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(54) **Highway driving assistance system for car drivers**

Strassenunterstützungssystem für Autofahrer

Système d'aide à la conduite sur route pour conducteurs

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(56) References cited:
EP-A- 0 860 804 **US-A- 5 289 183**

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Description

[0001] The present invention relates to an assisted-driving system for car drivers using highways or roads in general, characterized in that said routes are equipped with suitable radar sensors and/or infrared devices which are fixed and transmit, over a wireless (radio, GSM) link or by means of optical fibers, the processed data related to traffic conditions on the respective lanes, and are connected to suitable receivers or consoles installed on the cars in transit. Said system assists and informs the car driver in real time regarding traffic conditions or any traffic jams or road accidents or particular existing atmospheric conditions (for example, low visibility, fog, storms, et cetera) in the direction of travel and in detail on the individual lanes. By virtue of the connection according to the invention it is furthermore possible to provide the driver with further useful information, such as the distance from exit/access junctions, service stations, traffic jams, accidents, et cetera. The invention is defined by the features of claim.

[0002] In the current state of the art, there are already various information systems for driving assistance; some have a predominant influence on the assistance provided to drivers in order to increase their safety, others on the information supplied, which depending on its kind indirectly contributes to the drivers' safety or simply increase driving comfort. Systems are known which provide an acoustic indication when, for example when reversing into a parking space, one moves too close to the vehicle parked to the rear; anticollision onboard devices, that is to say, devices which during normal travel report the presence of vehicles ahead and to the sides of one's own vehicle, are also known. There are also radio or telephone systems dedicated to the transmission of traffic news, bad weather conditions, et cetera, and there are onboard devices which by having an archive of road maps progressively display the optimum route to reach the intended destination. From the constructive point of view, these systems can be of three kinds: vehicle-based; infrastructural; mixed.

[0003] Devices of the first type are those which can operate correctly without requiring the support of any external apparatus in addition to those installed on the vehicle (for example mapping devices, anticollision radars, et cetera), whereas so-called infrastructural devices are those which, like for example the variable-message information stations placed along roads or highways, inform drivers without requiring the adoption of any particular device on board the vehicle.

[0004] US-A-5 289 183 shows roadside transmitters transmitting their ID, position and time to passing vehicles, the vehicles send their ID and other data back to the roadside transmitters. Then, the roadside transmitters send this data to a central station, for statistic purposes and for traffic jam prediction. The central station can forward this information to be displayed in the vehicle.

[0005] Finally, mixed systems are those which in order

to operate correctly require both particular infrastructures on the road system and the adoption of dedicated devices on board the vehicle. A typical example of these solutions is constituted by traffic information broadcast over radio or telephone channels, satellite navigation systems, et cetera.

[0006] Up to now, the anticollision function, or more generally the automatic monitoring of the area ahead of (or surrounding) the vehicle has been performed by means of vehicle-mounted devices, mostly based on sensors using radar, laser or IR (infrared) technologies. Their characteristics, in addition to obviously depending on the specific methods of embodiment, are highly influenced by the technology used. These systems are expensive, have a limited range (no more than 60-100 m) and in any case do not allow to detect vehicles located beyond the nearest ones; they are affected by frequent false alarms, in that they very often detect vehicles which do not exist or detect them in incorrect positions; and they are of the single-function type, in that they cannot provide other information apart from data regarding the nearby vehicles.

[0007] The aim of the present invention is to provide a system for assisting and informing the driver, overcoming all of the described drawbacks.

[0008] The present invention provides for the availability, on board vehicles traveling on suitably equipped highways and roads, of a particular console which has a modest cost (on the order of the cost of an ordinary car radio) because it transfers to the road infrastructure the burden of monitoring the vehicles that are present. Other burdens for the driver might be dependent on the auxiliary services requested.

[0009] The information regarding the vehicles that are present in the region ahead of the travel area supplied to the vehicle equipped with suitable devices as described above will be more complete and exact. The sensors installed along the road in fact reveal the entire traffic situation. On board one can also be informed regarding vehicles located further away than the immediately neighboring ones. The sensors located in fixed positions on the road in fact overcome the drawbacks of mobile ones, that is to say, false alarms and vehicle detection failures are less likely, accordingly providing more reliable information.

[0010] Furthermore, multiple functions are possible with a single vehicle-mounted apparatus. In addition to the specific tasks of an anticollision sensor, it is possible to use the data link to the central computer to send other information which is useful to the driver, such as the distance from exit/access junctions, service stations, highway restaurants, traffic jams, accidents, et cetera.

[0011] According to the present invention, the aim of the system, as mentioned, is to provide assistance to people driving in poor visibility, for example due to fog or heavy rain, by means of a small console installed on board, which displays: the vehicles located ahead, differentiating them in terms of distance, travel lane and

relative speed; stationary or very slow-moving vehicles; approaches to exit/access junctions, service stations, highway restaurants, et cetera; indication of roadwork; other useful information. The information displayed on the console is updated continuously.

[0012] Another no less important function of the system is to allow remote, continuous and real-time monitoring of the highway route, since it provides the control center with information related to: vehicles stopped on the emergency lane or on a traffic lane; accidents requiring immediate intervention of rescue vehicles; traffic congestion or building up of traffic jams; development of traffic.

[0013] The system for acquiring information related to the traffic on the roadway uses a network of sensors constituted by radars and IR (infrared) sensors. The information collected by the sensors is sent to a central computer over the data transmission network (for example of the fiber-optics type) of the highway, where it is processed, providing tracking (that is to say, determining at each instant the position and speed) of the detected vehicles in real time.

