(12) UK Patent Application (19) GB (11) 2 441 348 (13) A

(43) Date of A Publication 05.03.2008

(21) Application No: 0617188.8

(22) Date of Filing: 31.08.2006

(71) Applicant(s):
Frank Baroukh
10 Somerset Square, LONDON, W14 8EE,
United Kingdom

Leon Michael Baroukh
10 Somerset Square, LONDON, W14 8EE,
United Kingdom

(72) Inventor(s):
Frank Baroukh
Leon Michael Baroukh

(74) Agent and/or Address for Service:
Marks & Clerk
90 Long Acre, LONDON, WC2E 9RA,
United Kingdom

(51) INT CL:
B60T 7/16 (2006.01) ***B60K 31/00*** (2006.01)
B60T 7/12 (2006.01) ***B60T 7/18*** (2006.01)
G05D 13/02 (2006.01)

(52) UK CL (Edition X):
G3N NGA4 N286C N288X

(56) Documents Cited:
GB 2381927 A **GB 2343264 A**
GB 2334352 A **GB 2327793 A**
GB 2179824 A **US 6691015 B1**
US 6690291 B1

(58) Field of Search:
INT CL **B60K, B60T**
Other: **Online: EPODOC, WPI, JAPIO**

(54) Abstract Title: **Adaptive speed management system**

(57) A speed limiting system for a vehicle comprises a receiver 1 for receiving a remote signal from a source outside the vehicle. Speed determining means 5 processes the remote signal to derive at least a prevailing speed limit. Prevention means 7 prevents the vehicle from exceeding the prevailing speed limit by controlling the breaking system and/or the fuel intake system. The user of the system may manually override the speed limiter if needed. The system may be provided with GPS capability to determine its position. It may also require the entry of an authorisation code to allow access.

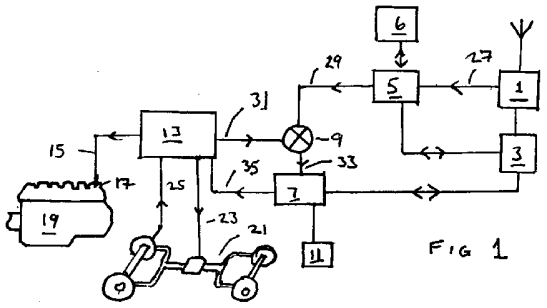

FIG 1

GB 2 441 348 A

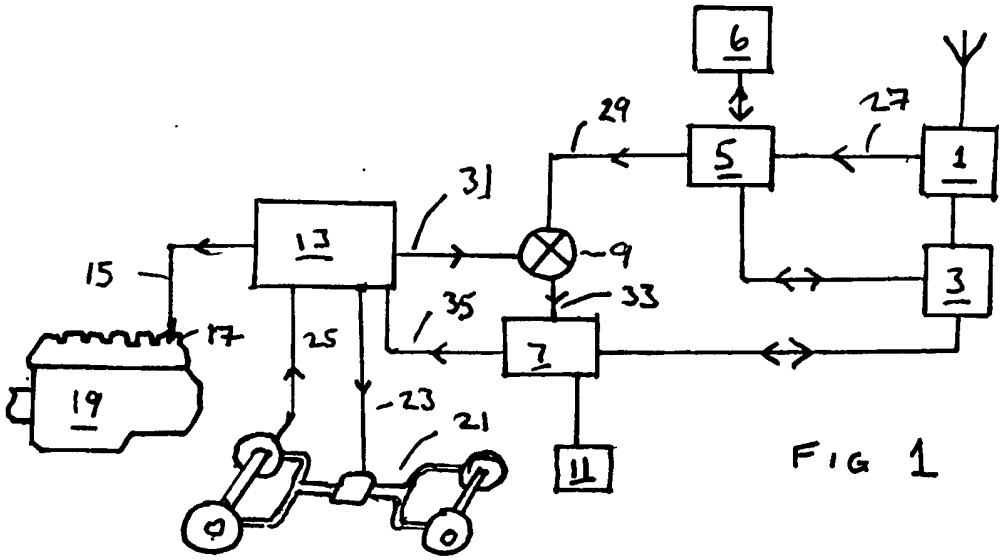
6
29
27
5
1
31
13
9
15
3
33
35
7
17
25
19
23
21
11

