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(54) **Vehicle information system**

(57) A vehicle information system comprises a series of transmitters 10, located at intervals along a track or road and mounted in or on existing road structures such as cat's eyes, street lights or the like. In association each of said transmitters 10 there is provided a vehicle detection device 12 for detecting a vehicle on the track or road as it approaches or passes the transmitter unit, a data storage device 14 and a proximity sensor 16.

A receiver module 18 is provided in or on a vehicle 20 and comprises a receiver 22, a decoder 24 for decoding or interpreting signals received from a transmitter 10 by the receiver 22, and a display device 26 for displaying received information.

The storage device 14 associated with each of the transmitters 10 stores permanent information relating to the stretch of track or road by or on which the transmitter 10 is located, such as a warning that there is a sharp bend in the road ahead and that the speed limit on the road at the bend is reduced. Each of the transmitter

modules may also be arranged to determine and transmit information relating to non-permanent and non-foreseeable events, such as the presence of a queue of stationary or very slow moving vehicles on the associated stretch of track or road.

In use, a vehicle detection device 12 detects the presence of a vehicle as it approaches or passes the associated transmitter module. When a vehicle is detected, the permanent information stored in the storage device 14 is retrieved and transmitted to the receiver 22 in the vehicle 20 and displayed on the display device 26 to the vehicle driver. Further, if a queue of slow moving traffic or other obstruction has been detected by the transmitter modules along the stretch of track or road under consideration, such information is also transmitted to the receiver module 18 in the vehicle 20 for display to the driver.

Description

[0001] This invention relates to a vehicle information system and, more particularly, to a system for use in providing information and/or warnings to vehicle occupants as the vehicle travels along a track or road.

[0002] There are many circumstances in which it may be desirable to provide information to a vehicle driver regarding, for example, driving conditions or potential hazards (permanent or otherwise) further along the track or road on which they are travelling.

[0003] Examples of permanent hazards might include a sharp bend in the road ahead, traffic signals, a narrow or low bridge, etc. Vehicle drivers are usually given adequate warning of such hazards by the provision of permanent road signs and the like. Although such road signs are quite expensive to produce, erect and maintain, they are usually effective in ensuring that vehicle drivers are aware of any potential hazards further along the track or road on which they are travelling.

[0004] However, there are many more hazards which may be encountered that are not permanent, such as a queue of traffic or other obstruction ahead, and some which are not even necessarily foreseeable, such as ice or flooding on the road ahead, and, although drivers can be warned that there is a possibility of a hazard up ahead (by means, for example, of a triangular road sign of the type in common use in the United Kingdom), there is no way currently in use to warn a driver that there is in fact such a hazard, nor is there any way to warn the driver of a presence of a non-foreseeable hazard ahead.

[0005] I have now devised an arrangement which seeks to overcome the problems outlined above.

[0006] Thus, in accordance with the present invention, there is provided a vehicle information system, comprising at least one transmitter located on or by a road or track, and being associated with that road or track, or at least a stretch thereof, at least one receiver located in or on a vehicle, means for causing said transmitter to transmit one or more signals representative of information relating to said road or track (or said stretch thereof) with which said transmitter is associated, said receiver being arranged to receive said one or more signals when it is within a predetermined distance of said transmitter, the system further comprising indicating means, responsive to said receiver receiving one or more said signals, for providing an indication of the information represented thereby.

[0007] The transmitter(s) are located on or by the road or track with which they are associated and the receiver is located within a vehicle travelling along that road or track. Information signals are transmitted directly from the transmitter(s) to the receiver to provide information to the vehicle occupant(s) relating to that vehicle or track. This provides a very convenient method of providing vehicle occupants of a wide range of different items of information, including speed limits on that track or road, the fact that the vehicle is exceeding such speed

limits, permanent hazards ahead, such as a sharp bend, traffic signals, etc., and non-permanent hazards ahead, such as a queue of traffic or other obstruction in the track or road ahead, ice or flooding on the track or road ahead, etc.

