicle can not be unauthorized started when a blocking function is released by the radio receiver adapted to receive a wide area transmitted radio signal. Even when one of the second assembly groups is found the vehicle can not be started and/or the travel can not be continued.

According to a further basic idea of the invention the radio receiver and the transmitting module forming the first assembly group is provided with a self-sufficient power supply. This self-sufficient power supply comprises an energy storage in form of an accumulator which is buffered by the board network during regular operation of the motor vehicle. Alternatively or additionally it is possible to use solar cells provided at the vehicle for buffering the accumulator of the second assembly group. Even in case the battery is temporary disconnected the radio receiver of the first assembly group is in readiness and able to receive a wide area transmitted radio signal wherein a switch signal is preferably stored by a bistable relay.

Later, when the unauthorized user has imaginary moved the vehicle out of the transmitting or the receiving range respectively the transmitting module of the first assembly

group will be activated due to the bistable state of the relay when reconnecting the battery. The receiving modules in each second assembly groups then receive the impulses of the transmitting module causing the desired blocking of the operational functions so that the vehicle can not be unauthorized used.

In an embodiment of the invention the second assembly group is constructed such that the control unit firstly triggers an acoustical and/or optical alarm informing on the one hand the environment of the unauthorized use of the vehicle and, on the other hand, warning the unauthorized user that the vehicle will be unroadworthy after a predetermined time. After a certain time delay the switching off of at least one of the operational functions is carried out as described above. By this measure it is ensured that during unauthorized use the driver has the possibility to e. g. steer the vehicle to the roadside without causing hazardous situations by a sudden and unexpected deactivation of the vehicle.

It is the idea of the invention to keep even the second assembly groups in an alarm state by a bistable relay or a similar storage component after receiving the impulses from the transmitting module of the first assembly group so that a possible disconnection of the battery leads to a release of the desired alarm respective interruption of the operational functions when reconnecting the battery. A resetting of the bistable relay or the second assembly group respectively is only possible with an usual code key or by entering a numeral code.

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Conveniently a so-called Scall-receiver may serve as a radio receiver of the first assembly group for the purpose of reducing the technical circuit complexity. The transmission of the information for activating a switchsignal is then effected by the public Scall-services.

In order to prevent said hazardous traffic situations in the moment the motor vehicle is being disabled an additional assembly group may be provided with which the vehicle speed is detected and an interrupting of the operational functions only takes place when a predetermined low speed is reached or when the vehicle stops e. g. at a traffic light.

Additionally or alternatively to the self-sufficient power supply of the first assembly group the second assembly groups may also be buffered by accumulators so that the possibilities of manipulation by disconnecting and reconnecting the battery are reduced.

In a special embodiment of the invention at least one part of the heating wire used for the electrical heating of the wing mirror and/or the rear windscreen serves as receiving antenna for the radio receiver of the first assembly group and/or as transmitting antenna for the transmitting module of the first assembly group. This may avoid supplemental antennas which are expensive and easy to discover whereby the security of the entire system is further improved.

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With respect to the method the securing of a vehicle equipped with a system according to the invention happens with a radio code signal broadcasted by a known existing wide area communication system when detecting the theft. This radio code signal is received by a radio receiver installed at an inaccessible place within the vehicle and a switchsignal used for activating a transmitting module placed at an inaccessible place within the vehicle is released. This transmitting module generates wireless transmittable impulses.

These impulses are received by at least one receiving module located separately from the transmitting module within the vehicle, and the receiving modul or moduls release an optical and/or acoustical alarm by means of self-holding switching devices and then disable the vehicle after a time delay.

In the following the invention is to be described in detail with help of an embodiment and a diagram.

On the one hand, the diagram shows the first assembly group comprising a radio receiver with a transmitting module and, on the other hand, an exemplary construction of a second assembly group comprising a receiving module and a control unit for disabling the vehicle.

The securing system for vehicles, particularly for motor vehicles, but also for boats or the like according to the embodiment consists of a first assembly group 1 with a

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Scall-receiver 2 which is able to generate a certain detection signal by means of an evaluation unit 3.

The detection signal provided from the evaluation unit 3 reaches an input of a first bistable relay 4. This first bistable relay 4 triggers a first timer 5 which activates the transmitting module 6 for a defined time, in the shown example 15 seconds. The Scall-receiver 2 and the transmitting module 6 comprise an accumulator-buffered power supply 7 and are hereby independent of the board network.

The receiving antenna 8 of the Scall-receiver 2 is for instance a part of a heating wire of a heated rear window of the motor vehicle. The transmitting module 6 comprises a transmitting antenna 9 which is built in form of a rod-shaped radiator, e. g. in form of a circuit section of the circuit board on which said assembly groups are located.

The entire first assembly group 1 is located at an inaccessible place within the vehicle for example under the roof covering of the inside, the so-called inner roof lining of the motor vehicle.

The buffered power supply 7 of the first assembly group 1 is constructed such that a removal of the entire assembly group immediately releases an alert in the second assembly groups 10 described in the following.

The at least one preferably several second assembly groups 10 comprise a receiving antenna 11 which each may

also consists of a circuit section of a circuit board on which the respective second assembly group 10 is mounted. The receiving antenna 11 is connected to a suitable input of a receiving module 12 for receiving the impulses of the transmitting module 6 of the first assembly group 1. Each second assembly group 10 comprises a second bistable relay 13 which is connected with its input to the receiving module 12.

Above this, the second bistable relay 13 is connected with a reset circuitry 14 in order to switch off the alert by authorized users. For example, the reset circuitry 14 consist of a known code key or a code lock which enables a certain switching state by entering a numeral code.