FIG 1

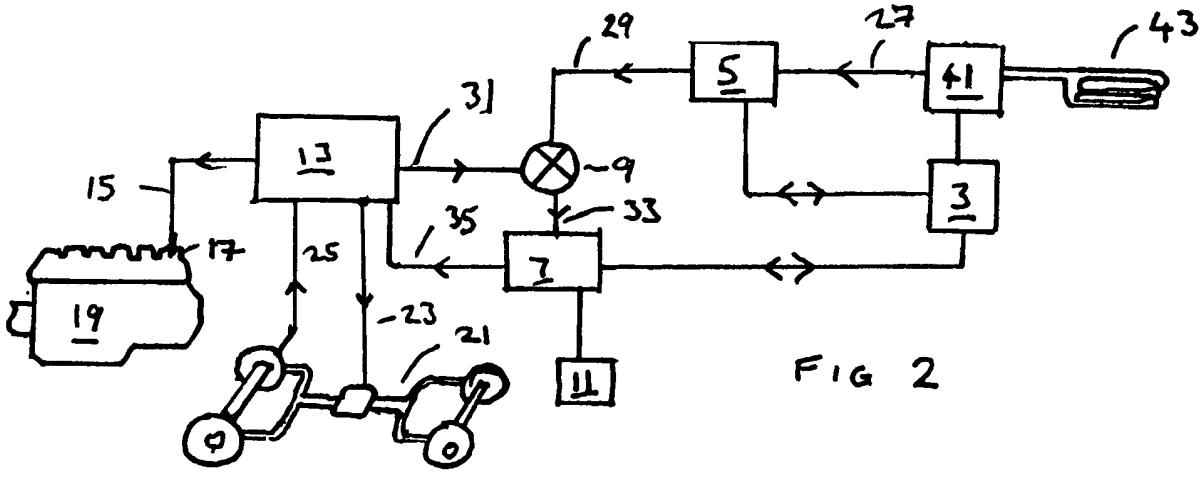
29
27
43
5
41
31
13
9
15
3
33
35
7
17
25
19
23
21
11

FIG 2

58692

ADAPTIVE SPEED MANAGEMENT SYSTEM

The present invention relates to an adaptive system for limiting or controlling the speed of motor vehicles.

It is becoming ever more common for speed limits to be rigidly enforced by the authorities. Whilst in some areas, curbing of traffic speed is effected by measures to inhibit vehicle speed, such as speed humps and chicanes, perhaps the most common method is the use of speed cameras. For reasons of safety, and also to avoid penalties, it is therefore important for drivers to be constantly aware of the speed limit for the area in which they are driving. However, this is difficult. First, signs which display the speed limit are not always sited at sufficiently short intervals and it is easy for a driver to forget the prevailing speed limit but then not be able to see a speed limit sign in the vicinity. In addition, even if the driver is aware of the limit, his or her attention can wander or the driver can be distracted by prevailing traffic conditions.

There is therefore a need for a system which overcomes the risk of drivers inadvertently breaking speed limits.

It is known for in-car satellite navigation systems based on the global positioning satellite system (GPS) to be adapted to alert drivers when they are in the vicinity of a known speed camera location. The GPS unit can then display the speed limit for that location. It is also known to provide receivers which are capable of detecting the microwave or infra-red laser beam emitted by certain kinds of speed camera and to produce an audible and/or visible warning. It is further known for authorities to provide roadside devices which detect a vehicle's speed and display warning the driver that the speed limit is being exceeded.

Another known in-car electronic driving aid displays a map of traffic density and hazards in the local area. This device picks up information transmitted by local transmitters, eg mounted on motorway gantries and bridges.

