(12) UK Patent Application (19) GB (11) 2 397 189 (13) A

(43) Date of A Publication 14.07.2004

(21) Application No: 0300684.8

(22) Date of Filing: 11.01.2003

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(51) INT CL[7]:
H04N 7/18 , B60R 1/00

(52) UK CL (Edition W):
H4F FAAE
B7J J69

(56) Documents Cited:

GB 2353167 A	**GB 2340097 A**
GB 2327823 A	**JP 060183298 A**
JP 010044863 A	**JP 2002154383 A**
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(58) Field of Search:
UK CL (Edition V) **B7J, H4F**
INT CL[7] **B60R, H04N**
Other: **Online: WPI,EPODOC,PAJ**

(54) Abstract Title: **Forward looking road monitoring system for vehicles**

(57) A vehicle is fitted with cameras 4,5 mounted in wing mirrors 6,7 to enable an enhanced view of the road in front of the vehicle. Images captured by the cameras are conveyed to a display means 3 to enable the driver of the vehicle to view the images captured. The system affords the driver of the vehicle increased visibility of the road ahead especially when the view from the driver position 12 is obstructed by another vehicle or a corner (see figures 2-6). The system also allows for the images captured to be transmitted to a remote viewer via a mobile telephone network to enable the remote viewer to identify where the driver is located. A further feature of the system is control of the camera direction, which is responsive to the direction of steering, allowing the steering angle to be sensed and causing the camera to rotate to face the direction in which the vehicle is turning.

