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(54) **Method and apparatus for indicating a possibility of safe passing a road**

(57) A method of detecting and indicating a safe passing of a road, wherein the speed and the distance of the vehicles approaching the measuring point in a first direction is measured and wherein based on the measured data the time the vehicle passes through a chosen point is calculated and then the lowest value of the calculated data is displayed in a second direction, which crosses the first direction.

An indicator of a safe passing a road comprises at least one measuring unit (3) for monitoring and measuring the speed and the distance of a vehicle approaching the indicator from a first direction; a computing unit (5) for calculating the time till the vehicle passes through the chosen point based on the data from the measuring unit (3); and at least one display unit (4) for displaying the time calculated by the computing unit (5) and /or for displaying a symbol assigned to the time calculated by the computing unit (5), wherein the display unit (4) is arranged such that it can display the data to the drivers and /or to the walkers approaching the indicator from the second direction which crosses the first direction, and the measuring unit (3) is connected to the display unit (4) via the computing unit (5).

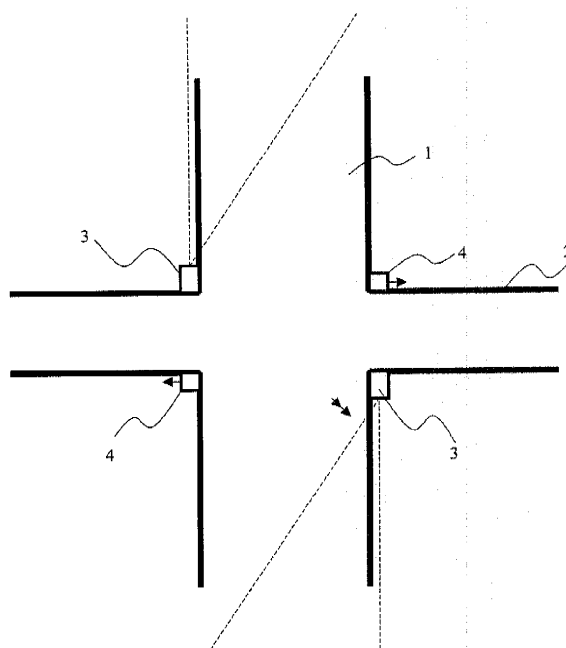


Fig. 1

Description

Field of the art

[0001] The invention relates to a method of a detection and an indication for a safe passing a road as well as to an apparatus for an indication for a safe passing a road.

Prior art

[0002] The road network system comprises many main and secondary roads crossings outside the urbanized area, where due to the absence of any objects along the main road, it is difficult to estimate the speed of the vehicles going on the main road. These sites are very dangerous because a wrong estimate made by the driver approaching on the secondary road, may result in a car accident. Fatal accidents have happened wherein especially a motorcyclist's way has been crossed by a slowly moving vehicle coming from a secondary road. At present, these situations are being solved by decreasing the speed limit on the main road. A device that would provide a safer passage through the crossing does not exist (except for traffic lights).

Summary of the invention

[0003] The disadvantages of the prior art are mostly eliminated by a method for detecting and indicating a possibility of safe passing a road wherein

- the speed and the distance of vehicles approaching a point of measuring in a first direction is measured;
- based on the measured data - the times till the vehicles pass through a chosen point are calculated;
- the lowest value of the calculated data is displayed in a second direction, which crosses the first direction.

[0004] Preferably, the calculation of the time till the passage of the vehicle through the chosen point is repeated based on the measured data with a frequency of 10 - 1000 measurements per second.

[0005] According to a preferred embodiment the speed and the distance of vehicles approaching the point of measurement on a main road is measured and the lowest calculated value is displayed to the drivers approaching the point of measurement on a secondary road which crosses the main road.

[0006] The disadvantages of the prior art are also eliminated by an indicator of safe crossing a road, wherein it comprises

- at least one measuring unit for monitoring and measuring the speed and the distance of a vehicle approaching the indicator from a first direction,
- a computing unit for calculating the time till the passage of the vehicle through a chosen point based on

the data from the measuring unit and

- at least one display unit for displaying the time calculated by the computing unit and/or for displaying of a symbol assigned to the time calculated by the computing unit, wherein the display unit is arranged for displaying the data to drivers and/or to walkers approaching the indicator from a second direction which crosses the first direction, wherein the measuring unit is connected to the display unit via a computing unit.