Many cars are now fitted with cruise control systems whereby the speed of a vehicle can be pre-set and the vehicle then proceeds at the set speed until either the accelerator or brake is depressed. This may be used to set the vehicle's speed at, or just below, the speed limit. However, such a system does not allow the driver to adjust driving speed according to prevailing conditions, yet still prevent breaking of the speed limit.

A system has now been devised which solves the problem of ensuring that a speed limit is not inadvertently exceeded whilst allowing the driver safe control of the vehicle.

Thus, the present invention provides a speed limiting system for a vehicle, the system comprising a receiver for receiving a remote signal from a source outside the vehicle, speed determining means for processing the remote signal to derive at least a prevailing speed limit and prevention means for preventing the vehicle from exceeding the prevailing speed limit.

The receiver is typically a radio receiver, for example a UHF or microwave receiver.

There are two basic alternative different ways in which the speed determining means can process the remote signal to derive information which comprises at least the prevailing speed limit. One of these is a situation where the receiver is a GPS receiver which enables the system to derive from the GPS signal, the current geographical location of the vehicle. That geographical location is then used to derive the prevailing speed limit for that location, from a source of that speed limit information. That source of speed limit information according to geographical location, may be derived from an on-

board electronic storage medium such as a computer memory, a CD or DVD, magnetic hard drive or any other suitable medium. Alternatively, the speed limit obtaining means may obtain the prevailing speed limit for the determined geographical location from a signal source in the vicinity of a road on which the vehicle is travelling, for example from local roadside or under-road transmitters. Such transmitters may be radio transmitters, eg in the UHF or microwave bands, as mentioned above in respect of the primary receiver, or they may be part of an inductive loop system, a corresponding inductive loop receiver being part of the on-board speed limiting system of the vehicle.

In another alternative, the prevailing speed limit may be obtained from a satellite or terrestrial radio signal, either a radio signal dedicated to that purpose or the prevailing speed limit information may be embedded in a signal intended for another purpose, eg a general broadcast signal.

The other way in which the speed determining means may derive the prevailing speed limit is direct from the remote signal itself. In this case, a signal source or sources may be provided in the vicinity of the road on which the vehicle is travelling, eg from roadside or under-road transmitters. In that case, those local transmitters communicate the prevailing speed limit direct to the system via the receiver, the speed limit information being extracted by the speed determining means. This is especially advantageous in areas where there is a variable speed limit.

In a hybrid system, an electronic storage medium may correlate the local speed limit with a geographical location indication derived from a GPS receiver. However, a subsidiary receiver (means for receiving a speed limit signal from a signal in the vicinity of the road on which the vehicle is travelling) may override the information obtained from the electronic storage medium, in situations such as when a variable speed limit applies.

The speed determining means will typically employ a signal decoder for extracting the data to be utilised from the received signal. Such a decoder may also comprise an authorisation means for receiving a user authorisation code. This may be employed in situations where the speed limiting system can only be used on payment of a user subscription. In that case, the authorisation means would need to be activated by the user by entering a code, for example by means of touch screen, keypad or insertion of an encoded card or disk.

To ensure that the speed limit is not exceeded, the system needs to read the speed of the vehicle, typically from the on-board electronic vehicle management system. It should preferably periodically or continuously compare the actual speed of the vehicle with the prevailing speed limit read from the decoder. When the vehicle reaches, or is about to reach the speed limit, the prevention means adjusts, i.e. limits the speed of the vehicle accordingly. Typically, the prevention means comprises control means for providing at least one control signal to the vehicle, preferably to the electronic vehicle management system. In preferred embodiments, the control means is able to provide at least one of a first control signal for applying braking to the vehicle and a second control system adjusting (e.g. reducing) vehicle fuel consumption. The control means is preferably adapted such that in situations such as transition from a zone with a high speed limit to a zone with a much lower speed limit, the vehicle is slowed in a safe and progressive manner, rather than being slowed abruptly. The latter arrangement includes the situation where the vehicle speed is limited to one or more intermediate pre-programmed limits before being finally slowed to the prevailing legal speed limit. Such intermediate limits may also be determined dynamically based on the initial speed of the vehicle and the distance to the beginning of the lower legal speed limit.