[0014] The data produced by the processing and related to the position and speed of the vehicles that are present are grouped appropriately and sent to the highway control center, in order to update the current traffic situation, and to the vehicles, by means of a digital wireless network link, for example of the GSM type, where they are displayed graphically on the onboard console and/or acoustically.

[0015] The operation of the system therefore requires the development of a series of units or subassemblies, the main ones being: the radar and IR sensors to be installed in fixed positions along the highway route; the local sensor control units, in which the information obtained from the sensors is digitized and processed; a central computing unit, which is connected to the sensors by means of a high-speed link (for example of the ATM (Asynchronous Transfer Mode) type) and to the vehicles by means of the GSM telephone network or the like; and an onboard console for each vehicle.

[0016] The radar and IR sensors, which constitute the network of sensors by means of which information concerning vehicle traffic is acquired, have the same functions and generate the same kinds of data, differing only in their different underlying technologies and different coverage areas.

[0017] The function of each sensor, common to the radar and to the IR sensor, is in fact to detect and locate vehicles with great accuracy, measure their speed, and originate information required for the operation of their local control unit.

[0018] Real-time processing of all the information acquired by the sensor (of the radar or IR type), filtering of said information and extraction of the information related to the vehicles present in the coverage area are performed by a high-performance DSP (Digital Signal Processor). Each unit also comprises a communications card

which ensures transfer of the information acquired by the sensor to the central computer over the data transmission network of the highway, and uses a standard data exchange interface.

[0019] The central computer receives all the data originating from the sensor network and processes them, ensuring vehicle tracking among contiguous sections of the highway, so as to: provide appropriate grouping thereof, generating the messages to be sent to the vehicles; providing the system supervisor, who works at the highway control center, with an "panoramic view" of all the traffic that is present on the sections covered by the sensors; and all the information useful for verifying that the system is operating correctly.

[0020] The central computer is essentially constituted by a rack which contains a series of microprocessor boards, communication boards required for data exchange with the field sensors and with the vehicles, and interface circuits for driving the monitor of the supervisor.

[0021] The vehicle-mounted console, characterized by small size and low cost, essentially consists of two sections, one for receiving the signals that arrive from the central computer and one which ensures their graphical presentation on a small display. The console is constituted by a low-consumption microprocessor unit which converts the data string received from the wireless data transmission network, generating a presentation which is formed by two parts: the first one is similar to the display of a short-range radar and the second one relates to the display of other information which is useful to the driver.

[0022] The innovations that derive from this invention are several and involve both drivers and road operators.

[0023] In fact: a) for drivers, it offers undeniable advantages in terms of safety, since it allows to "see", with considerable advance, the vehicles located ahead, which in poor visibility, typical of the winter season (with frequent possibility of fog, heavy rain, hail, et cetera) constitute potential causes of impact and loss of vehicle control. With respect to the latest generations of onboard anticollision devices, essentially based on onboard radar or laser sensors, the system, in addition to providing a larger coverage area, also allows to "see" the vehicles that precede the nearest ones. It is accordingly possible to brake in advance when approaching the rear end of a traffic jam or if stationary or slow-moving vehicles are reported ahead;

[0024] b) for traffic operators, the system allows remote and real-time monitoring of the highway stretches covered by the sensors and therefore allows continuous monitoring of the development of traffic and the immediate dispatching of rescue vehicles if accidents or vehicles stopped due to failures are detected. The nonintrusive nature of the sensors used is a further advantage of the system. With respect to conventional sensors, such as the electromagnetic induction coils widely used to detect vehicle traffic, they allow to: expand the area controlled by a single sensor to 1-2 km, whereas coils are, as is well-known, "point" sensors; install them without any in-

teraction with the road surface and therefore without being susceptible to all the installation and maintenance problems typical of coils, which arise from their installation in the traffic lanes of the roadbed.

[0025] The present invention is therefore highly useful for drivers, providing the user with information on what is occurring in his direction of travel with good precision and considerable advance, in order to allow him to perform the maneuvers required in order to avoid possible accidents.

[0026] The above described characteristics and others will become apparent and evident from the following detailed description of some non-limitative examples of embodiment of the system in the accompanying four drawing sheets, wherein:

figure 1 is a general block diagram of the system;
figure 2 is a schematic perspective view of an installation with a radar device on a highway;
figure 3 is a plan view of figure 2;
figure 4 is a plan view of a highway with two radar devices with overlapping (redundant) coverage;
figure 5 is a plan view of a highway with two mutually opposite radar devices installed at the roadside;
figure 6 is a front view of a vehicle console equipped for a highway with three lanes plus an emergency lane and for additional auxiliary information;
figure 7 is a view of the console which displays the traffic in the direction of travel of the user.

[0027] The system for assisting and informing drivers of vehicles traveling on roads or highways (1) first of all uses, in the more dangerous stretches of road and/or on entire routes, particular equipment which is fixed (for example on poles 2), such as radars (3) and/or (5) and/or infrared sensors which are connected by means of a data transmission network to the control center, which in turn processes and transmits to the wireless data transmission center in order to communicate over a wireless link with the vehicle-mounted console (7).

[0028] The sensors can be installed in various ways, according to technical and application requirements and to the requirements of the terrain. The installations can be unidirectional, bi-directional (3), or mutually opposite at the roadside (5). In the latter two cases, the coverage areas can mutually overlap partially (6) or completely (6.1) or be affected by a single sensor (6.2).