[0007] According to a preferred embodiment the indicator is arranged in an area of a main road and a secondary road intersection and it comprises

- a pair of measuring units, wherein each of them is adapted for monitoring and measuring of the speed of vehicles approaching the indicator on the main road (1) from one of the two directions,
- a pair of display units, wherein each of them is adapted for displaying the data from the computing unit to the drivers or to the walkers approaching the indicator on the secondary road from one of the two directions.

[0008] Preferably, the measuring unit is a stationary radar.

Brief description of the drawings

[0009] The preferred embodiments of the invention are illustrated in the figures, wherein Fig. 1 schematically shows a plan view of a crossing of a main road and a secondary road with an installed preferred embodiment of the invention, Fig. 2 shows a plan view of a road with a sharp turn and with a further embodiment of the invention and Figure 3 schematically shows a connection of parts of the invention.

Description of preferred embodiments

[0010] Fig. 1 shows a schematic plan view of a crossing of a main road 1 and a secondary road 2, wherein an arrangement of an exemplifying embodiment of the invention is indicated. On the main road 1 in the direction of travel in front of the intersection with secondary road 2 there is a measuring unit 3 (on the side of the road), which measures the distance and the speed of the vehicles coming along the main road 1 towards the intersection, whether it comes from one or the other side (dashed line indicates the scanned area). On the secondary road 2 in the direction of travel in front of the intersection there is a display unit 4 for displaying information to the drivers and / or walkers coming towards the intersection along the secondary road 2 (the arrow indicates the direction of displaying). In this preferred embodiment the invention comprises a pair of measuring units 3- one for each travel direction on the main road 1- and a pair of display units

4- one for each travel direction on the secondary road **2**. The invention comprises also a computing unit **5**, which is connected to the measuring unit(s) **3** and to the display unit(s) **4**.

[0011] The measuring unit monitors the main road **1** in a conical segment, and this segment preferably covers not only the part of the main road which includes (all) lanes in the corresponding direction, but it covers also the adjacent areas, so that the system may recognize for example cyclists riding just at the side of the road, as well as vehicles coming to the intersection in the lane intended for the opposite traffic direction because they are just overtaking or for other reasons.

[0012] The invention works as follows:

[0013] The measuring unit **3** measures the speed and the distance of approaching vehicles on the main road **1** and the current measured values are transmitted to the computing unit which calculates the estimated time of the arrival of the vehicle into the intersection. Then the computing unit **5** transmits the calculated time to the display unit **4**, which displays the current calculated value and /or an assigned symbol so the walkers and / or the cyclists and / or the drivers of motor vehicles approaching the intersection on the secondary road **2** may draw a conclusion whether they have enough time for a safe passage through the intersection or whether they should rather wait until the vehicle approaching on the main road leaves the intersection. In the case that there are more vehicles coming on the main road toward the intersection from one or the other side, the display unit **4** always shows the shortest calculated time. The calculated time is preferably displayed in seconds, the data may be accompanied by other graphical features such as different color of the displayed time: more than 10 seconds-green, 5-9 seconds orange, 0-4 seconds red, possibly accompanied by a red cross, etc.

[0014] The embodiment of the invention shown in Fig. 1 has been described based on a standard crossing of a main road **1** and a secondary road **2**. According to a further embodiment of the invention (not shown), the invention might be used in places, where there is only a crosswalk. **6** crossing the main road **1** instead of the secondary road **2** or where walkers frequently cross the main road or there is an intersection with a cycle track, such that the display units are used to inform walkers, cyclists or skaters.

[0015] Fig. 2 shows an embodiment of the invention, suitable for use on roads with a sharp turn and with a crosswalk. On the main road **1** there is a crosswalk **6** in front of the sharp turn. The measuring unit **3** is arranged on the outer side of the turn in a distance from the crosswalk **6**, so it could detect vehicles approaching the turn from the opposite side than the crosswalk **6** is. The measuring unit **3** is connected via the computing unit **5** with the display units **4**, which - based on the data received from the computing unit **5** - display the time till the arrival of the vehicle, wherein said time being displayed to the walkers at or near to the crosswalk. Alternatively, to im-

prove the safety, it is suitable to arrange another measuring unit **3** on the inner side of the turn close the crosswalk, for example as a part of the display unit **4**, so that the display units **4** could show the data about vehicles coming to the crosswalk **6** from both driving directions.

[0016] A similar arrangement may be used for example in case of a junction of between a main road and a secondary road, i.e. at a so-called T-junction of a secondary road to a main road.

