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(58) Field of search  
**G4N**

(54) **Burglar alarm system for a vehicle or the like**

(57) In a burglar alarm the circuitry is energised in response to the turning off of the ignition switch, whereupon a first timer is started and a quiet annunciator sounded. If the ignition switch is operated before expiry of the timer, the vehicle can be driven; otherwise the ignition circuit is disabled and the circuit 'armed' simultaneously with the cessation of the quiet annunciator. Upon reentry into the vehicle, a second timer is started to allow sufficient time for an initiated person to disable the alarm, but if no disablement has been effected by the expiry of the second timer, a loud annunciator is sounded. A radio signal may also be emitted.

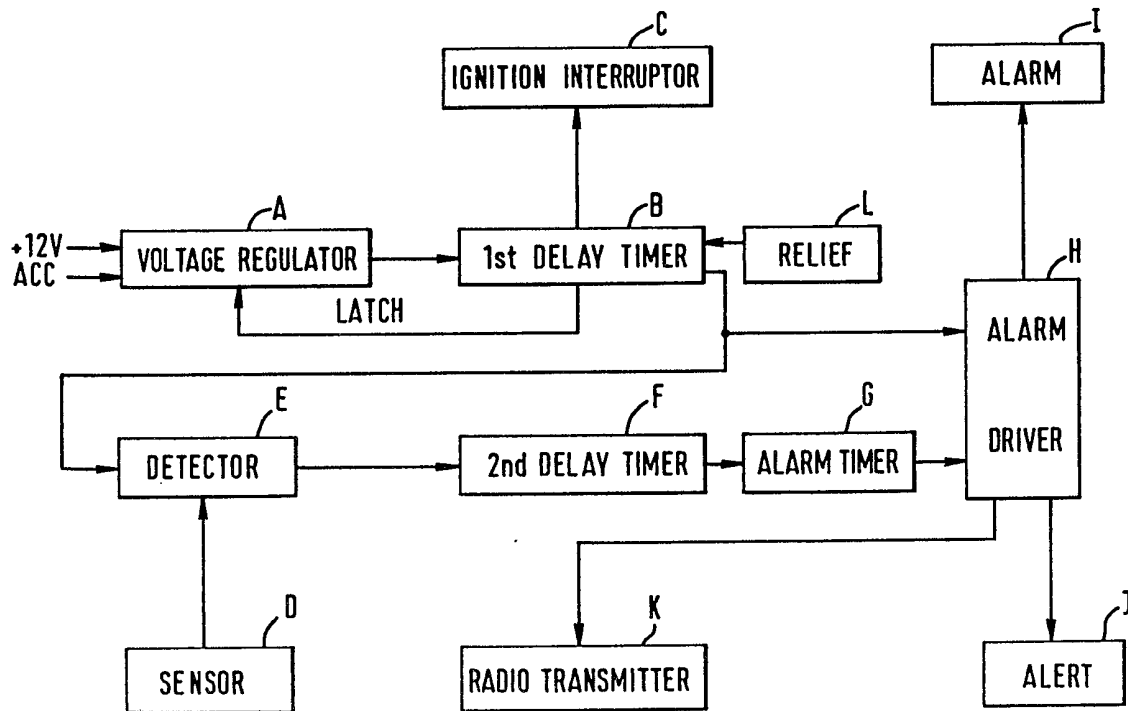


FIG. 1

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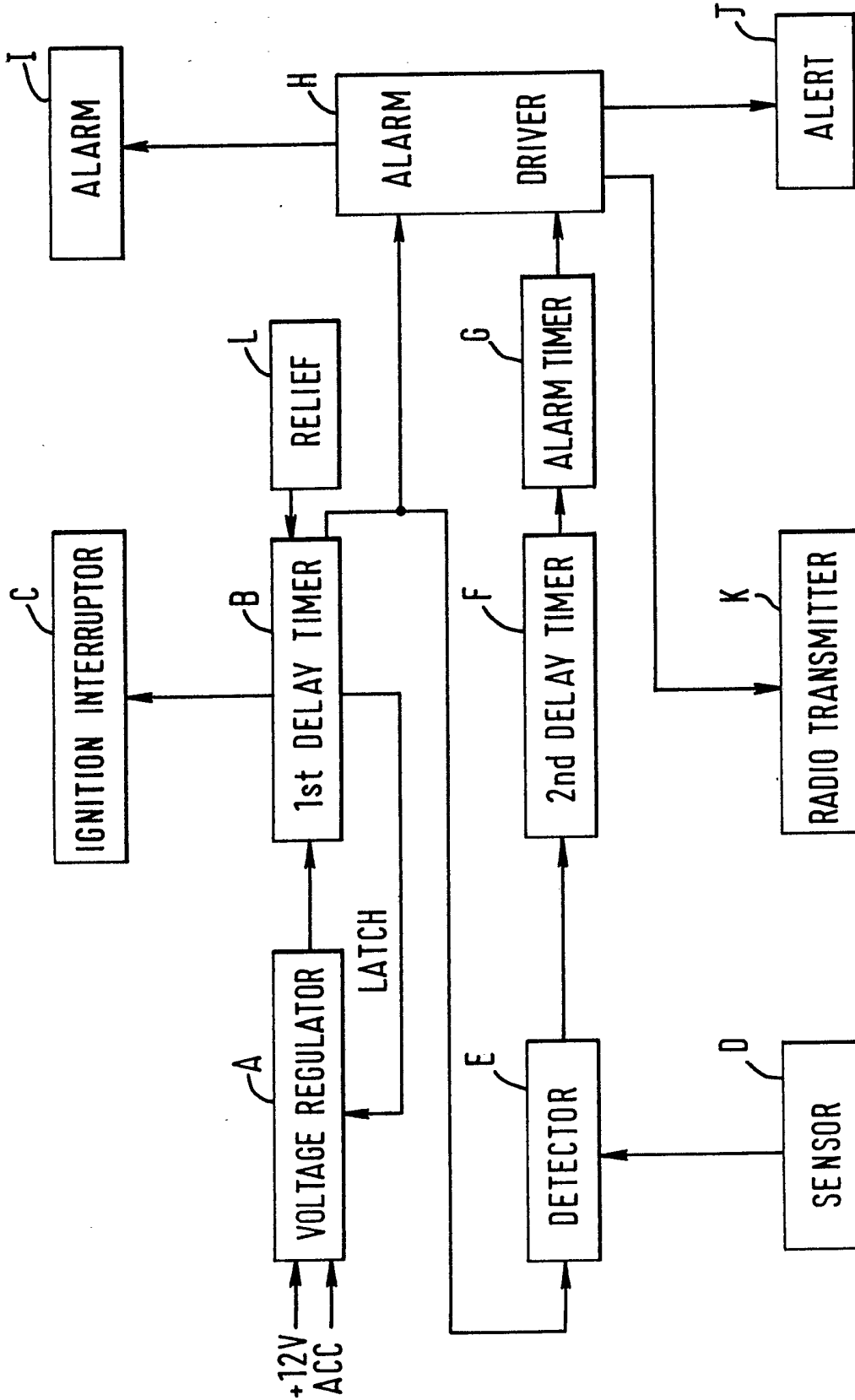