A system according to the present invention is also preferably provided with an emergency manual override. This may, for example, be activitable by a switch such as a switch mounted on or integral with on the steering wheel or an indicator or washer stalk, or a foot pedal such as the accelerator or brake pedal. In that way, if the driver needs to accelerate, albeit temporarily breaking the speed limit in order to avoid a dangerous situation, this becomes allowed by activation of the override.

Any of the integers of a system according to the present invention may be in the form of hard wired components. In addition any part of any one of them or any one or more of the whole of them may be embodied as encoded digital information such as instructions to be executed or used in an on-board computer or by computer components.

The present invention will now be explained in more detail, by way of the following description of a preferred embodiment and with reference to the accompanying drawings, in which:-

Figure 1 shows a block diagram of a first embodiment of a speed limiting system according to the present invention; and

Figure 2 shows a block diagram of a second embodiment of a speed limiting system according to the present invention.

A block diagram of a preferred system according to the present invention is depicted in Figure 1. As shown, the system comprises a GPS receiver 1, a control panel 3 which comprises a display and input keys (not shown), a decoder 5, an electronic storage device 6, a controller 7, a comparator 9 and an override switch 11.

In Figure 1, these components are shown as separate modules but two or more of them, especially, the decoder 5, controller 7 and comparator 9 may

be embodied as data held in a memory for operation of a computer microprocessor which carries out the functions of those components.

The system is mounted in a motor vehicle which has a computerised electronic management system 13 which includes functions for engine management, management of primary systems such as braking and electrics as well as other on-board electronic systems. In particular, the engine management system 13 is connected via a signal line 15 to the injector system 17 of the vehicle engine 19. It also is connected to the braking system 21 of the vehicle via another signal line 23. In addition, the vehicle management system 13 receives a signal from a transducer (not shown) via a signal line 25, whereby the management system 13 receives an indication of the vehicle's speed.

In operation, as the vehicle progresses, the GPS receiver 1 quasi-continuously receives updates of the vehicle's geographical position. As well as displaying the position on a conventional satellite navigation display of the module 3, the receiver 1 also outputs an electronic signal containing information including at least the geographical positions. This output is provided along signal line 27 to a decoder 5. The decoder 5 correlates the position of coordinates thus obtained with data stored in memory 6, pertaining to speed limits for each geographical location. The decoder outputs a signal on signal line 29 to the comparator 9.

The comparator 9 also receives a signal on another signal line 31 from the vehicle management system 13. This signal is derived from the speed signal received by the management system from signal line 25 and relates to the vehicle speed. Thus, the comparator line compares the actual vehicle speed with the speed limit it receives on signal line 29 from the decoder 5. The comparator 9 outputs a signal derived from the comparison on the signal line 33 to the controller 7. The controller 7 then outputs signals along signal line

35 to the vehicle management system 13. This control system directs the management system 13 to apply braking to the braking system 21, via signal line 23 and/or to restrict fuel supply from the fuel injection system 17, as determined by a signal output to the injection system via signal line 15.

In an emergency situation where the driver need temporarily to exceed the speed limit to avoid danger, he or she can activate the manual override switch 11 to signal to the controller 7 to allow the speed limit to be exceeded.

A block diagram of a second embodiment according to the present invention is shown in Figure 2. In this diagram, the same reference numerals are used as employed in Figure 1, to signify identical components. The difference is that instead of a GPS receiver 1, there is employed a receiver 41 connected to receive signals from an inductive loop 43. The inductive loop 43 is positioned on the vehicle so as to be able to pick-up signals from embedded inductive loop transmitter coils beneath the tarmac of the road. In this case, as the vehicle travels, the prevailing speed limit is obtained direct via the loop 43 from the under-road transmitter coils and is passed via signal line 27 direct to decoder 5. Thus, the storage medium 6 shown in Figure 1 is dispensed with. In this way, highway authorities can ensure that the transmitter coils under the road transmit speed limit data, including in areas of variable speed limits which will be determined by prevailing conditions.

