(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 August 2009 (27.08.2009)

PCT

(10) International Publication Number
WO 2009/105666 A1

(51) International Patent Classification:
H04W 24/00 (2009.01)

(21) International Application Number:
PCT/US2009/034706

(22) International Filing Date:
20 February 2009 (20.02.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/030,928 22 February 2008 (22.02.2008) US

(71) Applicant *(for all designated States except US)*: **CELL-BLOCK TELECOMMUNICATIONS COMPANY, INC.** [US/US]; 45 Grove Street, New Canaan, CT 06840 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **FERNANDEZ, Jose, M.** [US/US]; 1398 NW 127 Drive, Sunrise, FL 33323 (US). **AHL, Darcy** [US/US]; 22 Winding Lane, Darien, CT 06820 (US). **FARRELL, Frank** [US/US]; 7 Dark Pond Trail, Wilton, CT 06897 (US). **MANGIONE, Joseph** [US/US]; 286 Cedar Street, Cedar Grove, NJ 07009 (US). **VOWELL, Stephen** [US/US]; 4500 Sherwood Lane, #18, Houston, TX 77092 (US).

(74) Agents: **GITTEN, Howard, M.** et al.; Edwards Angell Palmer & Dodge LLP, P.O. Box 55874, Boston, MA 02205 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

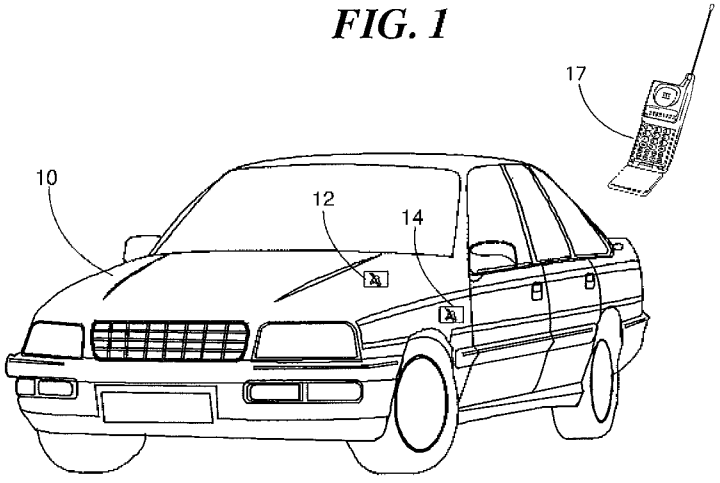
(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(54) **Title**: VEHICLE BASED SYSTEM FOR DISABLING A CELL PHONE WHILE TRAVELING

FIG. 1



(57) **Abstract**: An automotive vehicle comprising a mobile communication device associated with the vehicle. An automotive cellular blocker system embedded In the vehicle and communicating with the mobile communication device the automotive cellular blocker system receiving an input indicative of a speed of the vehicle determining whether the speed exceeds a predetermined value, and outputting a signal to disable the mobile communication device when the speed exceeds the predetermined value.

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VEHICLE BASED SYSTEM FOR DISABLING A CELL PHONE WHILE TRAVELING

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Patent Application No. 61/030,928 filed February 22, 2008 in its entirety.

BACKGROUND OF THE INVENTION

[0002] Today cellular communication systems do not account for disabling or a re-routing phone call while in a moving vehicle. The lack of this type of disabling technology and the enormous increase in cellular phone use, even while driving, has created a need to implement solutions that would minimize potentially hazardous conditions while operating a moving vehicle.

[0003] There exist today cellular jamming systems that can be installed in a vehicle to prevent any phone call from being received at a cell phone within a particular geographical area while a targeted vehicle is moving. The problem with this solution is that it is unlawful to implement in the U.S. It also does not discriminate between a driver's cellular phone and a passenger's cellular phone in the moving vehicle that are not part of the new service, and as such all parties will be blocked out from receiving calls. There is a also a possibility that the cellular jamming system can also reach other nearby moving vehicles and disable the ability of cellular phones in those non targeted vehicles to receive calls as well.

SUMMARY OF THE INVENTION

[0004] The invention describes a system that will disable or re-route a cellular phone call/text/video/messages etc if the cellular phone is known to be moving at a predetermined speed. The system will determine if the cellular phone is traveling at the predetermined speed and if so will alert the user then perform a set of predetermined options such as shutdown the phone, re-route all inbound calls to voice messages, store all text messages, shutdown the display, prevent outbound

calling/texting, and the like. The invention prevents an individual from using their cellular phone while operating a moving vehicle. The invention also covers vehicle mode feature sets. The invention is a unique vehicle mode implementation which allows for personalized configuration while the user is in a vehicle. The system can prevent driving while using your cellular phone in order to prevent hazardous driving conditions.

