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(72) Inventor: **Bocchi, Claudio**  
**43010 Noceto (Parma) (IT)**

(74) Representative: **Guareschi, Antonella**  
**c/o Ing. Dallaglio S.r.l.**  
**Viale Mentana 92/C**  
**43100 Parma (IT)**

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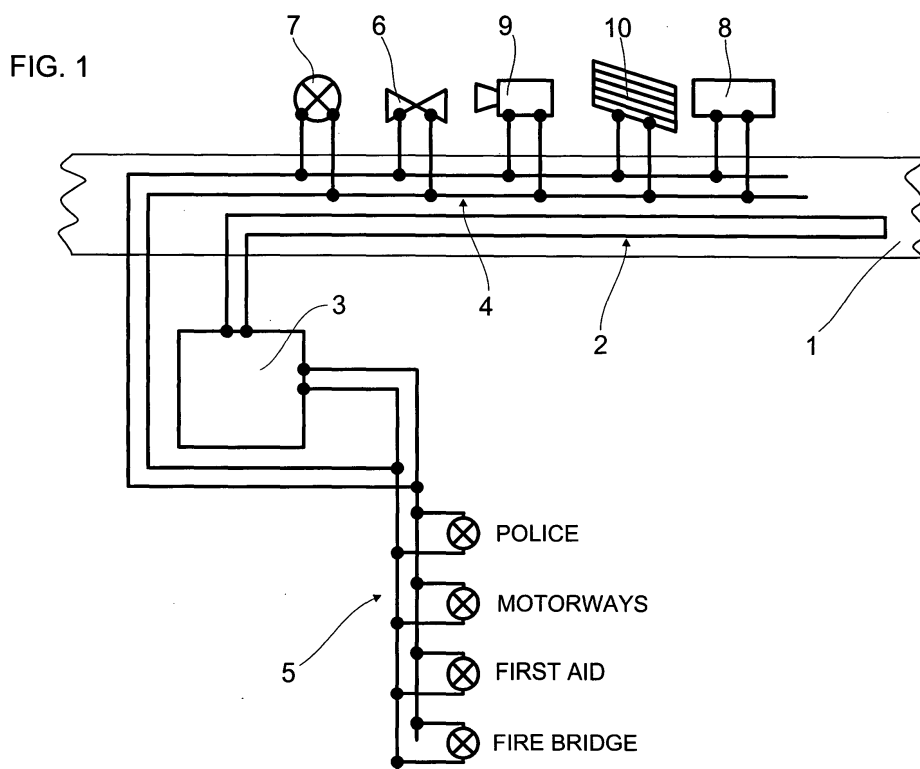
(71) Applicant: **Bocchi, Claudio**  
**43010 Noceto (Parma) (IT)**

(54) **Warning system for road and/or motorway accidents using signal interruption**

(57) The invention deals with the field of systems for detecting the position in which a road accident occurred along ordinary roads, and in particular along motorways. The system provides for the installation, along guard-rails or barriers made of reinforced concrete (1), of an electric circuit or a circuit for emitting a signal (2) placed in order to be easily interrupted by a motor vehicle im-

pect. The circuit interruption activates a processor (3) that processes electric data to determine the accident position and transfers these data to signalling circuits.

The signalling circuits can be of two types: signalling circuits (4) along the road route being surveyed, signalling circuits (5) located in assistance departments such as Traffic Police Stations, Fire Brigade Stations, First Aid Stations, etc.



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## Description

**[0001]** The present invention deals with a warning system for road and/or motorway accidents with signal interruption.

**[0002]** The system allows exactly locating the position in which the accident occurred and activating a warning signal to suitable assistance departments such as traffic police stations, fire brigade stations, first aid stations, etc., everything being made in real time.

**[0003]** Systems are already known, that are installed aboard motor vehicles that are suitable for recording an accident event in order to be able to establish, afterwards, how the accident occurred.

**[0004]** These systems however are not able to establish where the accident occurred and are not able to transmit a warning signal that could allow informing all departments responsible for the safety and health of motor vehicles passing along a certain road length.

**[0005]** Satellite information systems are also known, that however can only operate under certain weather conditions and only for motor vehicles that are equipped with sophisticated and costly receiving systems assembled aboard such vehicles.

**[0006]** Object of the present invention is removing the above inconveniences, providing a warning system for a road accident that is extremely simple, inexpensive, that does not require installations or modifications of already existing motor vehicles and above all that is able to supply, in real time, the exact position in which the accident occurred.

**[0007]** These and other objects are fully reached by the warning system for road and/or motorway accidents with signal interruption, subject of the present invention, that is characterised by what is included in the below listed claims and in particular in that it provides, placed along a guard-rail or a barrier made of reinforced concrete, an electric circuit or a signal emitting circuit that is adapted to be easily interrupted by a vehicle impact.

**[0008]** These and other characteristics will be better pointed out by the following description of a preferred embodiment shown, merely as a non-limiting example, in the enclosed table of drawing, in which:

- figure 1 shows a diagram of the system operating principle.