FIG. 1

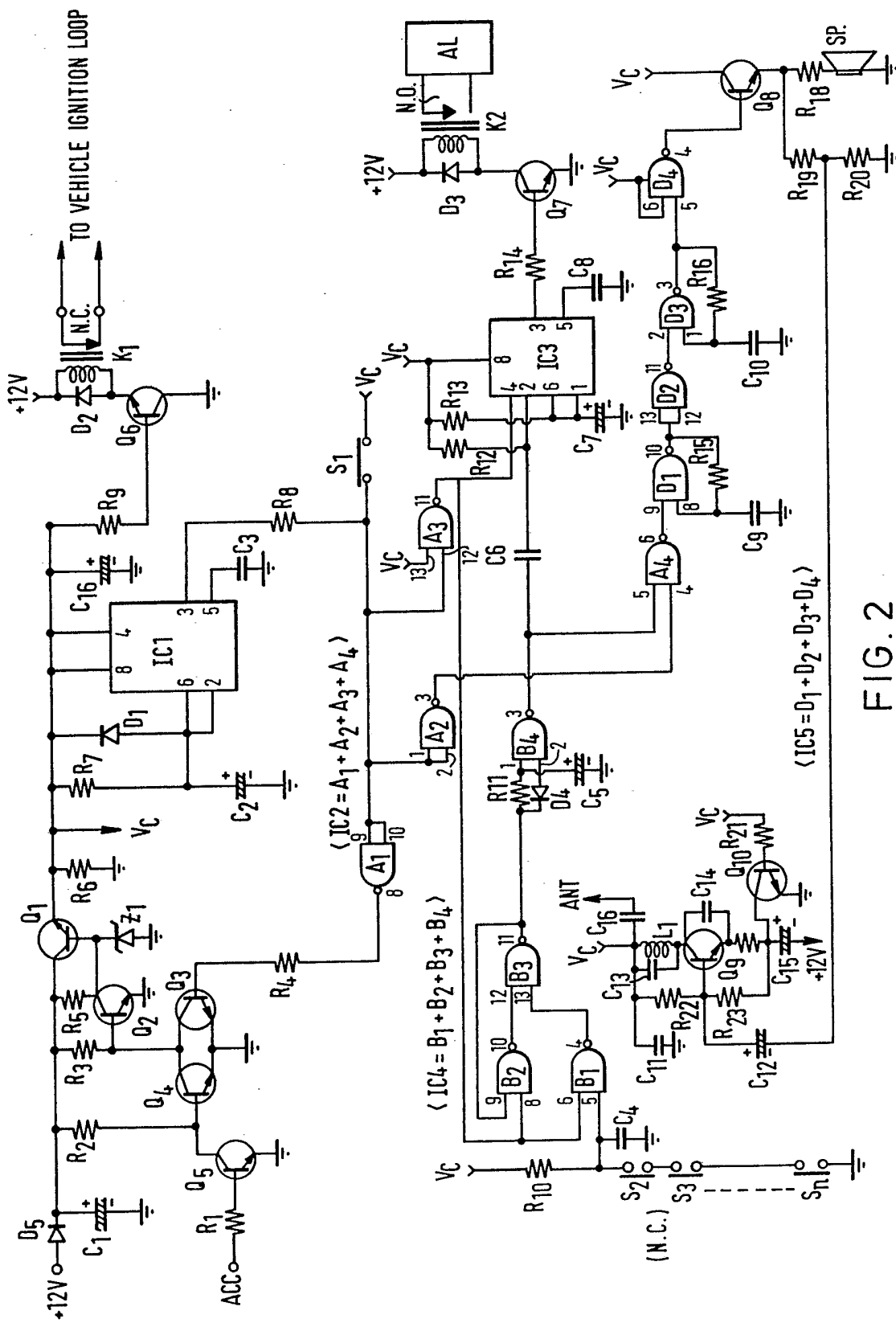


FIG. 2

## SPECIFICATION

### Burglar alarm system for a vehicle or the like

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### FIELD AND BACKGROUND OF THE INVENTION

10 The present invention relates generally to a burglar alarm, and, more particularly, to a burglar alarm system having unique anti-burglary functions and features for a vehicle or the like.