[0008] Irrespective of the manner in which the information is determined or obtained, the apparatus of the present invention offers the distinct advantage of providing substantially instantaneous information regarding a road or track (or a stretch thereof) directly to a vehicle which is travelling on that road or track (or stretch thereof). This eliminates the need for a GPS (global positioning system) or any other type of vehicle position determining system, because the transmitter is located in situ and information is transmitted therefrom directly to a nearby vehicle. Another advantage of the system of the present invention is that there is no need to provide image capturing and analysis means to obtain the required information.

[0009] Some types of information could be pre-programmed for transmission by the transmitter, either periodically or, more preferably, in response to the detection of a vehicle in the vicinity. Thus, the system, in this case, would include vehicle detection means and information storage means in association with the or each transmitter.

[0010] Types of information which could be stored and conveyed to vehicle drivers in this manner include the existence of a sharp bend steep hill or junction ahead and/or a reduction of speed limit on the road or track to allow for them, pre-programmed alternative routes for use in the event of congestion, an accident, etc., location information (for the purpose of direction finding - for example, information regarding a vehicle's location could be transmitted to the vehicle and displayed to the occupant(s) each time a transmitter is passed or approached by the vehicle, and it may even be possible to "rewind" the received "locations" to retrace the vehicle's route if required), or charging information relating to an upcoming toll bridge, tunnel or road, fines for exceeding the speed limit on a particular track or road, charges for entering a town or city centre, parking charges/fines, etc.

[0011] In some cases, the pre-programmed information may be time-related, in the sense that it only applies at certain times of the day, or different items of information apply depending on the time of day or day of the week. For example, where the information relates to, for example, an upcoming school crossing, it is only relevant for a short period of time in the morning and in the afternoon during the week. Similarly, some roads impose different speed limits according to the time of day and/or day of the week. In this type of case, the system preferably includes a clock or similar time-keeping device for determining and keeping track of the time of day, day of the week, etc. and for triggering the transmission of relevant information at the appropriate time(s).

[0012] Other types of information would have to be determined or obtained dynamically, particularly infor-

mation relating to non-permanent and non-foreseeable hazards, weather conditions, and the like. In this case, means for determining the occurrence or existence of such hazards may be associated with each individual transmitter, or more preferably, such means could be associated with a plurality of transmitters and arranged to provide such information to the transmitters when it is generated. The transmitter(s) may be arranged to transmit this information to receivers at other locations, as required.

[0013] This type of information might include volume of traffic up ahead, weather conditions (either expected or existing), ice or flooding on the road or track ahead, distance between a vehicle and the vehicle in front, a queue of traffic or other obstruction in the road ahead, an accident ahead. The transmission of such information may only be provided at predetermined locations on the road or track, such as before a blind bend or the like, or it may be provided by all transmitters on a stretch of road or track.

[0014] In one embodiment, the transmitter may be provided in the form of a transponder (i.e. capable of transmitting information to, and receiving information from a unit mounted in or on a vehicle). In this case, the information being transmitted could be altered in response to receipt of a signal from a passing vehicle, for example. Other means for altering the information transmitted by the transmitter might include an authorised signal from a remote location or authorised vehicle, for example, a time keeping device (as referred to above), a hand held device, etc.

[0015] As referred to above, the dynamic information determining means may be located on or near the road or track (or stretch thereof) with which the transmitter is associated. They may even be located in the same unit in or on the road or track. In one specific embodiment, the information determining means may comprise a proximity sensor or the like which is arranged to sense the existence of an obstruction within a predetermined distance thereof. The system may comprise a plurality of transmitters located in or on a road or track at spaced-apart intervals, and each transmitter may have associated therewith a proximity sensor, each transmitter preferably being linked to the adjacent transmitters, such that the overall system can sense the existence of a line of stationary or slow-moving traffic along a predetermined stretch of the road or track.

[0016] The system may also be arranged to determine if a vehicle is committing a traffic violation, such as exceeding the designated speed limit for a particular stretch of road or track, improper use of predesignated (bus, taxi, etc.) lanes, parking infringements, etc. and to transmit such information to the receiver in the vehicle in question, as information for the driver and/or to enable charging/fine information to be calculated and/or recorded.