**[0009]** With reference to the figure, 1 designates a common guard-rail made of steel or a barrier made of reinforced concrete, of the so-called Jersey type, that is normally employed as traffic divider barrier along motorways or beltways or normal roads with single running directions or even on viaducts or tunnels, both on motorways and on roads, or in crossroads that are deemed particularly critical for road conditions.

**[0010]** Along the whole path, over these guard-rails or Jersey barriers, a warning or alarm circuit 2 is placed, that can also be a cable circuit: by means of two electric

or optical fibre wires. The circuit will have to be placed at such an ideal height as to be easily stricken and interrupted by an impact of a motor vehicle that is involved into an accident.

**[0011]** The circuit in fact provides to be interrupted in its operation due to an accident and the interruption point will have to be detected by computing electric parameters.

**[0012]** In the unlikely event that the circuit is not interrupted by the accident, the circuit can be interrupted by any person that simply tears it.

**[0013]** The circuit can be advantageously supplied at low voltage, for example with a direct 12-Volt voltage, thereby being extremely safe even if a car bumps into it or it is voluntarily touched by people or animals.

**[0014]** The circuit 2 interruption is detected by a processor system 3 for activating signalling circuits that, in the example shown, are of two types:

- a first signalling circuit 4 along the road route;
- a second circuit 5 for signalling the event to departments responsible for readily intervening.

**[0015]** The processor system is for example able, by measuring the uninterrupted circuit impedance, to detect the exact position of the interruption point and thereby to activate circuits 4 and 5.

**[0016]** The first signalling circuit 4 provides, along the path, to install acoustic signalling devices 6 (sirens), optical signalling devices 7 (single-colour or multiple-colour traffic lights, for example red signal to point out an occurring accident, green signal to point out normal road traffic conditions, thereby without dangers) or visual signalling devices 8 (billboard with writings in which the type of event is displayed together with possible advices or suggestions). Finally, cameras 9 can be installed and arranged in critical path points, such cameras being automatically activated by the accident event with chance of filming the accident, that is also useful as regards future surveys to ascertain the responsibilities. An event-transmitting solar panel 10 can be provided in order to signal to users equipped with a suitable receiving apparatus.

**[0017]** The first circuit 4 must be placed in a place protected by the accident, preferably underground with only those positions in which signalling means, sirens, traffic lights or billboards etc. are located, that are projecting out of the ground, and the circuit can be placed on the right and/or left side of the road subjected to check.

**[0018]** Purpose of the second circuit 5 is signalling the presence of accidents and thereby warning departments such as Traffic Police, Motorway Services, Hospital First Aid Stations, Fire Brigades, by directly providing the exact position in which the accident occurred.

**[0019]** The event activating the signalling circuit is, as described above, of the interruption type, and precisely of the destructive type.

[0020] This implies the need of restoring the circuit continuity to the conditions for arranging a new event.

[0021] A maintenance must therefore be provided that has also to verify, many times a year, through suitable tests and simulations, the correct operating status of the whole system.

[0022] Such checks can be displayed, if deemed necessary, on existing luminous billboards.

The installation of such warning system when a traumatic event occurs can already be arranged when building the metallic guard-rails or barriers made of reinforced concrete, while for already-installed protections it will have to be applied, for example, through adhesives or supports that can be applied to such barriers.

Numerous modifications and variations can be provided, such as for example the electric circuit can be made through common small electric cables or through optical fibre cables; the detecting circuit 2 can as well be made through infrared or laser rays or through acoustic signals with different frequencies, such as for example ultrasound.

To realise the electric circuit, a conductive ribbon-shaped band can be used, applying it through adhesive. In the above described description, a specific reference has been made to a signalling system with signal interruption designed for signalling the position of road or motorway accidents, but its application is also possible in other sectors in which it is necessary to detect and locate a certain traumatic event that is able to interrupt the continuity of an electric circuit or a signal.

[0023] According to a further embodiment, a plurality of sensors can be provided, placed on the guard-rail or barrier made of concrete or on carriageway-delimiting lines or immersed on asphalt.

placed along the monitored road route.

4. Warning system according to claim 1 **characterised in that** it comprises a second signalling circuit (5) connected to assistance departments such as Traffic Police, Fire Brigades, First Aid Stations, Road and Motorway Directions.
5. Warning system according to claim 1 and 3 **characterised in that** the first signalling circuit (4) placed along the route comprises acoustic signalling devices (6), optical signalling devices (7), visual signalling devices (8), video-cameras (9) and signal-transmitting panels (10).

## Claims

1. Warning system for road and/or motorway accidents with signal interruption **characterised in that** it provides, arranged along the road and/or motorway route that has to be monitored, an electric circuit or a signal emitting circuit (2) placed along a guard-rail or a barrier made of reinforced concrete (1) in such a way as to be easily interrupted by a motor vehicle impact, such interruption of the electric circuit or the signal emitting circuit activating a processor (3) that processes electric data in order to determine the accident position and transfers these data to signalling circuits (4) and/or (5).
2. Warning system according to claim 1 **characterised in that** the processor processes the impedance or resistance data related to the circuit length that remained unaltered after the accident.
3. Warning system according to claim 1 **characterised in that** it comprises a first signalling circuit (4)

FIG. 1

