

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 860 804 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.08.1998 Bulletin 1998/35

(51) Int. Cl.⁶: **G08G 1/04**

(21) Application number: **98102407.8**

(22) Date of filing: **12.02.1998**

(84) Designated Contracting States:
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **19.02.1997 IT GE970014**

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(54) System for the detection and the signalling of objects on the roadway

(57) System for the detection and the signalling of objects along the roadway, comprising:

a plurality of detection means (1, 1'), placed regularly spaced apart from each other along the roadway;

control means (2, 2', 3), connected to the said detection means (1, 1'), said control means comprising means for transducing the signals received from the said detection means and means for the

selection of the said signals; and

a plurality of signalling means (4, 4'), placed regularly spaced apart from each other along the roadway, connected to the said control means (2, 2', 3) and comprising means for the emission of a signal (104, 204, 104'), said signal being addressed to the drivers in a certain portion of the roadway, at a given distance away from the event detected by a certain detection means (1).

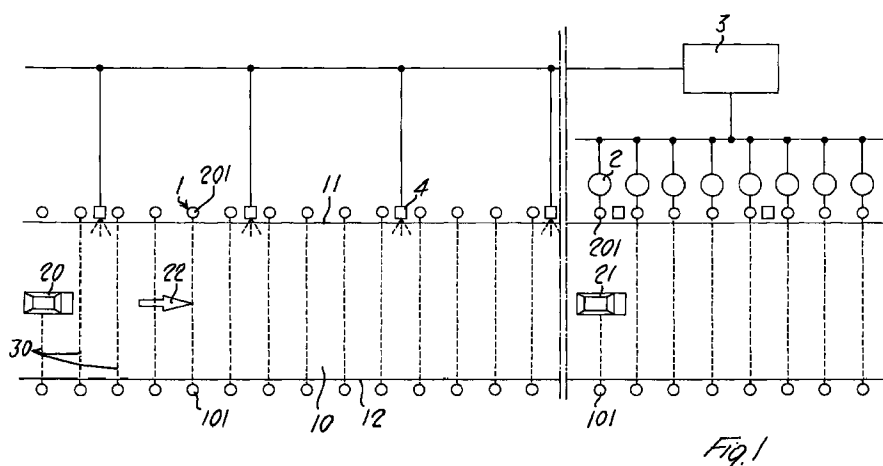


Fig. 1

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Description

The present invention relates to a system for the signalling of dangerous situations occurring on the roadway, and particularly refers to a system for the detection and the signalling of objects on the roadway.

At the present, many systems try to solve the problem relating to the quick detection and signalling of dangerous situations to the car drivers on the road, especially in the case of slow moving vehicles, car crashes, car queues or slowing down in the road traffic. It is very important to try to avoid accidents but, particularly in the case of poor or bad visibility, this aim is very hard to be fulfilled.

In some case the cars are provided with GPS (Global Positioning System) devices, and by this way a number of car can acknowledge the position of another car provided with the same system. However, such a system is yet costly, and moreover it is not able to give any information about cars or other object that are not provided with the said GPS device.

Many other systems, much more cheaper than that described above, are identically based on the assumption that the more cars are provided with a sort of transceiving device, sending automatically and/or manually an alert signal, the higher is the road safety degree achieved.

A primary task of the present invention is to allow the detection and the real time signalling of objects to every driver on the road, even if the drivers are not provided with any special safety device on their cars.

Another object of the present invention is to provide a system that can be easily adapted to many different situations.

The subject of the present invention is therefore to provide a system for the detection and the signalling of objects along the roadway, characterized in that the said system comprises:

A plurality of detection means, placed regularly spaced apart from each other along the roadway, each detection means being connected to power supply means;

control means, connected to the said detection means, said control means comprising means for transducing the signals received from the said detection means and means for the selection of the said signals; and

a plurality of signalling means, placed regularly spaced apart from each other along the roadway, connected to the said control means and comprising means for the emission of a signal, said signal being addressed to the drivers in a certain portion of the roadway, at given distance away from the event detected by a certain detection means.

In a preferred embodiment, said detection means comprise photo-cell sensing devices or the like, pro-

vided with means for emitting an electromagnetic radiation and means for sensing such a radiation. Preferably, the said detection means comprise photo cell infrared detectors.

In another preferred embodiment, said control means comprise a plurality selection means, provided with a timing device or the like, and each connected to a detection means, and one or more processing units, the said units elaborating the signals coming from the selection means and generating the signal to be sent to the signalling means.