[0005] An automotive vehicle includes a mobile communication device associated with the vehicle. An automotive cellular blocker system is embedded in the vehicle and communicates with the mobile communication device. The automotive cellular blocker system receives an input indicative of the speed of the vehicle and determines whether the speed exceeds a pre-determined value. The automotive cellular blocker system outputs a signal to disable the mobile communication device when the speed exceeds a pre-determined value.

[0006] In one embodiment of the invention, the automotive cellular blocker system communicates with the speedometer circuitry of the vehicle. In another embodiment of the invention, the mobile communication device itself, determines the speed of the mobile communication device and outputs a signal to the automotive cellular blocker system.

[0007] As known from the inventors' U.S. patent application no. 11/956,067 co-pending herewith, profiles including parameters for operation of a target mobile communication device are stored in a database. The database in a preferred embodiment of the present invention is on board the vehicle incorporated in the embedded automotive cellular blocker system. However, the database may be stored on the cellular phone or on a server in communication with the cellular phone. The database includes the parameters under which the target mobile communication device (cellular phone) is to operate when in motion. The parameters stored within the database include operation algorithms for the mobile communication device, by way of example, one of allowing certain phone calls to pass through, providing a busy signal,

diverting the communication to an email, voicemail or other communications address or the like. This methodology works whether the information is attempted to be originated at the target mobile communications device or whether the mobile communications device is the target communications device; i.e. inbound communications.

[0008] In its alternative embodiment, the database is stored remotely on a server in communication with a mobile communications network. The server communicates either with an automobile embedded mobile communications device or an associated mobile communications device, such as a cell phone associated with the user registered to the vehicle. The mobile communication device downloads the parameters for the database for operation of the algorithm.

[0009] The parameters may also include a predetermined speed which, when crossed by the vehicle, correspond to unsafe driving with simultaneous operation of a mobile device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Other objects, features and advantages of the present invention would be apparent from the written description and the drawings in which:

[0011] Fig. 1 is a schematic drawing of an embedded automotive cellular blocker system constructed in accordance with the invention;

[0012] Fig. 2 is a flow chart of the operation of the embedded automotive cellular blocking system in accordance with the invention;

[0013] Fig. 3 is a schematic diagram of the operation of the cellular blocking system in accordance with an embodiment of the invention;

[0014] Fig. 4 is a flow chart of operation of the embedded automotive cellular blocking system in accordance with another embodiment of the invention;

[0015] Fig. 5 is a schematic diagram and flow chart for demonstrating the operation of the embedded automotive cellular blocking system in accordance with a triangulation embodiment of the invention;

[0016] Fig. 6 is a schematic diagram and flow chart of the embedded automotive cellular blocking system for operation of the invention in accordance with a satellite embodiment of the invention;

[0017] Fig. 7 is a schematic diagram of an in-vehicle cellular blocking system constructed in accordance with the invention; and

[0018] Fig. 8 is a flow chart for operation of the embedded automotive cellular blocking system in accordance with the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] Referring to Figure 1, in which a schematic view of the embedded automotive cellular blocker system (EACBS) is provided, a vehicle, generally indicated as 10 includes an onboard engine control module 12 as is known in the art. The onboard engine control module 12 may be of the onboard CPU, a speedometer or odometer and supporting circuitry therefore including sensors for sensing current operating conditions of a vehicle 10. The embedded automotive cellular blocker system 14 is mounted within the vehicle 10, and may in fact be part of the circuitry for the car. Embedded automotive cellular blocker system 14 receives input from onboard control module 12.

[0020] In a preferred embodiment, the embedded automotive cellular blocker system 14 utilizes the user's key to identify the user and the potential presence of a mobile communication device 17 such as a pager, personal digital assistant or cellular phone. Once the key is used in the vehicle, a signal is sent from vehicle 10 to the cellular network to enable use of the parameters for the user while driving. This

includes but is not limited to, routing and storing phone calls, text messages, etc. until the user is stopped and out of the vehicle if the vehicle is moving at too great a speed. A cellular phone is used herein as an exemplary, non limiting, mobile communication device.

[0021] In one non-limiting embodiment, prior to the cellular blocker feature being enabled, the user may be notified via a unique audible tone/ring tone indicating that the phone is in Vehicle Mode; i.e., under the control of an algorithm making use of the Vehicle Mode parameters. The Vehicle Mode may also enable a configuration to allow for automatically enabling speaker phone, enabling critical inbound call for example a boss, or parents, or allowing 911 calling. The Vehicle Mode can also be turned ON by the user of the cellular phone as long as the user has priority rights to override the settings. In a similar manner the pairing of the mobile phone and vehicle can be done with Bluetooth or other media instead of a key.