[0017] If the sector is not well-arranged and the measuring unit cannot be placed to oversee a strip of the road that is long enough, it is possible to use a pair of measuring units, where one of them is placed close to the crossing and the other is further, for example behind another turn or behind a terrain wave. It is obvious that the calculations of the computing unit **5** have to take into account the distance of the measuring unit **3**, from which the data about the arriving vehicle were taken.

[0018] On the other hand the simplest embodiment would only comprise one measuring unit **3**, one display unit **4** arranged at the crosswalk on the outer arc of the turn. Both units would be connected via the computing unit **5**. In this case it would be assumed that the walker, who intends to cross the road from the outer to the inner side of the arc of the turn, has a relatively good view, and the data about what is happening behind the turn would be displayed only to the walkers, who want to cross the road from the inner to the outer side of the arc of the turn.

[0019] The invention can be also used in places, where the terrain is not easy to oversee-because of wavy terrain, sharp turns, objects disabling good view etc. or any combination of these factors.

[0020] Preferably, the measuring unit **3** is a stationary radar, but any other device that is able to measure the speed and the distance of the coming vehicle may be used.

Claims

1. A method for detecting and indicating a possibility of safe passing a road **characterized in that**
 - the speed and the distance of vehicles approaching a point of measuring in a first direction is measured;
 - based on the measured data - the times till the vehicles pass through a chosen point are calculated;
 - the lowest value of the calculated data is displayed in a second direction, which crosses the first direction.
2. The method according to claim 1, **characterized in that** the calculation of the time till the passage of the vehicle through the chosen point is repeated based on the measured data with a frequency of 10-1000 measurements per second.

3. The method according to claim 1 or 2, **characterized in that** the speed and the distance of vehicles approaching the point of measurement on a main road (1) is measured and the lowest calculated value is displayed to the drivers approaching the point of measurement on a secondary road (2) which crosses the main road (1). 5
4. An indicator of safe crossing a road, **characterized in that** it comprises 10
- at least one measuring unit (3) for monitoring and measuring the speed and the distance of a vehicle approaching the indicator from a first direction, 15
 - a computing unit (5) for calculating the time till the passage of the vehicle through a chosen point based on the data from the measuring unit (3) and
 - at least one display unit (4) for displaying the time calculated by the computing unit (5) and /or for displaying of a symbol assigned to the time calculated by the computing unit (5), wherein the display unit (4) is arranged for displaying the data to drivers and / or to walkers approaching the indicator from a second direction which crosses the first direction, 20 25
- wherein the measuring unit (3) is connected to the display unit (4) via a computing unit (5). 30
5. The indicator according to claim 4, **characterized in that** it is arranged in an area of a main road (1) and a secondary road (2) intersection and it comprises 35
- a pair of measuring units, wherein each of them is adapted for monitoring and measuring of the speed of vehicles approaching the indicator on the main road (1) from one of the two directions,
 - a pair of display units (4), wherein each of them is adapted for displaying the data from the computing unit to the drivers or to the walkers approaching the indicator on the secondary road (2) from one of the two directions. 40 45
6. The indicator according to the claim 4 or 5, **characterized in that** the measuring unit (3) is a stationary radar. 50

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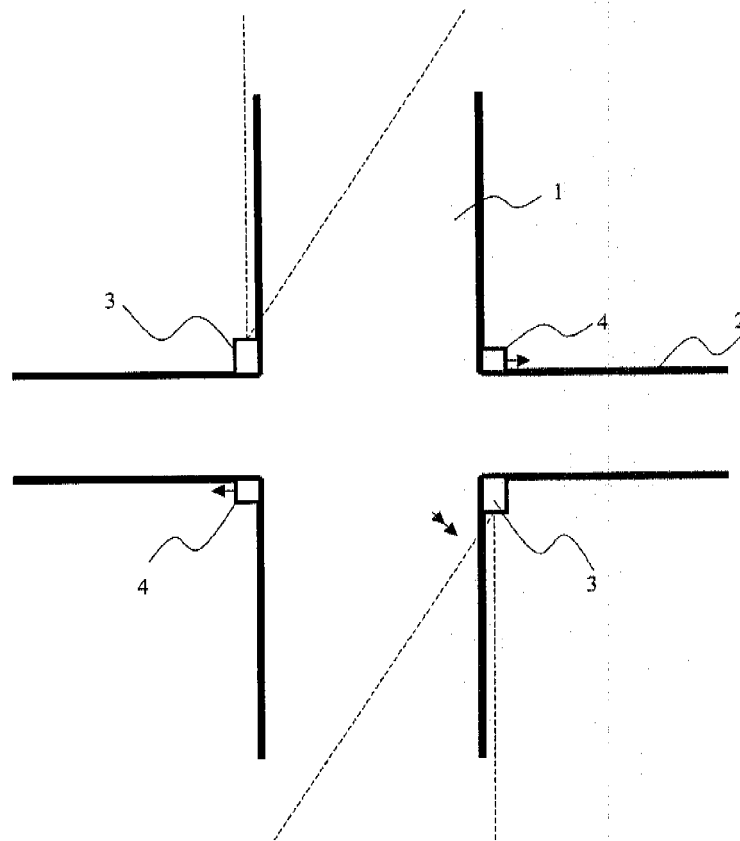