15 Having had a plurality of anti-burglary devices been provided in the art, however, on one hand, such devices are constituted by complicated circuits, it is costly, and it should be operated through many procedures so as to cause inconvenience for the possessor, or, 20 there is needed to carry with additional specific key for a relief of the installed device, it is troublesome in practice; on the other hand, a relief means of a traditional burglar alarm device is usually mounted on an exposive 25 location in the vehicle, it is therefore easily to be found and released by unauthorized persons, the original anti-burglary effect is thus failed.

### 30 SUMMARY OF THE INVENTION

35 Accordingly, it is an object of the invention to provide a burglar alarm system for a vehicle that accomplishes perfect effect of anti-burglary.

40 It is another object of the invention to provide a burglar alarm system for a vehicle that produces a weak sound and a visible light for alerting that the device is faultless while the driver turn-off the ignition key of vehicle.

45 It is a further object of the invention to provide a burglar alarm system for a vehicle, which generates a loud sound for alarming that the vehicle is meeting with burgle while the vehicle is intruded by an unauthorized person via skeleton key or any of other manners.

50 It is still further object of the invention to provide a burglar alarm system for a vehicle, which can cut off the igniting loop of the vehicle after the igniting key is turned off, through a predetermined period.

55 It is still another object of the invention to provide a burglar alarm system for a vehicle, which has a concealable contact means and an additionally magnetic element held by authorized person, by means of the provision of said concealable contact means, any undesired relief of the alarm device by unauthorized person is effectively avoided.

60 It is yet another object of the present invention to provide a burglar alarm system that is simple in construction, inexpensive, reliable in function and durable in operation.

65 The above, and other objects, features, and

advantages of the present invention will become readily apparent from the ensuing detailed description of the illustrative embodiment of the invention which is to be read in connection with the accompanying drawings in which:

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### BRIEF DESCRIPTION OF THE DRAWINGS

75 *Figure 1* is a block diagram showing an embodiment of the burglar alarm system for a vehicle in accordance with the invention.

*Figure 2* is a detailed circuit connection of the embodiment as shown in Fig. 1.

### 80 DETAILED DESCRIPTION OF THE INVENTION

85 Referring to the drawing in detail, and initially to Fig. 1 thereof, the burglar alarm system for a vehicle according to the invention is mainly composed of a voltage regulating means A, first delay timer B, vehicle igniting interrupter C, sensor means D, detector means E, second delay timer F, alarm timer G, alarm driver H, alarm means I, alert means J, radio transmitting means K and relief mean L.

90 The voltage regulating means A receives respectively power source, for example + 12 volts, directly supplied from vehicle battery and through control of vehicle igniting key (Acc).

95 Function and operation of the burglar alarm system in accordance with the invention will be described by some cases as follows:

100 Case 1: When the vehicle is parked and the igniting key is turned off:

105 Immediately, the voltage regulating means A receives power source, for example + 12 volts, directly from vehicle battery to function a stable voltage to drive the first delay timer B for timing a first predetermined period, within this period, the first delay timer B transmits a signal to energize the alarm driver for driving alert means J and the radio transmitting means K, a weak sound (and/or visible light) is generate to alert the driver that the burglar alarm system has not malfunction, while, a radio signal with a predetermined frequency is simultaneously transmitted, the driver can adjust frequency of his car radio to meet said predetermined frequency for a confirmation that the function of said radio transmitting means K is normal.

110 In the first predetermined period, the system is only functioned into an alert for a normality of the system and a transmission of a radio signal, there is functioned no any anti-burgle function, the first predetermined time is designed for a leave time of passengers in the vehicle.

115 In case of the driver and/or passengers suddenly changes his mind, that is, he does not want to leave his car after he turned off the car igniting key, when he can turn on the ignite key to start his vehicle, the burglar 130

alarm system of the invention is therefore separated from the vehicle, no any anti-burglary function of the burglar alarm system will be occurred in this time.