On the one hand, the second bistable relay 13 is connected with its output to an interval switch 15 which in an interval modus switches the horn and/or the warning flashers 17 of the vehicle by a suitable safety assembly group 16. With this it is indicated that the vehicle is obviously being used or started respectively by an unauthorized person.

Further, the second bistable relay 13 is connected to a second timer 18 which after a predetermined time, in the shown example 90 seconds, respectively disconnects or disables important operational functions of the motor vehicle by means of a further safety assembly group 19. For example, the power supply of the ignition and/or fuel pump 20 may be interrupted.

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By using the second timer 18 which allows the interrupting of an operational function of the motor vehicle only after a predetermined time the risk of an accident is considerably reduced. The unauthorized user is more or less informed by the releasing of an acoustical and/or optical warning signal. A warning sign can be supplementary installed in the inside of the motor vehicle so that the unauthorized user is previously informed of the forthcoming disabling of the motor vehicle after appearance of the acoustical and/or optical warning signal. It is additionally possible to provide a speed-dependent interruption of the operational functions ensuring a switching-off of essential operational functions only at a standstill or when reaching a low speed.

All in all the securing system for vehicles, particularly for motor vehicles, according to the invention enables a selective deactivation of said vehicle even after its theft by a wide area transmitted radio signal making the vehicle almost useless for the thief. In case the unauthorized user is driving the vehicle in public traffic bystanders will be moreover informed so that an increasing of the preventive function by installing the described securing system is provided.

A further advantage can be seen in that the securing system can be used even when the unauthorized user is in the possession of the fitting ignition key or code key of the eventually installed driving stop-work. With that, for example, rent-cars or the like can selectively be disabled.

Abstract

The invention relates to a securing system for vehicles, particularly for motor vehicles, against unauthorized use. The system consists of a radio receiver built into a vehicle for receiving a wide area transmitted radio signal and generating a switchsignal on receipt of a radio signal coded to the radio receiver. The radio receiver is operatively connected to a transmitting module and forms a first assembly group comprising a power supply indepent from the board network. The switchsignal generated by the radio receiver is forwarded to a transmitting module for transmitting wireless transmittable impulses which are received by at least one preferably several second assembly groups. These second assembly groups are located separately from the first assembly group and comprise a receiving module for receiving the impulses from the transmitting module wherein the receiving module generates output signals which cause a control unit to trigger an alarm and/or to interrupt at least one of the operational functions of the vehicle. The first assembly group is located at an inaccessible place within the vehicle. The second assembly groups are close to control units and interact with said control units which are essential for driving the vehicle.



Securing system for vehicles, particularly for motor vehicles

Patent claims

1. Securing system for vehicles, particularly motor vehicles, against unauthorized use comprising

a radio receiver arranged in the vehicle for receiving a wide area transmitted radio signal and for generating a switchsignal on receipt of a radio signal coded to the radio receiver and

a control unit for triggering an alarm and/or for interrupting at least one of the operational functions of the vehicle,

c h a r a c t e r i z e d in that

the radio receiver (2) forms with a transmitting module (6) a first assembly group (1) which comprises a power supply (7) at least temporary independent of the board network,

wherein the radio receiver (2) of the first assembly group (1) generates the switchsignal causing the transmitting module (6) to transmit wireless transmittable impulses,

at least one second assembly group (10) comprises a receiving module (12) for receiving the impulses from the transmitting module (6) which receiving module (12) supplies an output signal to the control unit (13, 15, 16, 17, 18, 19, 20) located in the second assembly group (10) for triggering an alarm and/or for interrupting at least one of the operational functions of the vehicle, and

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the first assembly group (1) is installed separately from the at least one second assembly group (10) at an inaccessible place within the vehicle.

2. Securing system according to claim 1,
c h a r a c t e r i z e d in that

at least two second assembly groups (10) are installed in the vehicle and each second assembly group (10) is able by itself to interrupt an operational function of the vehicle.

3. Securing system according to claim 1 or 2,
c h a r a c t e r i z e d in that

the radio receiver (2) is connected to a control circuitry which comprises a first bistable relay (4) which activates the transmitting module (6) for a predetermined time by a first timer (5).

4. Securing system according to claim 3,
c h a r a c t e r i z e d in that

the components of the first assembly group (1) are supplied by an accumulator (7) installed in the first assembly group and buffered by the respective board network.

5. Securing system according to claim 3,
c h a r a c t e r i z e d in that

the components of the first assembly group (1) are supplied by an accumulator installed in the first assembly group (1) and buffered by a solar cell existing in or on the vehicle.



6. Securing system according to one of the preceding claims,

characterized in that

the second assembly group (10) comprises a second bistable relay (13) which responds to the output signal of the receiving module (12) such that an alarm and a time delayed interruption of one the operational functions of the vehicle is effected, wherein a reset of the second bistable relay (13) is only possible with a code-protected reset unit (14).

7. Method for securing vehicles, particularly motor vehicles against unauthorized use comprising following steps:

- transmission of a radio code signal by a wide area communication system;

- receiving of the radio code signal by a radio receiver located at an inaccessible place within the vehicle and releasing a switchsignal for activating a transmitting module which is located at an inaccessible place within the vehicle and which generates wireless transmittable impulses;

- receiving of the impulses from the transmitting module by at least one receiving module located separately from the transmitting module within the vehicle, wherein the receiving module or modules release an optical and/or acoustical alarm and disable the vehicle after a time delay by means of self-holding switching devices.