Further advantages and features will become more apparent in the following detailed description of some embodiments of the system according to the present invention, given by the way of non-limiting examples, and referring to the appended drawings, wherein:

Figure 1 is a diagrammatic view of the operation of the system according to the present invention;

Figure 2 is a diagram of a first embodiment of the present invention;

Figure 3 is a diagram of a second embodiment of the present invention;

Figure 4 is a diagram of a variant of the embodiment shown in figure 2;

Figure 5 is a diagram of a variant of the embodiment shown in figure 3;

Figure 6 is a side elevation view of the signalling means according to an embodiment of the invention; and

Figure 7 is a side elevation view the signalling means according to another embodiment of the invention.

In figure 1 is shown a diagrammatic view of a portion of roadway in which is installed the system according to the present invention; the numeral 1 designates the detection means, for instance a photo cell infrared detector, comprising an unit for the emission of the radiation 101 and a sensing unit 201. The two units of each detection means 1 are placed at the opposite edges of the roadway 10, the sensing units 201 being located at the edge 11 of the roadway, and the emitting units 101 on the opposite edge 12.

Every sensing unit 201 is connected to a selection means 2, for instance a timing device or the like, which in its turn is connected to a processing unit 3. As shown in the figure, a number of selection means 2 are connected in parallel with one processing unit 3. The said processing unit 3 controls the signalling means 4, placed on the edge of the roadway 10, at a position which is upstream of the detection means 1 connected to the said processing unit 3, in respect of the running direction, shown by means of the arrow 22, of the cars 20, 21. As illustrated in the figure, if a car 20, 21 passes along the road 10, the radiation beam 30 emitted by the emitting unit 101 of the detection means 1 is intercepted.

The operation of the system according to the present invention is as following. In figure 2 is shown, in form of a diagram, an embodiment of the system according to the invention. In this case, every detection means 1, comprising an emitting unit 101 and a sensing unit 201, is connected only to a selection means 2, that directly controls the signalling means 4. This is the more simple apparatus requested to carry out the system according to the invention. When a car intercepts the radiation beam 30 emitted by the emitting unit 101 of the detection means 1, the timing device in the selection means 2 starts its count for a given number of frames, e.g. 3 seconds; then, if the sensing unit 201 still doesn't receive the radiation beam 30, the selection means 2 allow the lit up of the signalling means 4. On the contrary, if the sensing unit 201 connected to the selection means 2 receive again the radiation during the given period, the timing device is then reset.

The case illustrated in figure 3 is very similar to that shown in figure 1, but in this case every selection means 2 is individually connected to the processing unit 3. By this way, after the timing device of selection means 2 has counted the frames during which the sensing unit 201 has not received the radiation, the said selection means 2 communicates these data to the processing unit 3. The processing unit 3 is advantageously provided with a memory in which are stored the parameters useful to evaluate the data sent by the selection means 2. For example, a slow moving vehicle, a standstill vehicle and a speeding vehicle give rise to three different kinds of data sent by the selection means; thus, the processing unit can, according to the different case, allow a different signalling sequence to the signalling means 4.

In the diagram of Figure 4 is shown another embodiment of the present invention. In this embodiment, the data relative to the position of an object, vehicle or the like, on the road are not acquired as referred to above. This solution is based on the connection between two consecutive detection means 1, 1' and, more precisely, between the two selection means 2, 2' of the said detection means. When an object intercepts the radiation beam 30 of the detection means 1, the selection means 2 connected to the said detection means 1 send a signal to the selection means 2', which in its turn starts to count the time until the object passes through the radiation beam 30'. At this time, if the speed of the object is too high or too low in respect of the standard value of speed allowed for the portion of road in which the system is placed, or even if the object doesn't reach the radiation beam 30', the selection means 2' lit up the signalling means 4. On the contrary, if the object meet the radiation beam 30' during the given time range, the timing device of the selection means 2' is reset.

In Figure 5 is shown an embodiment of the present invention in which are merged the features of the two embodiments of Figg. 3 and 4. In fact, in this system are provided at least two consecutive detection means 1, 1';

when an object reach the radiation beam 30, the selection means 2 send a signal to the processing unit 3, which in its turn give rise to the start up of the timing device of selection means 2'. Also in this case, the processing unit 3 is advantageously provided with a memory, in which are stored different routines according to the different data sent from the selection means 2'

In Figures 6 and 7 are represented two examples of signalling means provided in the system according to the present invention. In figure 6 is shown a signalling means 4 comprising a pole 304 on which are mounted three coloured lamps 104 and an acoustic emitter 204. The signalling means 4' of the Figure 7 comprises a pole 304' and a transmitting device 104' provided with an antenna 204'. The signal of such a transmitting device 104' can be received by a receiving device as 404', provided with a loudspeaker 414', with a LED 424' and with an antenna 434'.