5 Case 2: After the first predetermined period is lapsed, that is, after all passenges have left the vehicle:

There is supplied no signal to the alarm driver H, so that the operation of the alert means J is stopped, meantime, a signal is generated from the first delay timer B to drive the vehicle igniting interrupter C for interrupting car igniting loop, furthermore, the first delay timer B generates a further signal as a latch to the voltage regulating means A.

10 It is means that, after the first predetermined period is passed away, the system keeps silience and the igniting loop of the vehicle is interrupted, however, the system is functioning in standby condition.

Case 3: When an unauthorized person intends to intrude into the vehicle:

Possibly, he will open the door of vehicle, destroy the window of car and so on, in this event, the sensor means D immediately senses a signal and sends to the detector means E to drive the second delay timer F for timing a second predetermined period, within this second predetermined period, the alarm driver H has not been energized and the alarm means I does not operate since the intention of the second predetermined period is to provide a proper time for the authorized person who returns back to his vehicle and prepares to relieve the relief means L. Either the authorized or the unauthorized person has to operate the relief means L according to a given manner within the second predetermined period, if not, the system should generate a loud alarm as to be described hereinafter.

Case 4: After the second predetermined period lapsed and the relief means L does not to relief:

45 The second delay timer F actuates the alarm driver H through the alarm timer G for driving the alarm means I and radio transmitting means K, as a result, a loud alarm is sent from the alarm means I and a radio signal is transmitted from the radio transmitting means K, in this condition, not only the vehicle itself is alarming but also a receiver held by the authorized person is receiving the transmitted signal.

55 The provision of the alarm timer G is to time a predetermined alarming period, after this period, the alarm will be stopped automatically.

In addition to the functioning of the alarm means I and the radio transmitting means K during the vehicle is burgling, the alert means J is also energized by the alarm driver H, after the predetermined period of the alarm timer G has been passed, the alert signal is still functioned continuously due to the alert means J

is regardless to the alarm timer G, therefore, even if the burglar has run away from the vehicle, when the authorized person returns to his vehicle and finds the alert means J is functioning, that is, the weak sound and/or a visible light is operated, it is means that the vehicle has been invaded by unauthorized person.

Case 5. Relief operation:

70 The authorized person opens the door of the vehicle, the detector means E is energized at once by the sensor means D, the second predetermined period is timing by the second delay timer B as described above, then the authorized person should first turn on the igniting key to Acc position indicated on igniting position of the vehicle, and second, operate the relief means L, the burglar alarm system of the invention is now released from the vehicle, no any function will be generated hereafter, then the vehicle is to be operated by normal condition. It is noted that the above operations of the igniting key and the relief means should be finished within the second predetermined period, otherwise, the alarm device I will be actuated as mentioned above.

To achieve all functions disclosed hereinabove, one embodiment of a detailed circuit connection is illustrated in Fig. 2. For the purpose of description for main functions, a well-known technoledges regarding to a normal electronic function such as bias, function of gate, are omitted here.

As shown in Fig. 2, the operation of the circuit as shown in this figure will be described by some cases corresponding to that of Fig. 1.

Case 1. When the vehicle is parked and the igniting key is turned-off:

105 There is no voltage presense in the Acc, transistor Q5 is turned-off and transistor Q4 is simultaneously turned-on as well as the transistor Q2 is cutoff, such that, A voltage regulating combination of transistor Q1, resistor R5 and zenor diode Z1 will regulate a vottage at input end and output a stable voltage Vc such as + 5V D.C. at output end of the transistor Q1, the stable voltage supplys respectively to relevant parts such as Ic1, Ic2, relief means S1, Ic3, Ic4, radio transmitting means K (transistor Q10), Ic5 and alarm means I (transistor Q8). The Ic1 which is provided as first delay timer is energized into H (high) level at its third pin, in addition, time constant composed of resistor R7 and capacitor C2 is started to timing while the stable voltage Vc is supplied, during this timing period, the alarm driver Ic3 and alarm detector means Ic4 is set to stand-by condition by NAND GATE A3 in Ic2, the function as mentioned-above is regardless to the condition of sensing elements S1, S2, -Sn, the provision of this timing period is for a convenience of the driver who can ignite his car immediately when he wants suddenly to start the car again

after the car is parked and the igniting key is turned-off.