[0029] The console (7) displays, in the upper and lower part (11), in the various frames, the information related to exit/access junctions, distance from toll stations, and alarms related to traffic jams, accidents, roadwork, et cetera. The central part of the screen displays the traffic lanes (8) of the highway and the emergency lane, highlighting (9) the lane in which one's own vehicle is traveling. The presence of vehicles ahead is indicated by lighting the corresponding distance segments, whereas their color identifies the relative speed class of one's own vehicle with respect to said vehicles. Furthermore,

it is possible to display on the screen (10) in various scales the traffic and the emergency situations on the various lanes.

Claims

1. A highway assisted-driving system for car drivers, wherein a stretch of road or highway (1) or the entire route is equipped with fixed sensing devices such as radars (3, 5) and/or infrared devices capable of detecting and transmitting signals representative of the detection over a data transmission network to a central computer, where the signals representative of the detection are processed and transmitted to a wireless data transmission center and are transferred over a wireless link to a vehicle-mounted console (7) of a vehicle traveling on the stretch of road or highway or the entire route,
characterized in that the vehicle-mounted console (7) is adapted for receiving, in case of poor visibility, continuously updated parameters based on the signals representative of the detection and for informing the driver visually and/or acoustically as to the situation of the traffic ahead of his vehicle, on his travel lane and on the adjacent lanes, the parameters including the vehicles located ahead, differentiating them in terms of distance, travel lane and relative speed; stationary or very slow-moving vehicles; approaches to exit/access junctions, service stations, highway restaurants; indication of roadwork.
2. A highway assisted-driving system according to claim 1, **characterized in that** the sensing devices used along the stretch of road or highway or the entire route are of the unidirectional type.
3. A highway assisted-driving system according to claim 1, **characterized in that** the sensing devices used along the stretch of road or highway or the entire route are of the bi-directional type.
4. A highway assisted-driving system according to claim 1, **characterized in that** the sensing devices used along the stretch of road or highway or the entire route are located mutually opposite at the roadside.
5. A highway assisted-driving system according to claim 1, **characterized in that** the fixed sensing devices are provided by using in combination various types of radar (3, 5) and/or infrared sensors.
6. A highway assisted-driving system according to claim 1, **characterized in that** the processed or raw signals of the fixed sensing devices are transmitted to the central computer over a radio or a satellite link.

7. A highway assisted-driving system according to claim 1, **characterized in that** a network for connecting the fixed sensing devices to each other and to the central computer can be of the fiber-optics type; on a telephone or coaxial cable; a wireless data transmission network; a radio network; a satellite network. 5
8. A highway assisted-driving system according to claim 1, **characterized in that** a network for connection between the central computer and the wireless data transmission center can be of the fiber-optics type; on a telephone or coaxial cable; a wireless data transmission network; a radio network; a satellite network. 10 15
9. A highway assisted-driving system according to claim 1, **characterized in that** a network for connection between the wireless data transmission center and the vehicle-mounted console (7) can be: a wireless telephone network; a wireless data transmission network; a radio network; a satellite network; an infrared network; a microwave network. 20
10. A highway assisted-driving system according to claim 1, **characterized in that** it further includes visual indicators arranged along roadways such as lamps, flashing lights, traffic lights, variable-message panels and the like, the visual indicators being adapted to receive alarm signals that are used for the activation thereof. 25 30
11. A highways assisted-driving system according to claim 1, **characterized in that** the information displayed on the vehicle-mounted console (7) is integrated with the information that can be supplied by other devices, such as for example a GPS navigation system; a map storage system; a cellular telephone; a CD player; a connection to the Internet or to similar data networks; a radio receiver. 35 40
12. A highways assisted-driving system according to claim 1, **characterized in that** the vehicle-mounted console (7) is adapted to visualize the presence of vehicles ahead by lighting corresponding distance segments, whereas their color identifies the relative speed class of one's own vehicle with respect to the vehicles ahead. 45

Revendications

1. Un système d'aide à la conduite sur route pour un conducteur d'automobile, dans lequel un tronçon de route ou d'autoroute (1) ou la totalité de la route est équipé(e) de dispositifs de détection fixes, tels que des radars (3,5) et des dispositifs à infrarouge capables de détecter et de transmettre des signaux 55

représentatifs de la détection, sur un réseau de transmission de données, à un ordinateur central, auquel les signaux représentatifs de la détection sont traités et transmis à un centre de transmission sans fil et transférés, sur une liaison sans fil, à une console, embarquée dans le véhicule (7), d'un véhicule se déplaçant sur un tronçon d'une route ou 'une autoroute ou sur le trajet routier entier,

caractérisé en ce que

la console embarquée sur véhicule (7) est adaptée pour, dans le cas d'une mauvaise visibilité, recevoir des paramètres mis à jour de façon continue d'après des signaux représentatifs de la détection, et informant le conducteur, de façon visuelle et/ou acoustique, de la situation du trafic au devant de son véhicule, sur sa voie de déplacement et sur les voies adjacentes, les paramètres comprenant des véhicules situés devant lui, en les différenciant en terme de distance, de voie de déplacement et de vitesse relative ; des véhicules stationnaires ou se déplaçant lentement ; des approches aux jonctions de sortie/d'accès, des stations services, des restaurants sur autoroutes ; une indication des travaux routiers.

2. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce que** les dispositifs de détection, utilisés sur le tronçon de route ou sur la totalité du trajet routier, sont de type unidirectionnel. 25
3. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce que** les dispositifs de détection, utilisés sur le tronçon de route ou d'autoroute ou sur la totalité du trajet routier, sont de type bidirectionnel. 30
4. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce que** les dispositifs de détection, utilisés sur le trajet de route ou d'autoroute sur la totalité du trajet routier, sont situés de façon mutuellement opposée, sur le côté de la route. 35 40
5. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce que** les dispositifs de détection fixes sont prévus en utilisant en combinaison divers types de radars (3,5) et/ou de capteurs à infrarouge. 45
6. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce que** les signaux, traités ou bruts, venant des dispositifs de détection fixes sont transmis à l'ordinateur central, par radio ou par liaison satellite. 50
7. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce qu'**un réseau, servant à connecter les dispositifs de détection fixe 55

les uns aux autres et à l'ordinateur central, peut être du type à fibre optique ; fonctionner sur un câble téléphonique ou coaxial ; un réseau de transmission de données sans fil ; un réseau radio ; un réseau à satellites.

8. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce qu'un** réseau servant à la connexion entre l'ordinateur central et le centre de transmission de données sans fil peut être de type à fibre optique ; fonctionner sur un câble téléphonique ou coaxial ; un réseau de transmission de données sans fil ; un réseau radio ; un réseau à satellites.

9. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce qu'un** réseau de connexion, entre le centre de transmission de données sans fil et la console embarquée sur véhicule (7), peut être : un réseau téléphonique sans fil ; un réseau de transmission sans fil ; un réseau radio ; un réseau à satellites ; un réseau à infrarouge ; un réseau à micro-ondes.

10. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce qu'il** comprend en outre des indicateurs visuels, disposés le long des voies routières, tels que des lampes, des lampes à éclat, des feux de signalisation de trafic, des panneaux à message variable et analogue, les indicateurs visuels étant adaptés pour recevoir des signaux d'alarme utilisés pour leur activation.

11. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce que** l'information affichée sur la console embarquée sur véhicule (7) est intégrée à l'information pouvant être fournie par d'autres dispositifs tel que par exemple un système de navigation GPS, un système de stockage de cartes, un téléphone cellulaire, un lecteur de CD, une connexion à l'Internet ou à des réseaux de données similaires ; un récepteur radio.

12. Un système d'aide à la conduite sur route selon la revendication 1, **caractérisé en ce que** la console embarquée sur le véhicule (7) est adaptée pour visualiser la présence de véhicules situés devant, par éclairage de segments indicatifs de distance correspondants, tandis que leur couleur identifie la classe de vitesse relative d'un véhicule propre par rapport au véhicule situé à l'avant.

Patentansprüche

1. Ein Autobahn-Fahrerunterstützungs-System für Autofahrer, worin ein Abschnitt einer Straße oder Autobahn (1) oder die gesamte Strecke mit festen Ab-

tastgeräten, wie zum Beispiel Radaren (3, 5) und/oder Infrarot-Vorrichtungen, ausgestattet ist, die in der Lage sind, Signale, die die Erfassung darstellen, zu erfassen und über ein Datenübertragungs-Netzwerk an einen Zentralrechner zu senden, wo die die Erfassung darstellenden Signale verarbeitet und an ein Zentrum für drahtlose Datenübertragung gesendet und über eine drahtlose Verbindung an eine im Fahrzeug angebrachte Konsole (7) eines Fahrzeugs übertragen werden, das auf dem Abschnitt der Straße oder Autobahn oder auf der gesamten Strecke fährt,

dadurch gekennzeichnet, dass

die im Fahrzeug eingebaute Konsole (7) ausgebildet ist, um im Falle schlechter Sicht kontinuierlich aktualisierte Parameter auf Grundlage der Signale, die die Erfassung darstellen, zu empfangen, und um den Fahrer visuell und/oder akustisch über die Verkehrssituation vor seinem Fahrzeug, auf seiner Fahrspur und auf den benachbarten Spuren zu informieren, wobei die Parameter Folgendes einschließen: die vorne befindlichen Fahrzeuge, wobei diese nach Entfernung, Fahrspur und relativer Geschwindigkeit unterschieden werden; stationäre oder sehr langsam sich bewegendende Fahrzeuge; Anfahrten zu Aus-/Auffahrten, Tankstellen, Autobahn-Restaurants; Anzeige von Straßenarbeiten.

2. Ein Autobahn-Fahrerunterstützungs-System, gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Abtastgeräte, die entlang dem Abschnitt der Straße oder Autobahn oder der gesamten Strecke verwendet werden, unidirektional sind.

3. Ein Autobahn-Fahrerunterstützungs-System gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Abtastgeräte, die entlang dem Abschnitt der Straße oder Autobahn oder der gesamten Strecke verwendet werden, bidirektional sind.

4. Ein Autobahn-Fahrerunterstützungs-System gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Abtastgeräte, die entlang dem Abschnitt der Straße oder Autobahn oder der gesamten Strecke verwendet werden, sich einander gegenüber am Straßenrand befinden.

5. Ein Autobahn-Fahrerunterstützungs-System gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die festen Abtastgeräte bereitgestellt werden durch Verwendung verschiedener Arten von Radar (3, 5) und / oder Infrarot-Sensoren in Kombination.

6. Ein Autobahn-Fahrerunterstützungs-System gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die verarbeiteten oder unverarbeiteten Signale der festen Abtastgeräte über eine Funk- oder eine Satellitenverbindung an den Zentralrechner übertragen

werden.