[0022] Referring now Figure 2, a flowchart for the operation of EACBS is provided. As shown in Figure 2, EACBS 14 embedded in vehicle 10 pairs with an associated cell phone in a step 20. Engine control module 12 provides an input to the EACBS in a step 24. EACBS will obtain the speed of the vehicle in a step 22, and then under control of an algorithm stored in EACBS 14 perform a disabling mode of the cellular phone.

[0023] The block logic can be a signal sent to the network or mobile phone direct, i.e., bluetooth by the unit. If the system is using the internal car mobile system i.e. microphone , speaker etc via the mobile phone's bluetooth solution, then the unit can store all calls, text, etc without having to send the block logic signaling to the network. The user can then retrieve all the stored or forward information once the vehicle reduces its speed below the predetermined speed.

[0024] As seen from Fig. 2, EACBS 14 receives an input from onboard engine control module 12 indicative of the speed of the vehicle in step 22. In a first embodiment, the engine control module 12 may input an odometer reading or engine

rpm which corresponds to vehicle speed. The EACBS then compares the determined speed with a stored predetermined speed parameter to determine whether the speed exceeds the predetermined speed parameter in a step 26. If so, in accordance with the algorithm, the EACBS sends a trigger signal in step 28 to automotive cellular blocker system 14 embedded in vehicle 10 to cause the target cellular mobile device/cellular phone to operate in accordance with the predetermined parameters. If the mobile device is in fact incorporated within the vehicle, then a control signal will disable the communication device by either turning off the antenna of the communication device, diverting calls to voicemail, causing a busy signal to be sent by taking the mobile device "off hook" or any other similar action, or outputs an instruction to the cellular phone disabling the cellular phone or causing any other functions discussed above.

[0025] It should be noted that in an alternative embodiment, movement of the mobile device itself may be used to calculate the speed of the mobile device. As is discussed below, this may be done by triangulation, satellite monitoring or the like, utilizing straightforward time and distance calculations. In this embodiment, the targeted mobile device communicates with the EACBS 14 to instruct the EACBS 14 regarding the speed of the mobile device. This data is then utilized as discussed above in accordance with the algorithm to control the action of the EACBS 14.

[0026] Generally, there are several embodiments in which to implement a location based system for triggering the control of the cellular phone. The first is using a global positioning feature within the cellular phone. The invention provides for a unique algorithm which calculates the user's speed, using GPS readings from EACBS 14, onboard engine control 12, or the phone 17 itself, and then, depending on the predetermined user conditions set forth in the in-vehicle system database, disables the phone, including operation in accordance with preset parameters. The algorithm causes the EACBS to periodically monitor the location of the phone and then calculate if the phone distance as traveled corresponds to a speed which will cause the activation of the in-vehicle conditions, i.e., exceeds the predetermined speed. Typically the algorithm is set so that a speed corresponding to walking or running will not trigger operation of the EACBS in order to minimize false detections.

[0027] For a phone not equipped with GPS then the system can use triangular location tracking system, which utilizes the cellular network towers 30a, 30b, 30c in a triangulation manner to predict the phone location as shown in Fig. 3. If the phone is moving at a high speed, the triangle location tracking system via a unique algorithm will detect the high speed and trigger the disabling process based upon the stored vehicle parameters. In this embodiment, the cellular service provider may block service at the source, within the network.

[0028] Turning to Fig. 4, a flow chart for utilizing cell towers 30a-30c in accordance with the invention is provided. Cell phone 17 is paired with the EACBS in a step 40. In this way, cell phone (not shown) is in communication with EACBS 14. As the cell phone 17 traveling within vehicle 10 moves relative to cell towers 30a, 30b, 30c, triangulation is performed as a function of the relative strength of the communication signal between the cell phone and the respective tower 30. In a step 42, EACBS 14 determines the relative strength of the signal from the respective cell towers 30a-30c as input from the cellular phone 17. As above, in a step 44 EACBS 14 determines whether the speed exceeds a predetermined threshold speed value as stored either in a network system, EACBS 14 or on a cellular phone and issues a block logic signal to disable the cell. In a step 46, the EACBS disables the cell phone.