In addition, during the timing period, Ic5 (as a part of alert means) is energized by NAND GATE A4 in Ic2, a speaker or buzzer SP will be excited, a weak sound and/or a visible light (not shown) is thus occurred to alert that the burglar alarm system keeps its normal condition.

It is obviously that the ON/OFF of the burglar alarm system of the invention is controlled by Acc (igniting key) during the first predetermined period, once the driver turns on the igniting key, the burglar alarm system is simultaneously cut off from the vehicle.

Meanwhile, a purpose of the timing period by the time constant as described hereinbefore is to provide an appropriate time for leaving of passengers.

Cases 2 and 3. After first predetermined period is lapsed and the vehicle is intruded by an unauthorized person:

After the first predetermined period is lapsed, third pin of Ic1 is turned to Low level, weak sound of buzzer SP (and/or a light) is turned-off, power source, for example +12V, energized first relay K1 to open a normal closed contact NC, the igniting loop of the vehicle is therefore interrupted. In the same time, output end of NAND GATE A1 in the Ic2 turns to High level for turning-on transistor Q3 and turning-off transistor Q2 as a latch for Acc, then, control of the burglar alarm device of the invention is regardless to power source of Acc.

Ic4 is formed by, for example, a CMOS Schmitt trigger so as to prevent error operation of the devices due to any interference or incorrect level, and combination of resistor R10 with capacitor C4 is of an integrator having short time constant, therefore, once the vehicle is invaded by unauthorized person, such as to open a door of the vehicle, to disrupt a window of the vehicle, then, one of sensing elements S2 to Sn is opened, simultaneously, Ic4 detects a signal from pin No. 5, output of pin No. 4 is turned to low level, and pin No. 11 is high level and is locked since a latch connection between pin No.9 and No. 11 is previously connected thereon. At this state, combination of resistor R11, capacitor C5 and NAND GATE B4 in the Ic4 starts to timing for a second predetermined period.

It is noted that there is no function for burglar alarming within the second predetermined period, the period is designed for a suitable time to the driver or authorized person who can operate the relief means for releasing the burglar alarm system from the vehicle as to be described after.

After the second predetermined period is lapsed, capacitor C6 triggers Ic3, output of pin No. 3 of Ic3 appears High level and energizes transistor Q7 for exciting relay K2, a normal opened contact N.O. is closed, a loud

alarm is thus generated from alarm device AL, in the same time, NAND GATE A4 in Ic2 is energized by pin No. 3 of the NAND GATE B4 in Ic4 operating Ic5, so that a weak sound and/or a light (not shown) is also functioned.

Ic3 is functioned as a timer, when time constant of resistor R13 and capacitor C7 is lapsed, there is no presence of High level at pin No. 3 of Ic3, the transistor Q7 is cut-off, the loud alarm of the alarm means AL is silenced, however, the weak sound and/or visible light is regardless to Ic3 due to the Ic3 does not function Ic5.

Case 4. Relief of the device from the vehicle:

S1 is a means and is functioned for relief, to release the system of the invention, the igniting key should first be turned to position of Acc for releasing the latch of Acc, then to close relief means S1, here, it is to be noted that the relief means S1 in accordance with the invention is of, for example, a magnetic means which is to be lied concealably on any suitable position within the vehicle, and such position is known only by authorized person and is difficult to be found by unauthorized person. After the relief means S1 is turned-on, NAND GATE A1 in Ic2 is forced to High level, pin No. 8 of Ic2 is turned to Low level, transistor Q3 is turned-off, however, transistors Q5 and Q4 remains in On and Off condition due to power source +12V has previously been applied from Acc (i.e. igniting key), so that transistor Q2 is turned-on, there is no voltage outputted from transistor Q1 so as to deenergize transistor Q6, finally, relay K1 is deenergized, normal closed contact NC of relay K1 recovers its normal closed condition, the ignition loop of the vehicle is thus established, the vehicle is to be driven by normal operation, that is, the burglar alarm device now is automatically separated from the vehicle.