7. Ein Autobahn-Fahrunterstützungs-System gemäß Anspruch 1, **dadurch gekennzeichnet, dass** ein Netzwerk zur Verbindung der festen Abtastgeräte miteinander und mit dem Zentralrechner von der Glasfaserart sein kann; auf einem Telefon- oder Koaxialkabel; ein drahtloses Datenübertragungs-Netzwerk; ein Funk-Netzwerk; ein Satelliten-Netzwerk. 5
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8. Ein Autobahn-Fahrunterstützungs-System gemäß Anspruch 1, **dadurch gekennzeichnet, dass** ein Netzwerk zur Verbindung zwischen dem Zentralrechner und dem Zentrum für drahtlose Datenübertragung von der Glasfaserart sein kann; auf einem Telefon- oder Koaxialkabel; ein drahtloses Datenübertragungs-Netzwerk; ein Funk-Netzwerk; ein Satelliten-Netzwerk. 15
9. Ein Autobahn-Fahrunterstützungs-System gemäß Anspruch 1, **dadurch gekennzeichnet, dass** ein Netzwerk zur Verbindung zwischen dem Zentrum für drahtlose Datenübertragung und der im Fahrzeug eingebauten Konsole (7) Folgendes sein kann: ein drahtloses Telefon-Netzwerk; ein drahtloses Datenübertragungs-Netzwerk; ein Funk-Netzwerk; ein Satelliten-Netzwerk; ein Infrarot-Netzwerk; ein Mikrowellen-Netzwerk. 20
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10. Ein Autobahn-Fahrunterstützungs-System gemäß Anspruch 1, **dadurch gekennzeichnet, dass** es weiter visuelle Indikatoren einschließt, die entlang Fahrbahnen angebracht sind, wie zum Beispiel Lampen, Blinklichter, Ampeln, Wechselverkehrszeichen und dergleichen, wobei die visuellen Indikatoren ausgebildet sind, um Alarmsignale zu empfangen, die zur Aktivierung davon verwendet werden. 30
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11. Ein Autobahn-Fahrunterstützungs-System gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die Informationen, die auf der im Fahrzeug eingebauten Konsole (7) angezeigt werden, mit Informationen ergänzt werden, die von anderen Vorrichtungen geliefert werden