[0029] In a similar manner a satellite based GPS system can be used as shown in Fig. 6 in which positioning satellites 60a, 60b, and 60 c are substituted for cellular towers, but the algorithm is substantially the same. This triangle method can be mobile phone centric or network centric, meaning it can be handled by the mobile phone itself or by the network monitoring the mobile phone.

[0030] As seen, in a step 62 EACBS 14 determines signal strength from the respective satellite 60a, 60b, and 60c. EACBS 14 receives GPS co-ordinants through a cellular network in a step 64. In this network centric embodiment, the EACBS compares the GPS co-ordinants to parameters stored in a database associated with the cellular phone in a step 66. If the parameters are exceeded or matched, to trigger

cellular phone control, the data center sends a command in a step 68 to block the calls to and from the cell phone (data center or EACBS).

[0031] Referring to Figure 7, an in-vehicle cellular blocker system embodiment of the invention is illustrated. It consists of an EACBS control unit 90 installed in the vehicle. Control unit 90 consists of a cellular module which is used to communicate with the cellular network. It also incorporates an accelerometer to determine speed of the vehicle along with other peripheral devices such as bluetooth, GPS, etc. The main function of control unit 90 is to identify that the vehicle 10 is moving and communicate with the cellular network. If the vehicle is moving then the control unit will send a signal to the cellular network to activate the Vehicle Mode algorithm. Vehicle Mode as used herein is a menu of parameters for vehicle mode operation. Once the Vehicle Mode parameters are pre-determined they are then used to configure the cellular phone/network based upon the user vehicle mode selections. In accordance with the algorithm, if the vehicle is traveling above the predetermined speed the cellular phone will be disabled during the period the vehicle is in use. Note the vehicle mode menu could disable multiple phones or simply one. If the cellular phone has bluetooth then a pairing can be provided prior to enabling the vehicle mode configuration.

[0032] The embedded automotive cellular blocker system will incorporate the vehicular onboard diagnostic system to determine the vehicle's operating condition such as engine on, rpms, vehicle speed, etc. This may be initiated by utilizing the vehicle key as an identifier and which identifies the user. User of the key is then identified and the vehicle sends a signal to a network or an onboard controller and database, to disable the user's cellular phone based upon the Vehicle Mode parameters as stored.

[0033] The location based cellular blocker system uses the cellular phone GPS system or triangle location system to determine whether the user of the phone is traveling at a predetermined speed corresponding to the speed at which the phone is to

be disabled. The predetermined speed is a function of user selected Vehicle Mode parameters.

[0034] The in-vehicle M2M cellular blocker system of Fig. 1 uses a small unit mounted in the vehicle which is preprogrammed with the user's information; including, in one embodiment, the Vehicle Mode parameters. It is ideal for the aftermarket. Once the vehicle begins to move and achieves the predetermined speed, the unit sends a signal to the network to disable the cell phone associated with user. Prior to the disabling process the unit will call the cell phone notifying the user that the cellular phone is about to be disabled. This will occur during an ideal stage of the vehicle. The in-vehicle small unit can also take advantage of short range communication feature such as Bluetooth, Zigbee or other wireless protocols to communicate with the user phone in order to configure the system from a remote server. The system can also incorporate a cellular jamming section if warranted such as in international markets.

CLAIMS

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A system for controlling operation of a mobile communication device in an automotive vehicle comprising:

a mobile communication device associated with the vehicle;

an automotive cellular blocker system embedded in the vehicle and communicating with a mobile communication device; and

the automotive cellular blocker system receiving an input indicative of a speed of the vehicle, determining whether the speed exceeds a predetermined value, and outputting a signal to disable the mobile communication device when the speed exceeds the predetermined value.

2. The system of claim 1, further comprising a mobile communication device embedded within the vehicle.

3. The system of claim 1, further comprising sensors for determining the speed of the vehicle and outputting a vehicle speed signal to the automotive cellular blocker system.

4. The system of claim 1, wherein the mobile communication device determines a speed of the mobile communication device and outputs a signal as the input indicative of a speed of the vehicle to said automotive cellular blocker system.

5. The system of claim 4, wherein said automotive cellular blocker system outputs the signal to disable the mobile communication device to a cellular communication network, the cellular communication network disabling the mobile communication device in response thereto.

6. The system of claim 1, wherein disabling comprises one of disabling an antenna associated with said mobile communication device; powering off the mobile communication device; causing a busy signal to be generated in response to an incoming call to the mobile communication device; and routing the incoming call to the mobile communication device to a voicemail.