[0017] In all cases, the transmitter could be arranged to transmit the relevant information itself, i.e. a signal

which represents, for example, "30mph left hand bend", or it could be arranged to transmit an encoded version of such information, for example, "no. 179", "dot-dot-dash", etc., which code would be decoded or recognised by the unit containing the receiver so as to display the relevant information to the vehicle occupant(s).

[0018] It will be appreciated that the transmitters (and any other associated equipment) could be mounted in or on existing roadside structures, such as cat's eyes or the like.

[0019] The transmitters in a system or along a stretch of track or road may be stand-alone units or they may be linked. Such units may be powered by, for example, solar power or standard power lines, etc.

[0020] The transmitter may be a short wave radio transmitter, an infra-red transmitter, or any other suitable remote signal or hard-wired transmitter, according to physical restrictions and design requirements.

[0021] An embodiment of the present invention will now be described by way of example only and with reference to the accompanying drawing, in which:

Figure 1 is a schematic block diagram of a vehicle information system according to an exemplary embodiment of the present invention.

[0022] Thus, referring to Figure 1, a vehicle information system according to an exemplary embodiment of the present invention comprises a series of transmitters 10, located at intervals along a track or road and mounted in or on existing road structures such as cat's eyes, street lights and the like. In association with each of said transmitters 10 there is provided a vehicle detection device 12 for detecting a vehicle on the track or road as it approaches or passes the transmitter unit. Also in association with each transmitter, there is provided a data storage device 14 and a proximity sensor 16.

[0023] A receiver module 18 is provided in or on a vehicle 20 and comprises a receiver 22, a decoder 24 for decoding or interpreting signals received from a transmitter 10 by the receiver 22, and a display device 26 for displaying received information.

[0024] The transmitters 10 and receiver 22 preferably comprise short wave radio transmitters and receiver respectively.

[0025] The storage device 14 associated with each of the transmitters 10 stores permanent information relating to the stretch of track or road by or on which the transmitter 10 is located. Such information for the purpose of this description might comprise, for example, a warning that there is a sharp bend in the road ahead and that the speed limit on the road at the bend is reduced.

[0026] Each of the transmitter modules may be linked by a communication link 28 (hard-wired or otherwise), and each of the proximity sensors 16 may be arranged arranged to detect the presence of a stationary vehicle nearby. Thus, the "chain" of linked transmitter modules

each having a proximity sensor enables the system to determine the presence of a queue of stationary or very slow moving vehicles on the associated stretch of track or road.

[0027] In use, a vehicle detection device 12 (which may comprise, for example, a motion sensor) detects the presence of a vehicle as it approaches or passes the associated transmitter module. When a vehicle is detected, the permanent information stored in the storage device 14 is retrieved and transmitted to the receiver 22 in the vehicle 20 and displayed on the display device 26 to the vehicle driver. Further, if a queue of slow moving traffic or other obstruction has been detected by the proximity sensor(s) in any one of the transmitter modules along the stretch of track or road under consideration, such information is also transmitted to the receiver module 18 in the vehicle 20 for display to the driver.

[0028] The driver is now aware that there is a sharp bend in the road up ahead on which the speed limit is reduced, and he can reduce his speed accordingly. Further, he is also aware that there is a traffic jam up ahead and can proceed with care accordingly.

[0029] An embodiment of the present invention has been described above by way of example only and it will be apparent to a person skilled in the art that modifications and variations can be made to the described embodiment without departing from the scope of the invention as defined in the appended claims.