können, wie zum Beispiel einem GPS-Navigationssystem, einem Karten-Speicherungssystem, einem Mobiltelefon, einem CD-Player, einer Verbindung zum Internet oder zu ähnlichen Daten-Netzwerken, einem Radio-Empfänger. 40
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12. Ein Autobahn-Fahrunterstützungs-System gemäß Anspruch 1, **dadurch gekennzeichnet, dass** die in das Fahrzeug eingebaute Konsole (7) ausgebildet ist, um die Anwesenheit von sich vor dem Fahrzeug befindlichen Fahrzeugen durch Erleuchtung entsprechender Abstands-Segmente anzuzeigen, während ihre Farbe die relative Geschwindigkeitskategorie des eigenen Fahrzeugs im Verhältnis zu den vorne befindlichen Fahrzeugen kennzeichnet. 50
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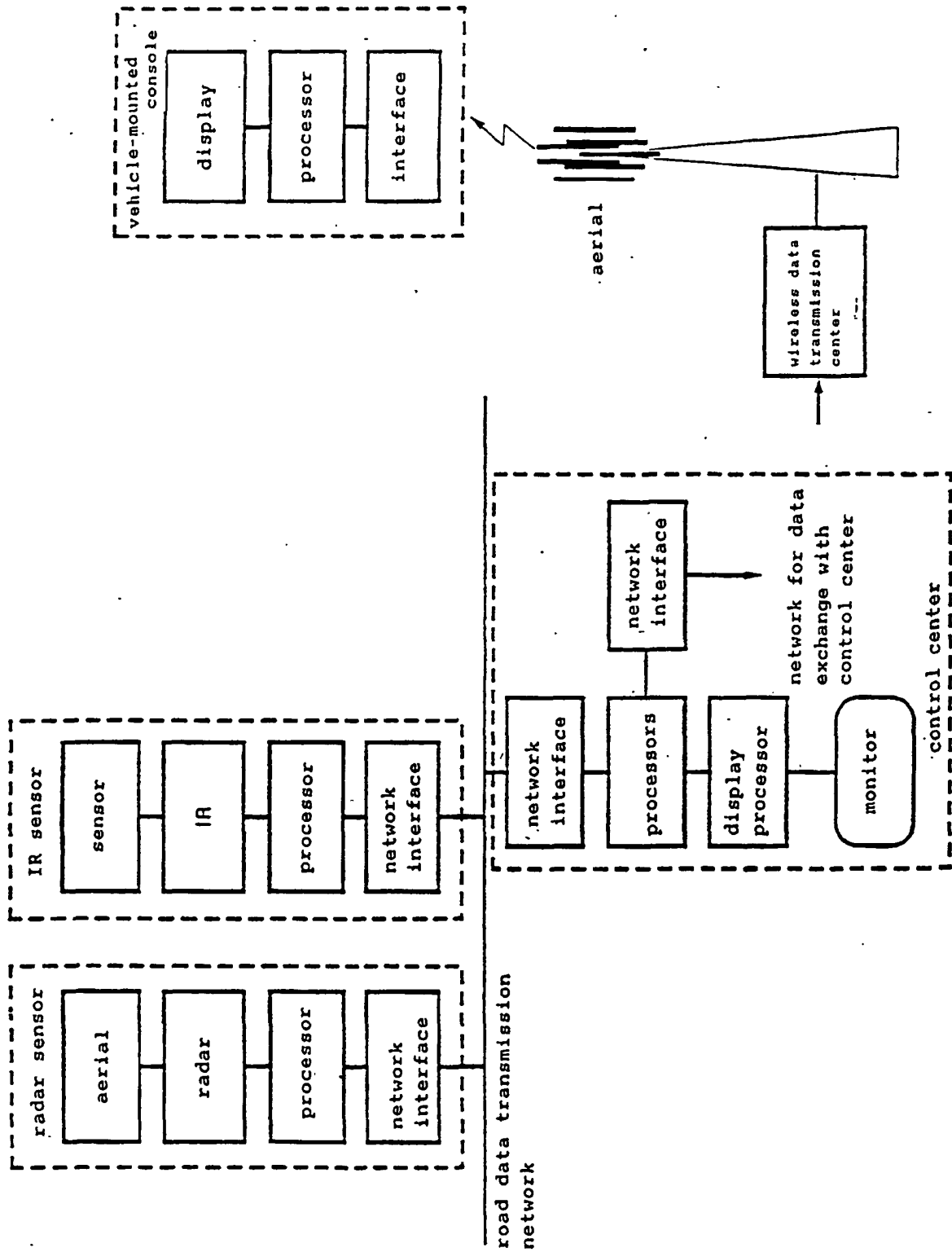
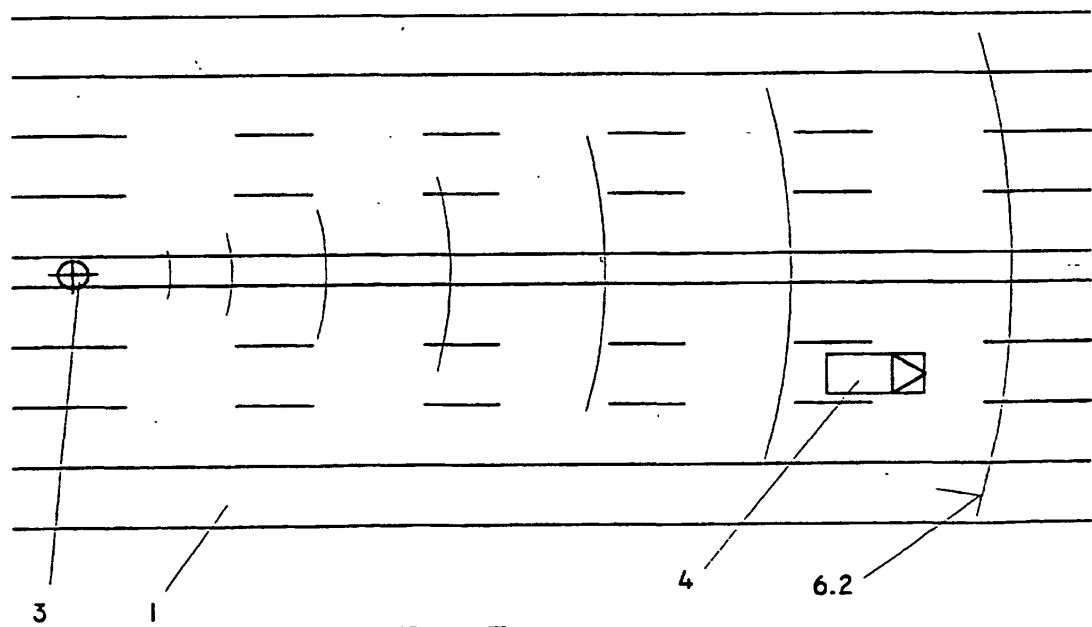
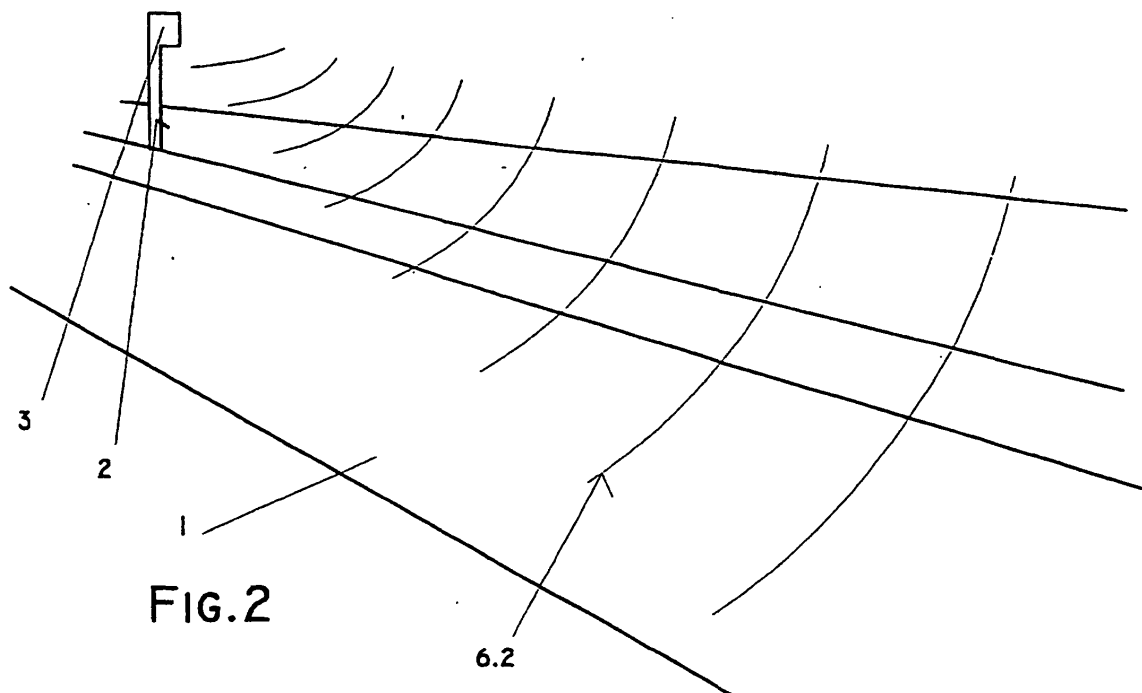
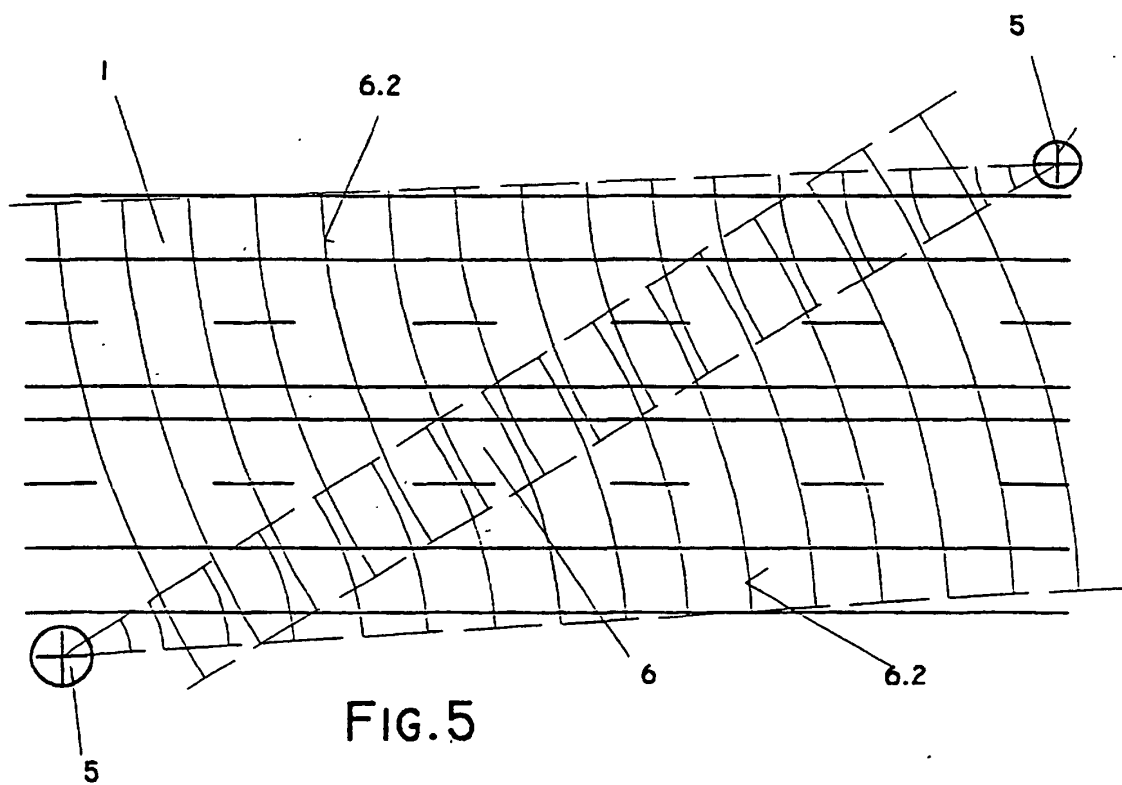
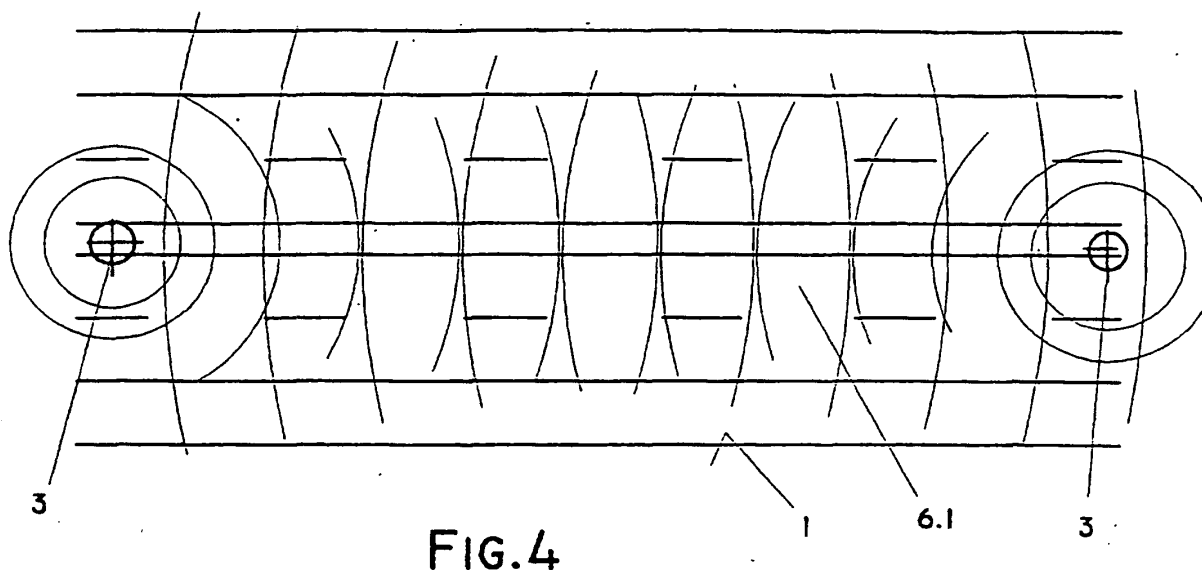