It is noted that, in the case of the relief operation is reversed, that is, first to operate the relief means S1 then Acc, NAND GATE A1 in Ic2 can not be turned to High level since there is no voltage input for S1 in this time, the normal closed contact NC of relay K1 is still openend.

Case 5. The function of radio signal transmission:

During functioning of NAND A4 in Ic5, transistors Q10 and Q9 are turned-on by the operation of Ic5 through transistor Q8, the transmitter composed of transistor Q9, capacitors C14, C13 and coil L1 transmits a frequency modulated radio signal through an antenna ANT, an portable receiver (not shown) held by authorized person, or any other receivers, can receive the transmitted signal during burgling.

While the present invention has been described with reference to the particular structure shown, it is not confined to the details

herein disclosed, and this application is construction as may come within the purposes of the invention or the scope of the following claims.

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#### CLAIMS

1. An improved burglar alarm system for a vehicle and the like comprising:

10 a power regulator means for receiving respectively power source directly from vehicle battery and through an igniting key of the vehicle, a stable power is automatically outputted from said power regulator means after said igniting key is turned-off;

15 a first delay timer adapted to receive said stable power for timing a first predetermined period;

20 an alarm driver means adapted to receive a signal from said first delay timer for energizing an alert means, said alert means generates a signal for an alert that the installed burglar alarm system is faultless;

25 a sensing means having at least one sensor mounted in suitable position of the vehicle for sensing a signal while the vehicle is invading by an unauthorized person;

a detector means in response to said sensing means for generating a detected signal;

30 a second delay timer in response to said detected signal of said detector means for timing a second predetermined period, after said second predetermined period is lapsed, said alarm driver will be driven automatically; and

35 an alarm means adapted to be driven by said alarm driver means for generating a loud alarm.

40 2. An improved burglar alarm system as defined in claim 1 in which an alarm timer is adapted between said second delay timer and said alarm driver means for cutting-off said loud alarm after a predetermined time.

45 3. An improved burglar alarm system as defined in claim 1 in which a latch circuit is provided between said power regulator means and said first delay timer for latching the power supply caused by the operation of said igniting key after said first predetermined period is lapsed.

50 4. An improved burglar alarm system as defined in claim 1 in which there is no signal provision from said first delay timer to said alarm driver means after said first predetermined period is lapsed.

55 5. An improved burglar alarm system as defined in any of claims 1 to 4 further comprising a vehicle ignition interrupter means adapted to be received a signal from said first delay timer, said ignition interrupter means is  
60 functioned to cutoff the igniting loop of the vehicle after said first predetermined period is lapsed.

65 6. An improved burglar alarm system as defined in any of claims 1 to 5 further comprising a relief means, a relief of the burglar

alarm system should be operated by such that first to turn-on the igniting key of the vehicle into Acc position then to close said relief means.

70 7. An improved burglar alarm system as defined in any of claims 1 to 6 in which said alarm means is of vehicle horn itself or a separated alarm means.

75 8. An improved burglar alarm system as defined in any of claims 1 to 7 in which when said sensing means is functioned and after said second predetermined period is lapsed, both said alarm means and said alert means are functioned and the later is regardless to the  
80 function of said alarm timer.

85 9. An improved burglar alarm system as defined in any of claims 1 to 8 further comprising a radio signal transmitter means adapted to said alarm driven means, said transmitter means transmits a radio signal from an antenna during a signal from said alarm driver means is applied there to.

90 10. An improved burglar alarm system as defined in claims 1 to 9 in which each said sensor of said sensing means is of normal closed type and is series connected each other.