Claims

1. A vehicle information system, comprising at least one transmitter located on or by a road or track, and being associated with that road or track, or at least a stretch thereof, at least one receiver located in or on a vehicle, means for causing said transmitter to transmit one or more signals representative of information relating to said road or track (or said stretch thereof) with which said transmitter is associated, said receiver being arranged to receive said one or more signals when it is within a predetermined distance of said transmitter, the system further comprising indicating means, responsive to said receiver receiving one or more said signals, for providing an indication of the information represented thereby.
2. A system according to claim 1, comprising storage means associated with said at least one receiver for storing (selectively or otherwise) information transmitted to and received by said at least one receiver for retrieval and review if required.
3. A system according to claim 1 or claim 2, comprising vehicle detection means for detecting a nearby vehicle and information storage means for storing predetermined information in association with the or each transmitter.
4. A system according to claim 3, wherein said predetermined information is time-related, in the sense that it only applies at certain times, and wherein the system includes a clock or similar time-keeping device for determining and keeping track of time and for triggering the transmission of relevant information at the appropriate time(s).
5. A system according to any one of claims 1 to 4, wherein at least some of said information is determined or obtained dynamically.
6. A system according to claim 5, comprising means associated with each of a plurality of transmitters for dynamically determining or obtaining said information; or comprising means for dynamically determining or obtaining said information and transmitting or otherwise providing said information to each of a plurality of transmitters.
7. A system according to any one of the preceding claims, wherein said information is transmitted periodically for receipt by a receiver in a nearby vehicle; and/or wherein the transmitter is in the form of a transponder (i.e. capable of transmitting information to, and receiving information from a unit mounted in or on a vehicle).
8. A system according to claim 6, wherein said dynamic information determining means comprises one or more proximity sensors arranged to sense the existence of an obstruction within a predetermined distance thereof.
9. A system according to any one of the preceding claims, comprising a plurality of transmitters located in or on a track or road at spaced-apart intervals adjacent transmitters being linked by a communication link.
10. A system according to any one of the preceding claims, including encoding means for encoding said information prior to transmission thereof; and/or wherein the transmitter is a short wave radio transmitter or an infra-red transmitter.

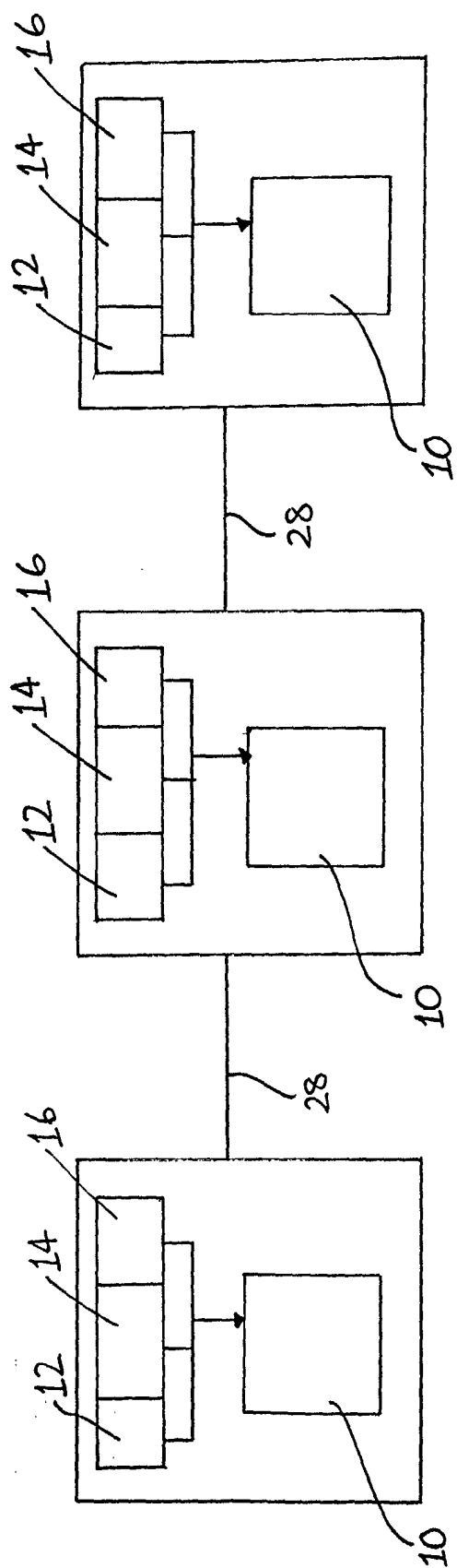


FIG. 1