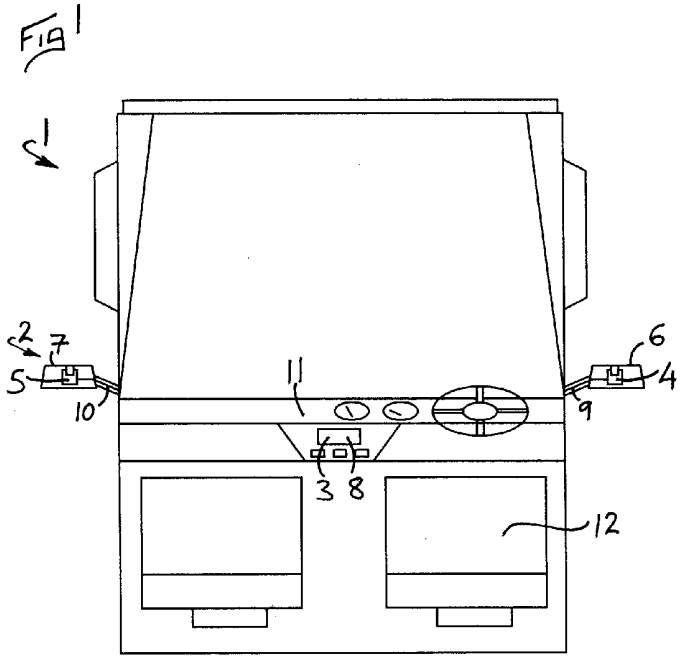

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Fig 1

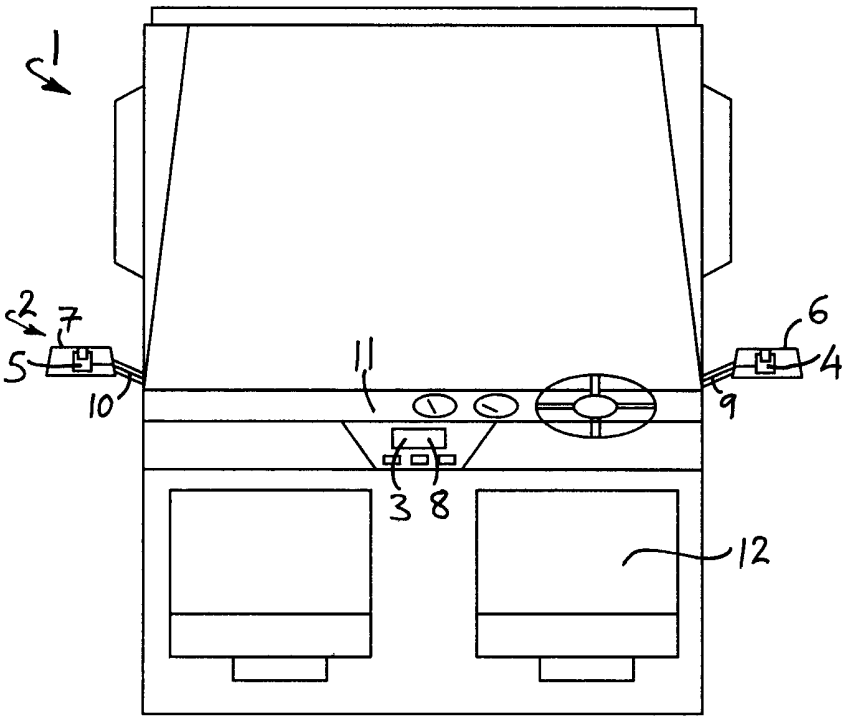


Fig 2

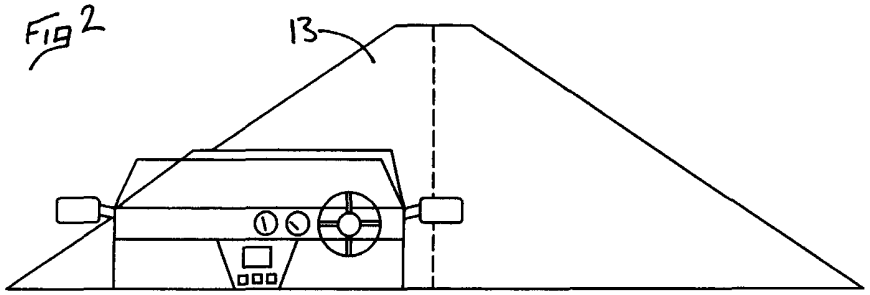


Fig 3

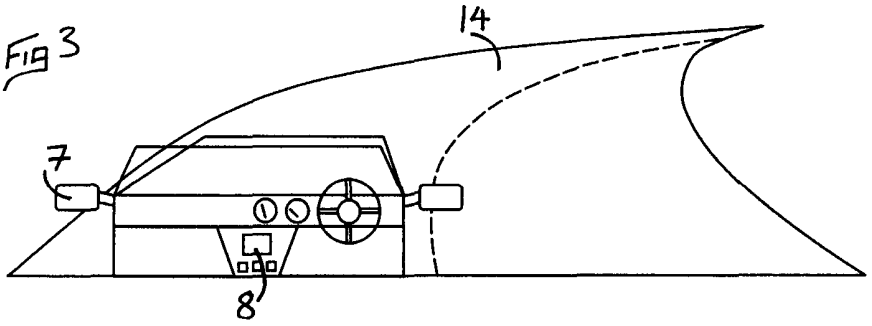


Fig 4

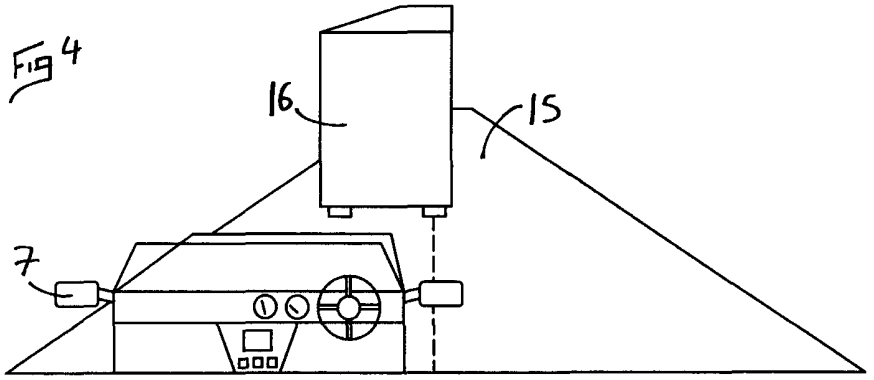


Fig 5

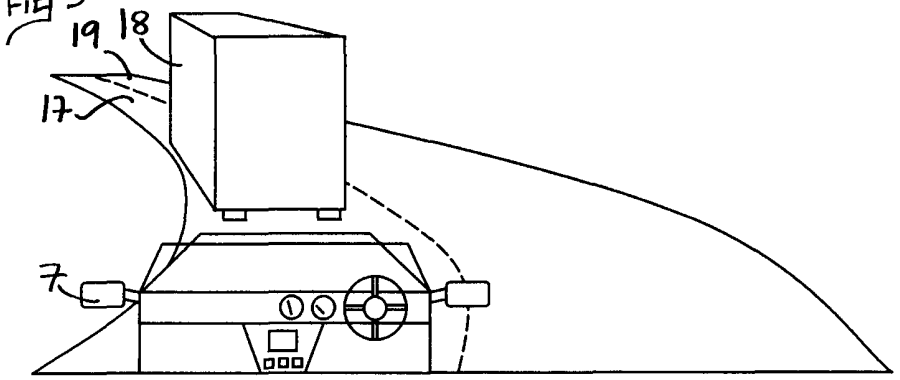
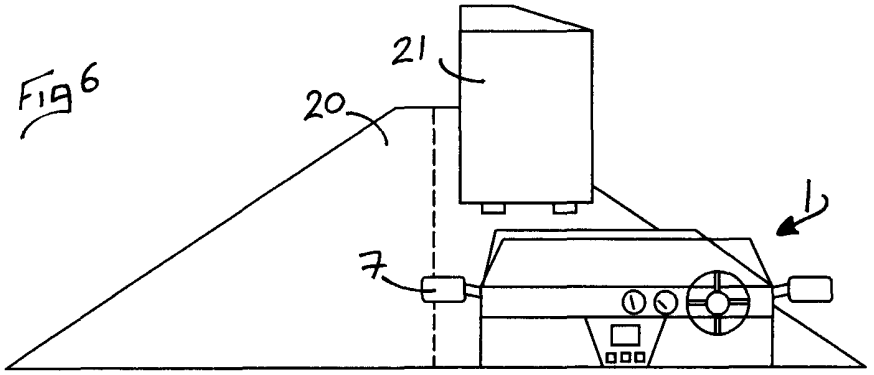


Fig 6



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Camera Means for a Vehicle

This invention relates to a view assistance camera system for a motor vehicle.

Motor vehicles, in particular cars and their derivatives, are commonly provided with a driver's seat on one side of the cabin. The driver is positioned adjacent the centre of the road to provide the most central view of the road ahead.

With this arrangement the driver may also conveniently see past vehicles in front when preparing to overtake. Further, if a driver is seated on the right, they gain the best view around a bend to the left, and visa versa.

However, in some circumstances a driver seated on one side of a vehicle is not best positioned to view the road ahead. For example, a driver seated on the right does not gain the best view around a bend to the right, and visa versa. In addition, if a vehicle in front moves across the path of the vehicle when preparing to turn off the road, the driver may not conveniently see past the near side of the vehicle.

Further, neighbouring countries drive on opposite sides of the road, in particular the British Isles and the rest of Europe. Thus, when a vehicle from one of these territories travels to the other, the driver is seated on the wrong side of the vehicle, adjacent the side of the road. Thus, they are not positioned to gain the most central view of the road ahead, and cannot conveniently see past vehicles in front when preparing to overtake.

The present invention is intended to overcome some of these problems.

According to the present invention camera means for a vehicle comprise one or more cameras and a display means, in which the cameras are adapted to capture images of the environment ahead during driving of the vehicle on a road, and the display means are adapted to display the camera images.