7. The system of claim 1, further comprising an automotive vehicle.

FIG. 1

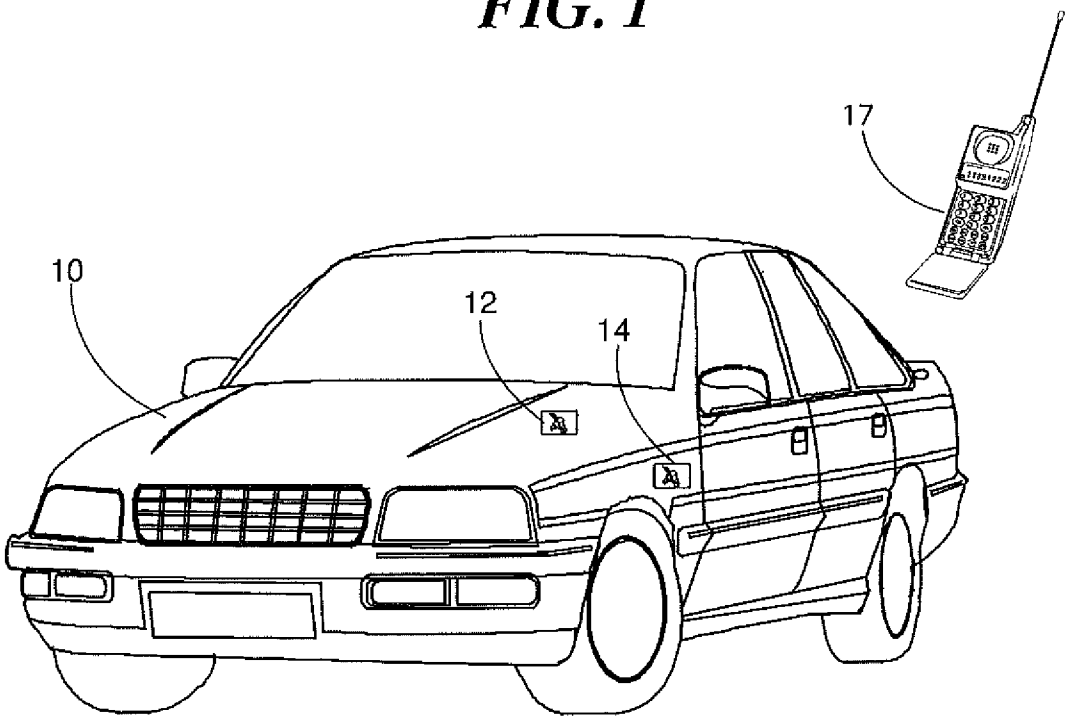

17
10
12
14

FIG. 2

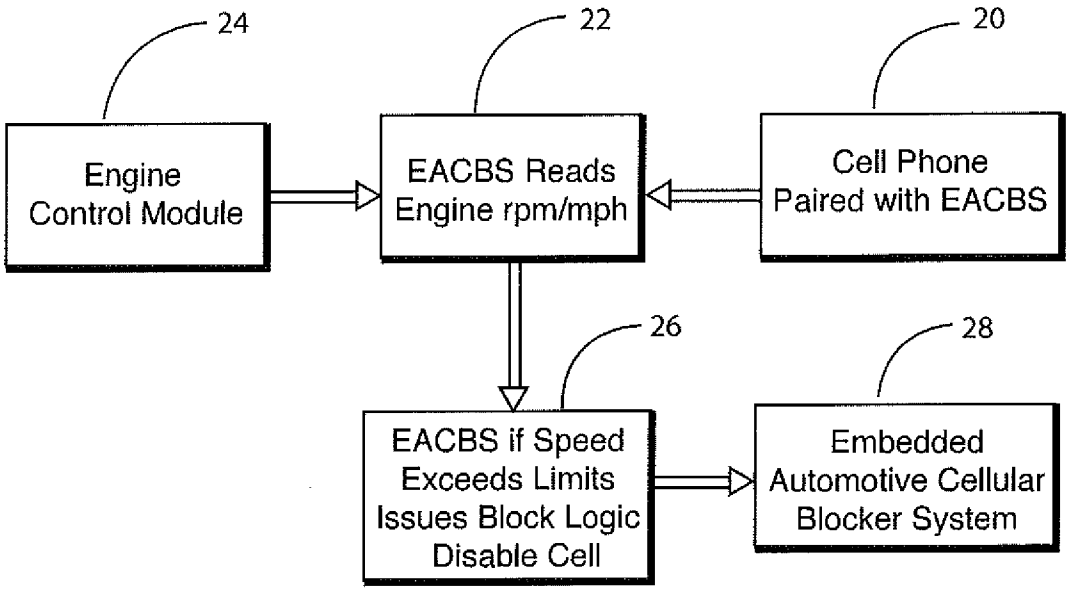

24
22
20
Engine Control Module
EACBS Reads Engine rpm/mph
Cell Phone Paired with EACBS
26
28
EACBS if Speed Exceeds Limits Issues Block Logic Disable Cell
Embedded Automotive Cellular Blocker System