The construction and operation of the system shown in Figure 2 is otherwise identical to those described with respect to Figure 1 and as shown in Figure 1.

In the light of the described embodiments, modifications of those embodiments, as well as other embodiments, all within the scope of the invention, for example as defined by the appended claims, will now become apparent to persons skilled in the art.

CLAIMS

1. A speed limiting system for a vehicle, the system comprising a receiver for receiving a remote signal from a source outside the vehicle, speed determining means for processing the remote signal to derive at least a prevailing speed limit and prevention means for preventing the vehicle from exceeding the prevailing speed limit.

2. A system according to claim 1, wherein the receiver is a radio receiver.

3. A system according to either preceding claim, wherein the receiver is a GPS receiver and the system further comprises speed limit obtaining means for obtaining a prevailing speed limit corresponding to a geographical location obtained from the GPS receiver.

4. A system according to claim 3, wherein the speed limit obtaining means comprises electronic storage medium on board the vehicle.

5. A system according to claim 3, wherein the speed limit obtaining means comprises means for receiving a speed limit signal from a signal source in the vicinity of a road on which the vehicle is travelling.

6. A system according to claim 1 or claim 2, wherein the receiver is adapted to receive a speed limit signal from a signal source in the vicinity of a road on which the vehicle is travelling.

7. A system according to either preceding claim, wherein the speed determining means comprises a signal decoder.

8. A system according to claim 7, wherein the signal decoder comprises authorisation means for receipt of a user authorisation code.

9. A system according to any preceding claim, further comprising a comparator for comparing current speed of the vehicle with the prevailing speed limit.

10. A system according to any preceding claim wherein the prevention means comprises control means for providing at least one control signal to the vehicle.

11. A system according to claim 10, wherein the control means is adapted to provide at least one of a first control signal for applying braking and a second control signal adjusting fuel consumption of the vehicle.

12. A system according to claim 10 or claim 11, wherein the at least one control signal slows the vehicle progressively or stepwise via one or more intermediate speeds until the vehicle is slowed to the prevailing speed limit.

13. A system according to any preceding claim, further comprising an emergency manual override.

14. A speed limiting system for a vehicle, the system being substantially as hereinbefore described with reference to any one or more of the accompanying drawings.

The Patent Office

For innovation

Application No:	GB0617188.8	**Examiner:**	Mr Paul Marshall
Claims searched:	All	**Date of search:**	8 March 2007

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1, 2, 6, 7, 9, 10, 12, 13	GB 2381927 A (BALANTYNE) See whole document.
X	1, 2, 6, 7, 9-13	US 6691015 B1 (LEVINE) See lines 42-67, column 1; line 30, column 2 to line 9, column 3; line 32, column 3 to line 3, column 4; line 43, column 9 to line 30, column 10.
X	1, 2, 6, 7, 9-13	GB 2343264 A (KENNEDY) See whole document.
X	1, 2, 6, 7, 9, 10, 13	GB 2179824 A (VERNON) See lines 13-24, page 1; line 47, page 1 to line17, page 2.
X	1, 2, 6, 7, 9, 10, 13	GB2334352 A (CURTIS) See line 3, page 1 to line27, page 2; line 35, page 2 to line 7, page 3; lines 18-33, page 3.
X	1, 2, 6, 7, 9-13	GB2327793 A (KING) See whole document.
X	1-3, 5-7, 9, 10, 13	US 6690291 B1 (CARDILLO) See whole document.

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^{X} :

Worldwide search of patent documents classified in the following areas of the IPC

B60K; B60T

The Patent Office

For innovation

The following online and other databases have been used in the preparation of this search report

Online: EPODOC, WPI, JAPIO