In a preferred construction the cameras may be adapted to provide images which are not available from the driver's normal seating position. Further, the images provided can be adapted to assist the driving of the vehicle on a road, and may include views past vehicles in front when preparing to overtake, or views round a bend in the road from the opposite side of the vehicle to the driver's seat.

In one embodiment the cameras can be adapted to rotate to provide the optimum view. For example the cameras may be adapted to turn in synchrony with the front wheels of the vehicle, so that the cameras capture images in the direction of turn, rather than the direction of the body of the vehicle.

In a preferred construction two cameras can be provided, a first positioned on the right flank of the vehicle, and the second on the left flank of the vehicle. In one embodiment the cameras may be housed inside the wing mirrors of the vehicle.

The cameras can be connected to the screen by signal wires, or via remote signal means of any known type.

The display means can be a visual display screen of any known type, which in one embodiment is positioned on the dash board of the vehicle, where it can be viewed by the driver in the driver's seat.

It alternative embodiments the screen can be any screen which an image can be projected from. For example, a driver head-up display, or a mobile phone screen.

In the case of the mobile phone screen, the image can be sent to the mobile phone in the same manner as any image is sent to such a device. With this arrangement the invention has the additional advantage that the mobile phone user can see where the vehicle is heading from a different location. This can be of use if the vehicle is stolen, or if directions are to be given to the driver by a third party.

In one embodiment the vehicle can be a motor car, but it will be appreciated that any road going vehicle can be fitted with the above described system.

The invention also includes a vehicle provided with camera means comprising one or more cameras and a display means, in which the cameras are adapted to capture images of the environment ahead during driving of the vehicle on a road, and the display means are adapted to display the camera images.