Fig. 1

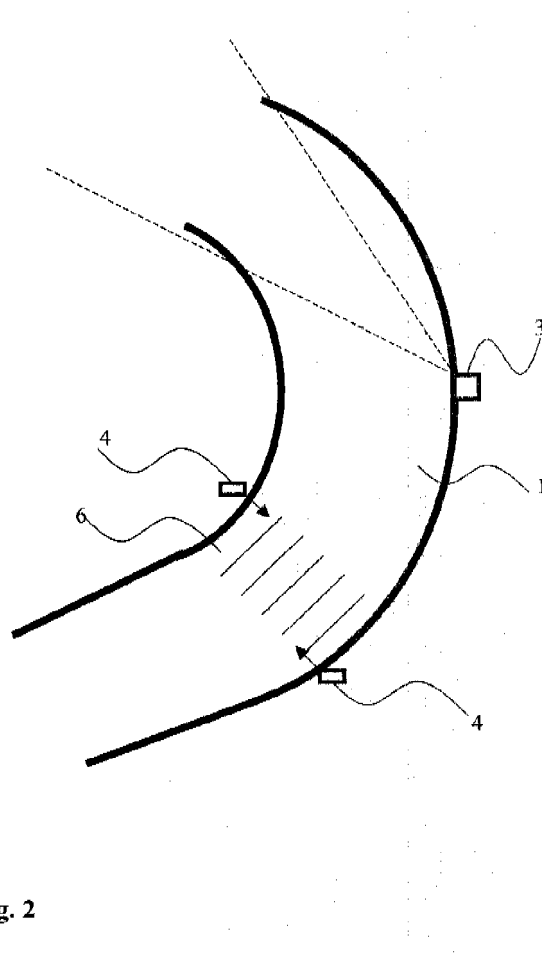


Fig. 2

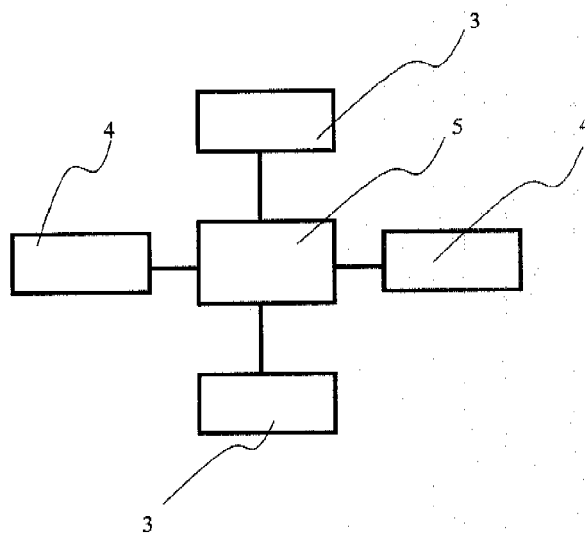


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 11 46 6022

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	FR 2 858 451 A1 (JCDECAUX SA [FR]) 4 February 2005 (2005-02-04) * page 1, line 14 - page 2, line 6 * * page 5, line 27 - page 6, line 5 * * page 7, line 15 - page 8, line 11 * * page 9, line 5 - line 11 * * page 9, line 35 - page 10, line 11 * -----	1-6	INV. G08G1/16 G08G1/052
Y	EP 2 034 467 A1 (AISIN AW CO [JP]) 11 March 2009 (2009-03-11) * column 4 - column 6 * * paragraph [0020] - paragraph [0029] * * paragraph [0036] - paragraph [0043] * * paragraph [0052] * -----	1-6	
A	EP 1 351 207 A1 (JCDECAUX SA [FR]) 8 October 2003 (2003-10-08) * paragraph [0026] * * paragraph [0047] - paragraph [0049] * * figure 4a * -----	1-6	
			TECHNICAL FIELDS SEARCHED (IPC)
			G08G
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		27 November 2012	Wagner, Ulrich
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 11 46 6022

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82