FIG. 3

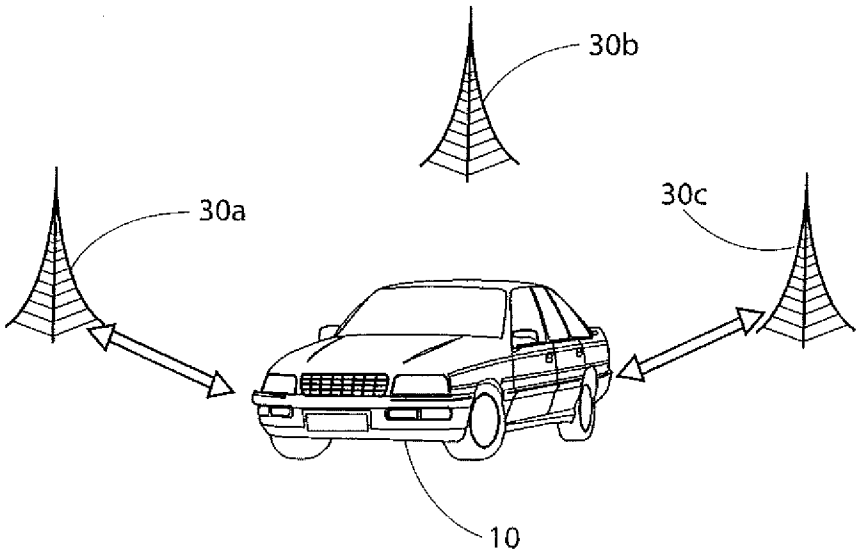

30b
30a
30c
10

FIG. 4

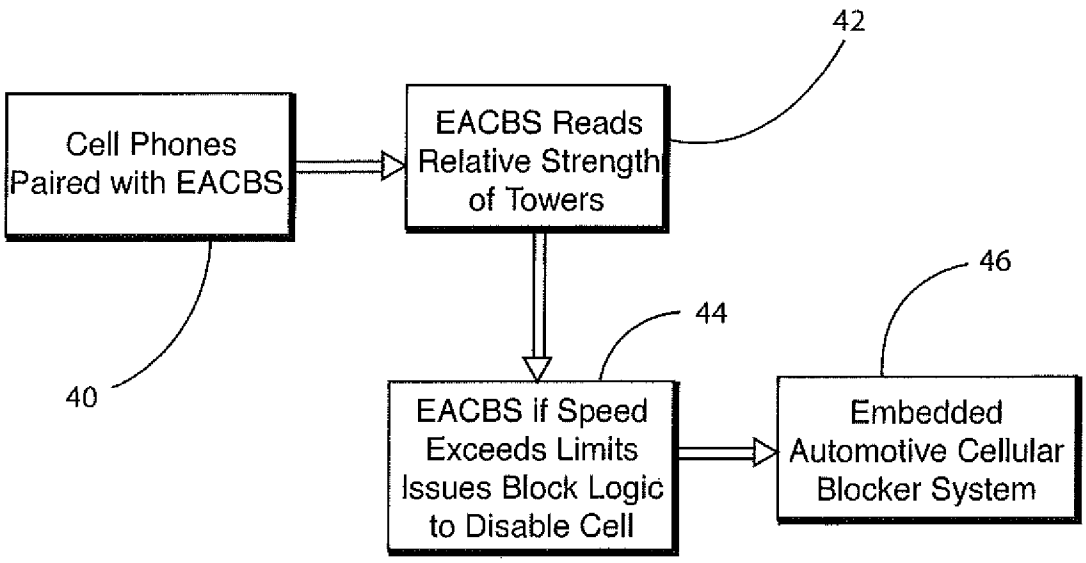

42
Cell Phones Paired with EACBS
EACBS Reads Relative Strength of Towers
40
44
46
EACBS if Speed Exceeds Limits Issues Block Logic to Disable Cell
Embedded Automotive Cellular Blocker System