The invention can be performed in various ways but one embodiment will now be described by way of example and with reference to the following drawings, in which:-

Figure 1 is a diagrammatic top view of the front half of a motor car equipped with a camera means according to the present invention;

Figure 2 is a diagrammatic rear view of the motor car as shown in Figure 1, in a first situation;

Figure 3 is a diagrammatic view of the motor car as shown in Figure 1 in a second situation;

Figure 4 is a diagrammatic view of the motor car as shown in Figure 1 in a third situation;

Figure 5 is a diagrammatic view of the motor car as shown in Figure 1 in a fourth situation; and,

Figure 6 is a diagrammatic view of the motor car as shown in Figure 1 in a fifth situation.

As shown in Figure 1 a motor car 1 is equipped with camera means 2 and display means 3, in which the camera means 2 are adapted to capture images of the environment ahead during driving of the motor car 1 on a road, and the display means 3 are adapted to display the camera images.

The camera means 2 comprise two closed circuit television cameras 4 and 5. Camera 4 is disposed inside the right-hand side wing mirror 6, and camera 5 is disposed inside the left-hand side wing mirror 7.

The display means 3 comprise a television screen 8, which is connected to the cameras 4 and 5 by signal wires 9 and 10. The screen 8 can show the images captured by either camera 4 or 5.

The screen 8 is disposed in the central console 11 of the motor car 1, where it is readily visible from the normal seated position in the driver's seat 12. It will be appreciated that the cameras 4 and 5 are able to capture forward views of the environment ahead of the car 1, which are not visible to a driver seated in the normal position in the driver's seat 12.

Figures 2 to 6 show various possible road scenarios. The Figures are not intended to be exhaustive.

Figure 2 shows a scenario in which a driver has a good view of a straight road 13 ahead and requires no assistance from the cameras 4 or 5 (not visible).

Figure 3 shows a scenario in which the road 14 ahead bends to the right. In this situation a better view around the bend can be gained from the position of the wing mirror 7 than from the driver's normal seated position. Therefore, if the images captured from the camera 5 are displayed on the screen 8, the driver may be able to see further round the bend than they can from their normal seated position.

Figure 4 shows a scenario where the view of the road 15 ahead is blocked by traffic 16. In this situation it may assist the driver to see past the traffic 16, from either camera 4 or 5. Further, if the traffic 16 moves into the middle of the road 15, in preparation to turn right off the road 15, the driver of the car 1 may attempt to pass the traffic 16 on the inside. Under these circumstances the view from wing mirror 7 would assist the driver to see past the traffic 16 down the inside.

Figure 5 shows a scenario where the road 17 ahead bends to the left, and the view ahead is blocked by traffic 18. In this situation is may assist the driver of the car 1 to see the portion 19 of the road 17 ahead of the traffic 18, which can be viewed from the position of wing mirror 7, but not from the driver's normal seated position.

Figure 6 shows a scenario where the car 1 is being driven abroad, where the traffic drives on the opposite side of the road 20. In these circumstances the driver's forward view is compromised because the driver's seated position is on the inside of the carriage way. Therefore, the view from camera 5 in wing mirror 7 may be of assistance in seeing past traffic 21 in front when preparing to overtake, or under any other conditions when a view from the centre of the road 20 is advantageous.

It will be appreciated that the Figures 2 to 6 can be mirrored when the car is provided with left-hand drive. It will be further appreciated that the scenarios shown in Figures 2 to 6 are not exhaustive, and the camera 4 and 5 may of assistance to the driver in other scenarios.

In an alternative embodiment, (not shown) the cameras are provided with rotating means which are adapted to point the cameras substantially in the direction of the front wheels of the car. With this arrangement the cameras capture images in the direction of turn, rather than the direction of the body of the vehicle. This may be of assistance in the scenarios shown in Figures 3 or 5, when the front wheels of the car are pointing in the direction of the turn, but the body of the car is pointing straight

ahead. The pivoting cameras may also be of assistance in other scenarios. The rotating means can be electric motors of any known type or configuration.

In a further alternative embodiment (not shown) the motor car 1 is further provided with a transmitter, which is capable of transmitting the images captured by the cameras, so that they can be received by a third party at another location. In a preferred construction the transmitted uses mobile phone technology, and the third party can view the images captured by the cameras on their mobile phone. This can be advantageous if directions are to be given to the driver from a third party, or if the vehicle has been stolen or misplaced.

Thus a road vehicle is provided with cameras which allow the driver to see more of the road ahead than is visible from their normal seated position.