FIG.1





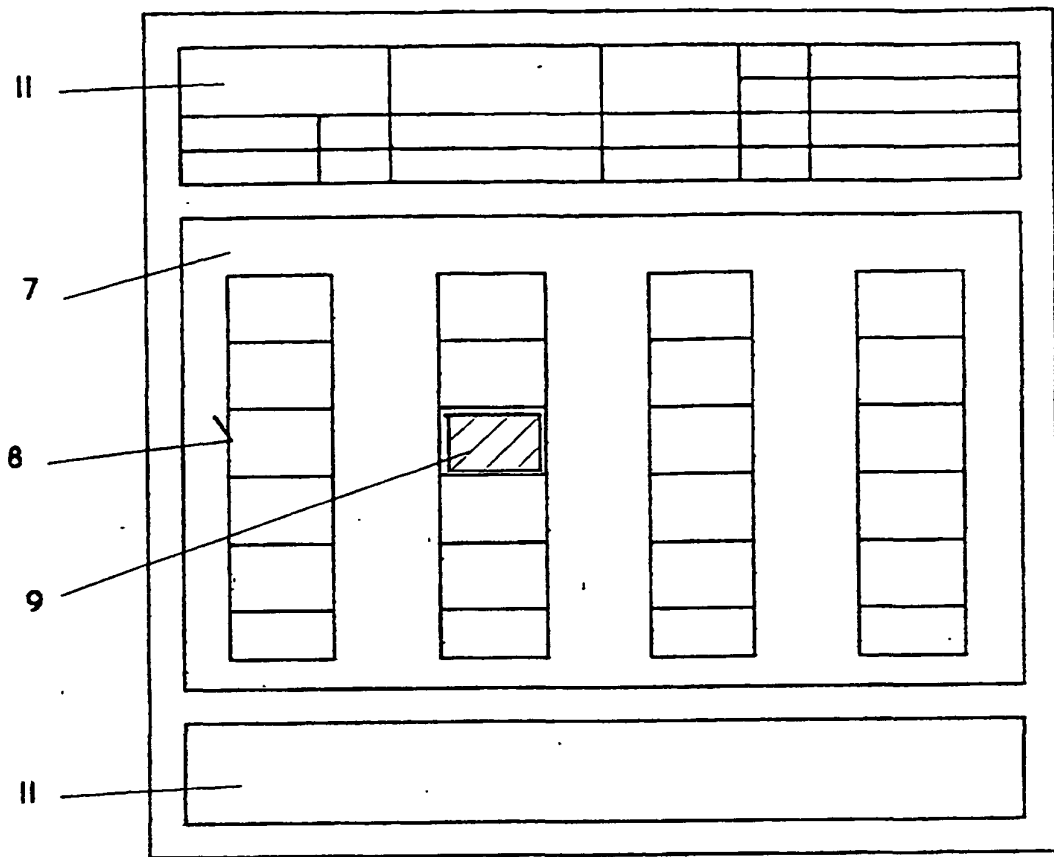


FIG.6

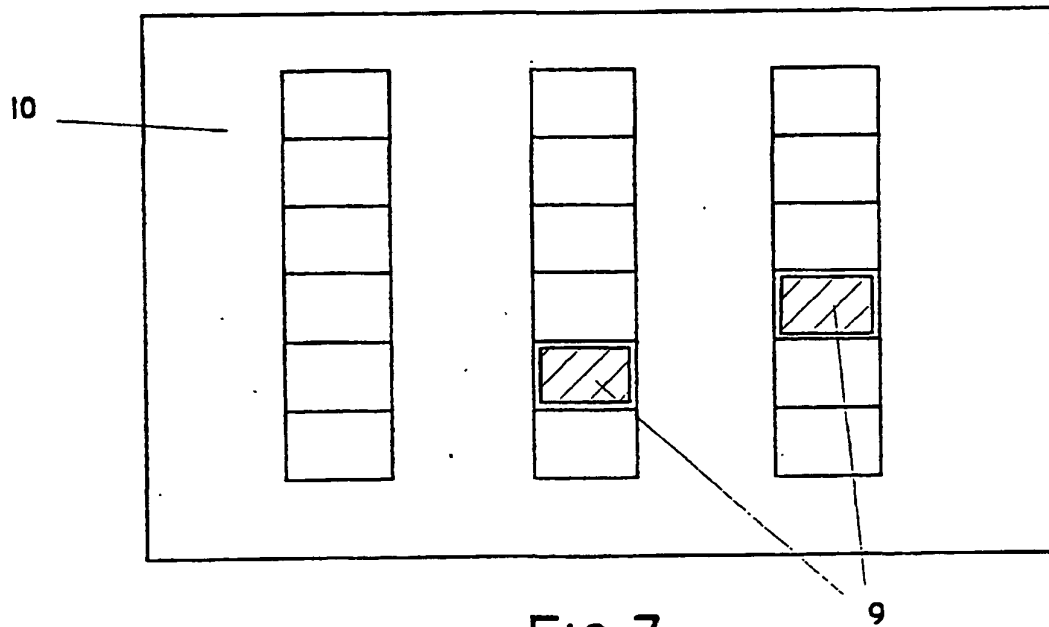


FIG.7