FIG. 5

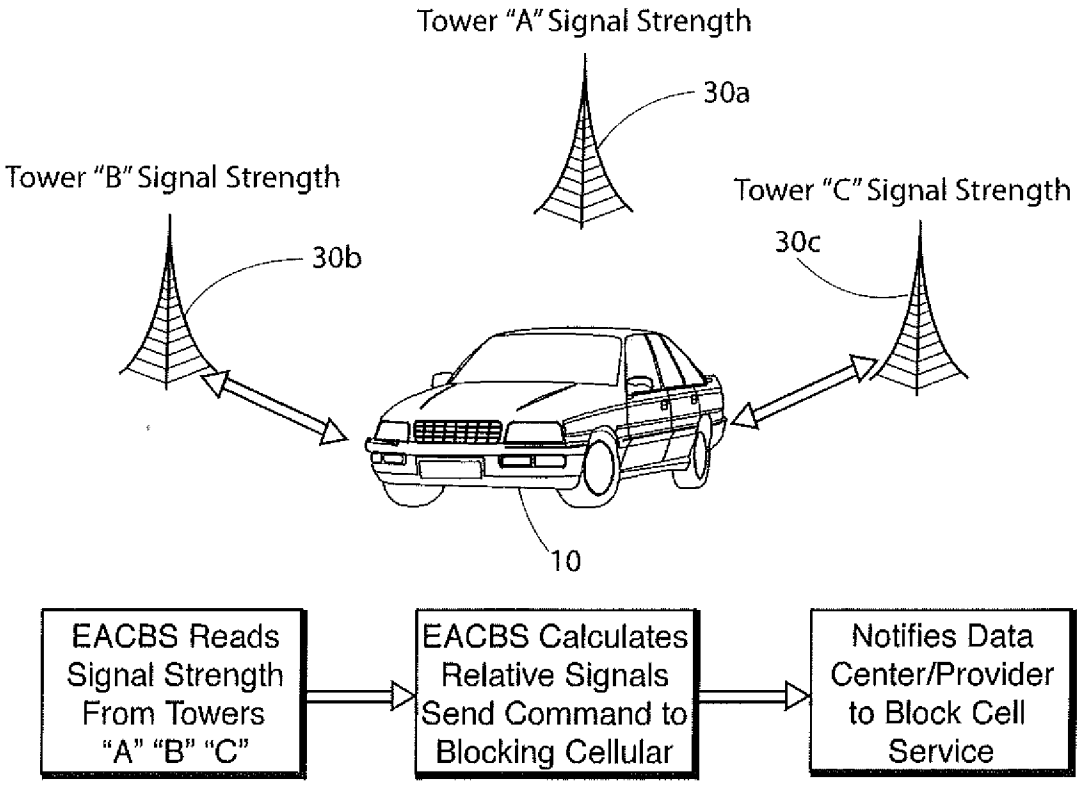

Tower "A" Signal Strength
30a
Tower "B" Signal Strength
30b
Tower "C" Signal Strength
30c
10
EACBS Reads Signal Strength From Towers "A" "B" "C"
EACBS Calculates Relative Signals Send Command to Blocking Cellular
Notifies Data Center/Provider to Block Cell Service