Claims

1. Camera means for a vehicle comprising one or more cameras and a display means, in which the cameras are adapted to capture images of the environment ahead during driving of the vehicle on a road, and the display means are adapted to display the camera images.

2. Camera means for a vehicle according to Claim 1 in which the cameras are adapted to provide images which are not visible to a driver of the vehicle when positioned in the vehicle's normal driving position.

3. Camera means for a vehicle according to Claim 2 in which two cameras are provided.

4. Camera means for a vehicle according to Claim 3 in which a first camera is positioned on the right flank of the vehicle, and a second camera is positioned on the left flank of the vehicle.

5. Camera means for a vehicle according to Claim in which the cameras are housed inside the wing mirrors of the vehicle.

6. Camera means for a vehicle according to any of the preceding Claims in which the display means is a visual display screen.

7. Camera means for a vehicle according to Claim 6 in which the screen is positioned on the dash board of the vehicle, where it can be readily viewed by the driver when positioned in the vehicle's normal driving position.

8. Camera means for a vehicle according to Claim 6 in which the camera means is provided with a transmitter, and the screen is adapted to receive the images transmitted by the transmitter at a location outside the vehicle.

9. Camera means for a vehicle according to Claim 8 in which the transmitter is a mobile telephone, and in which the images captured by the cameras can be viewed on a mobile telephone outside the vehicle.

10. Camera means for a vehicle according to any of the preceding Claims in which the cameras are provided with rotating means.

11. Camera means for a vehicle according to Claim 10 in which the rotating means are adapted to point the cameras substantially in the direction of the front wheels of the vehicle.

12. Camera means for a vehicle according to any of the preceding Claims in which the vehicle is a motor car.

13. Camera means substantially as described herein and as shown it the accompanying drawings.

14. A vehicle provided with camera means according to any of the preceding Claims.

AMENDMENTS TO THE CLAIMS HAVE BEEN FILED AS FOLLOWS

Claims

1. Camera means for a road going vehicle provided with a left and a right wing mirror, comprising one or more cameras housed inside one or both of the wing mirrors and a display means, in which the cameras are provided with rotating means which are adapted to point the cameras substantially in the same direction as the front wheels of the vehicle, and in which the cameras are adapted to capture images of the environment ahead of the vehicle during driving of the vehicle on a road, and the display means are adapted to display the camera images to a driver seated in the vehicle.

2. Camera means as claimed in Claim 1 in which a camera is housed in both the left and the right wing mirror.

3. Camera means for a vehicle according to any of the preceding Claims in which the display means is a visual display screen.

4. Camera means for a vehicle according to Claim 3 in which the screen is positioned on the dash board of the vehicle, where it can be readily viewed by the driver when positioned in the vehicle's normal driving position.

5. Camera means for a vehicle according to Claim 4 in which the camera means is provided with a transmitter, and the screen is adapted to receive the images transmitted by the transmitter at a location outside the vehicle.

6. Camera means for a vehicle according to Claim 5 in which the transmitter is a mobile telephone, and in which the images captured by the cameras can be viewed on a mobile telephone outside the vehicle.

7. Camera means for a vehicle according to any of the preceding Claims in which the vehicle is a motor car.

8. Camera means substantially as described herein and as shown in the accompanying drawings.

9. A vehicle provided with camera means according to any of the preceding Claims.

Application No: GB 0300684.8 **Examiner:** Jeremy Cowen
Claims searched: 1-14 **Date of search:** 9 June 2003

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,Y	X 1-7, 12,14 Y 8-11	GB 2353167 A	(Clarke), see whole document
X,Y	X 1-7, 12,14 Y 8-11	GB 2340097 A	(Pollock-Hill), see whole document
X,Y	X 1-7, 12,14 Y 8-11	JP 2001180378 A	(Kyoichi), see abstract
X,Y	X 1-7, 12,14 Y 8-11	JP 2000272418 A	(Sony Corp), see abstract
X,Y	X 1-7, 12,14 Y 8-11	JP 10-044863 A	(Akinobu), see abstract
X,Y	X 1-7, 12,14 Y 8-11	JP 6-183298 A	(Alpine Electronics Inc), see abstract
Y	8,9	GB 2327823 A	(Ley), see page 6, paragraph 3
Y	10,11	JP 2002154383 A	(Furukawa), see abstract and figure 4

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[V]:

B7J,H4F

Worldwide search of patent documents classified in the following areas of the IPC[7] :

B60R,H04N

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

WPI,EPODOC.PAJ