By this way, the system of the present invention can provide a very accurate and inexpensive signalling of dangerous situations occurring on the road, especially in conditions of poor or bad visibility. Particularly, the system shown in Figure 1 operates either according the embodiment of Figure 3, or according the embodiment of Figure 5. That is to say that, depending on the software stored in the memory of the processing unit 3, the said processing unit can consider the available data from each single detection means 1, or on the contrary from every consecutive pair of detection means.

The time range at which the timing devices of the selection means are regulated is calculated on the base of the optimum driving speed along the specific portion of the road, and can change according to many conditions, such as weather, visibility and the like.

As above described, the kind of signalling the dangerous situation depends strictly on the kind data sent to the processing unit by the selection means. That is to say, when a standstill object or a slow moving object are detected on the roadway, the signalling must to take place upstream in respect of the location wherein the detection occurs; moreover, the two signalling can be different one to another. On the other hand, a speeding vehicle must be signalled downstream, so as to prevent a possible collision.

The minimum distance between the signalling of any event occurring on the road and the same event is also based upon the braking distance at the above cited driving speed. The event can be further signalled up to 1 km away from it.

The signalling can be carried out in many different ways. For example, as shown in Figure 6, a number of poles 304 provided with lamps 104 can be placed on the edge of the roadway, and the lamps 104 can have different colours one to another, so as to signal with different light emissions. The same pole 304 can be also provided with an acoustic emitter 204. This kind of signals can be noticed by any driver on the road, but the information given is relatively poor. As shown in Figure 7, a

pole 304' can be provided with a transmitting device, e.g. a radio wave transmitter or the like, having stored in a memory a set of pre-recorded messages that can be sent to the drivers provided with a receiving device like 404' The said receiving device can be even a common FM car radio.

Claims

1. System for the detection and the signalling of objects along the roadway, characterized in that the said system comprises:
 - a plurality of detection means (1, 1'), placed regularly spaced apart from each other along the roadway;
 - control means (2, 2', 3) , connected to the said detection means (1, 1'), said control means comprising means for transducing the signals received from the said detection means and means for the selection of the said signals; and
 - a plurality of signalling means (4, 4'), placed regularly spaced apart from each other along the roadway, connected to the said control means (2, 2', 3) and comprising means for the emission of a signal (104, 204, 104'), said signal being addressed to the drivers in a certain portion of the roadway, at a given distance away from the event detected by a certain detection means (1).
2. System according to claim 1, characterized in that said control means comprise a plurality selection means (2, 2'), provided with a timing device or the like, each connected to a detection means (1, 1') , and connected to the signalling means (4, 4') placed at a given distance away from the event detected by a certain detection means (1).
3. System according to claim 1 characterized in that said control means comprise a plurality selection means (2, 2'), provided with a timing device or the like, each connected to a detection means (1, 1') , and one or more processing units (3) connected to the said selection means (2, 2'), the said processing units (3) elaborating the signals coming from the selection means (2, 2') and generating the signal to be sent to the signalling means (4, 4') placed at a given distance away from the event detected by a certain detection means (1).
4. System according to claim 2, in which the said selection means are all serially connected, the timing device of a given selection means (2') being activated by another selection means (2) located directly upstream, referring to the driving direction of the roadway, in respect of the given selection means (2').
5. System according to claim 3, in which the said selection means (2, 2') are all parallelly connected to one or more processing units (3), the timing device of a given selection means (2') being activated by the said processing unit (3) after the reception of the signal of another selection means (2) located directly upstream, referring to the driving direction of the roadway, in respect of the given selection means (2') .
6. System according to anyone of the preceding claims, in which the said detection means comprise photo-cell sensing devices (1) or the like, provided with means for emitting (101) an electromagnetic radiation and means for sensing (201) such a radiation.
7. System according to claim 6, in which the said detection means comprise photo-cell infrared detectors (1).
8. System according to anyone of the preceding claims, in which the said signalling means comprise one ore more lamps (104) mounted on a pole (304) fitted on the edge of the roadway.
9. System according to anyone of the preceding claims, in which the said signalling means comprise an acoustic emitter (204) mounted on a pole (304) fitted on the edge of the roadway.
10. System according to anyone of the preceding claims, in which the said signalling means comprise a transmitting device (104'), preferably a radio wave transmitting device, mounted on a pole (304') fitted on the edge of the roadway.
11. System according to claim 10, in which the said radio wave transmitting device (104') is an FM radio wave transmitting device.