FIG. 6

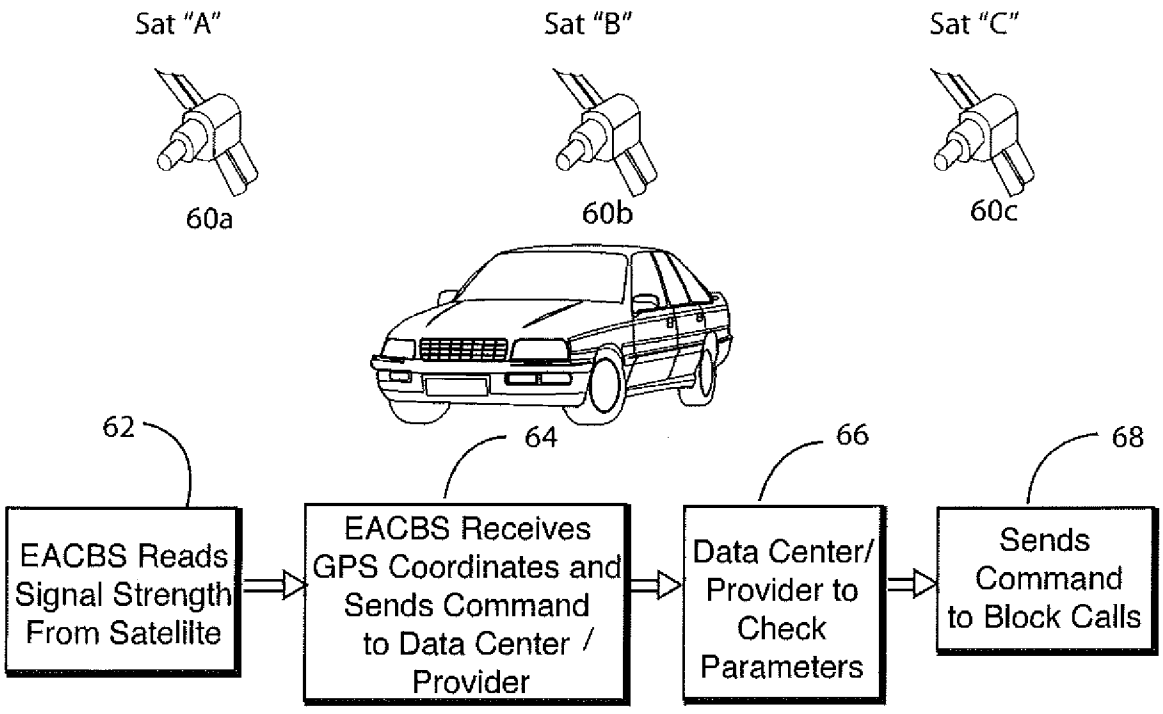

Sat "A"
Sat "B"
Sat "C"
60a
60b
60c
62
64
66
68
EACBS Reads Signal Strength From Satelilte
EACBS Receives GPS Coordinates and Sends Command to Data Center / Provider
Data Center/ Provider to Check Parameters
Sends Command to Block Calls

FIG. 7

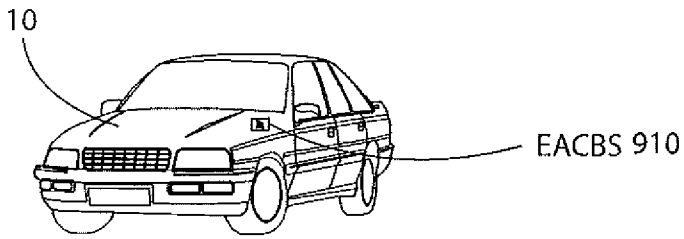
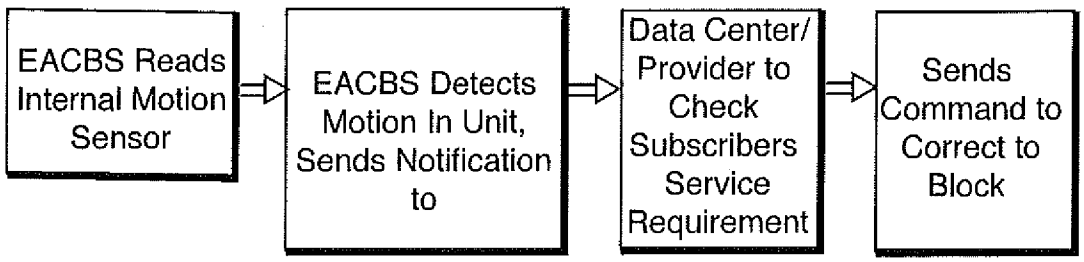

10
EACBS 910

FIG. 8


EACBS Reads Internal Motion Sensor
EACBS Detects Motion In Unit, Sends Notification to
Data Center/ Provider to Check Subscribers Service Requirement
Sends Command to Correct to Block

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 09/34706

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - H04W 24/00 (2009.01)
USPC - 455/456.4
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC: 455/456.4

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 455/403, 456.4; 340/426.14 keyword limited - see search terms below

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWest (PGPB,USPT,USOC,EPAB,JPAB), Google Scholar, Google Patent
Search terms: cellular, mobile, communication, device, telephone, phone, vehicle, automobile, speed, velocity, motion, sensor, traveling, disable, block, restrict, jamming, predetermined, limit, threshold, above, exceed, antenna, power off, busy signal, voice

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2002/0177928 A1 (MORIGUCHI et al.) 28 November 2002 (28.11.2002), para [0012]-[0014]	1-7
Y	US 6,922,571 B1 (KINOSHITA) 26 July 2005 (26.07.2005), col 1, ln 50-57, col 2, ln 62 to col 3, ln 3, col 5, ln 1-9, 22-33	1-7
Y	US 6,687,497 B1 (PARVULESCU et al.) 03 February 2004 (03.02.2004), col 1, ln 44-65, col 2, ln 18-20	6
A	US 2005/0255874 A1 (STEWART-BAXTER et al.) 17 November 2005 (17.11.2005), entire document	1-7

☐ Further documents are listed in the continuation of Box C. ☐

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"A" document defining the general state of the art which is not considered to be of particular relevance
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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 March 2009 (27.03.2009)	14 APR 2009
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Lee W. Young PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774