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UK CL (Edition T) **B7J J69 , H4F FAAE FAAX FKX**

INT CL⁷ **B60R 1/00 11/04 , H04N 7/18**

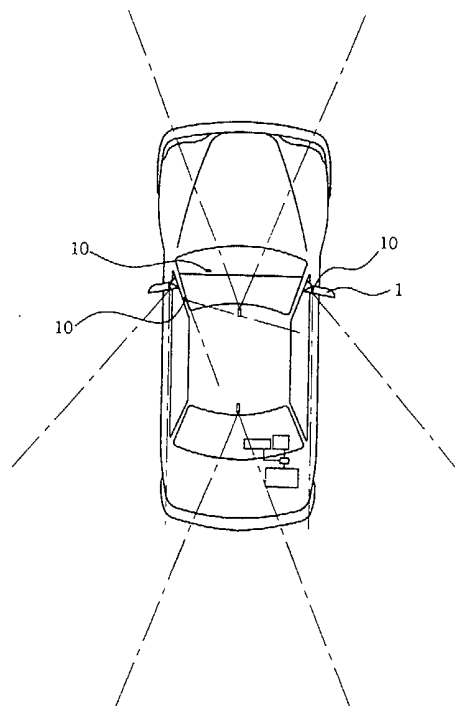
Online: **WPI,EPODOC,PAJ**

(54) Abstract Title

Image recording and voice monitoring for vehicle

(57) An image recording system is installed in a vehicle to enable the driver to have a greater awareness of surrounding events, whilst driving. A number of digital cameras 10 are disposed about the vehicle to capture images in the vicinity of the vehicle. A memory is provided such that these images may be recorded and accessible thereafter for a predetermined period. A monitor (20, figure 7) is located on the vehicle dashboard to enable the driver to observe images captured by the cameras. These are displayed in a split screen format. Furthermore the system comprises a voice monitoring means which compares detected audio signals with stored voice signals to determine whether the vehicle is under threat of break-in etc. If a threat is detected an audible alarm is sounded.

FIG.5



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FIG.1

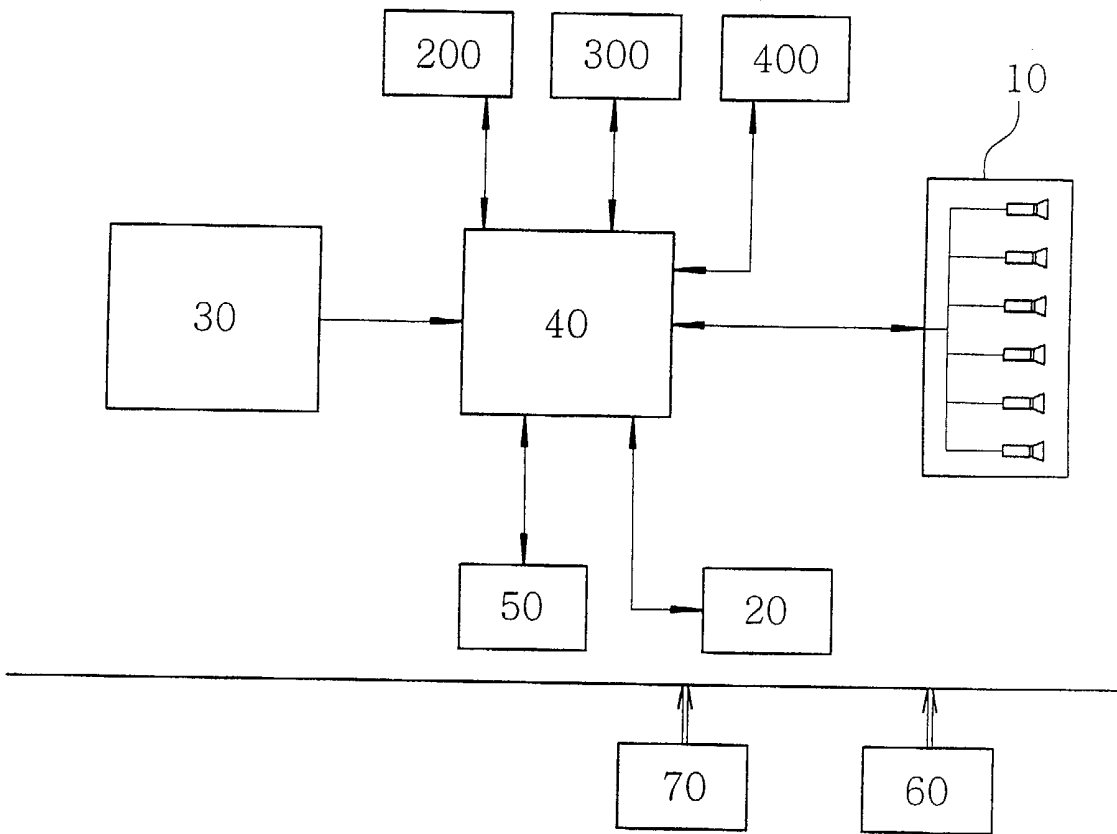


FIG. 2

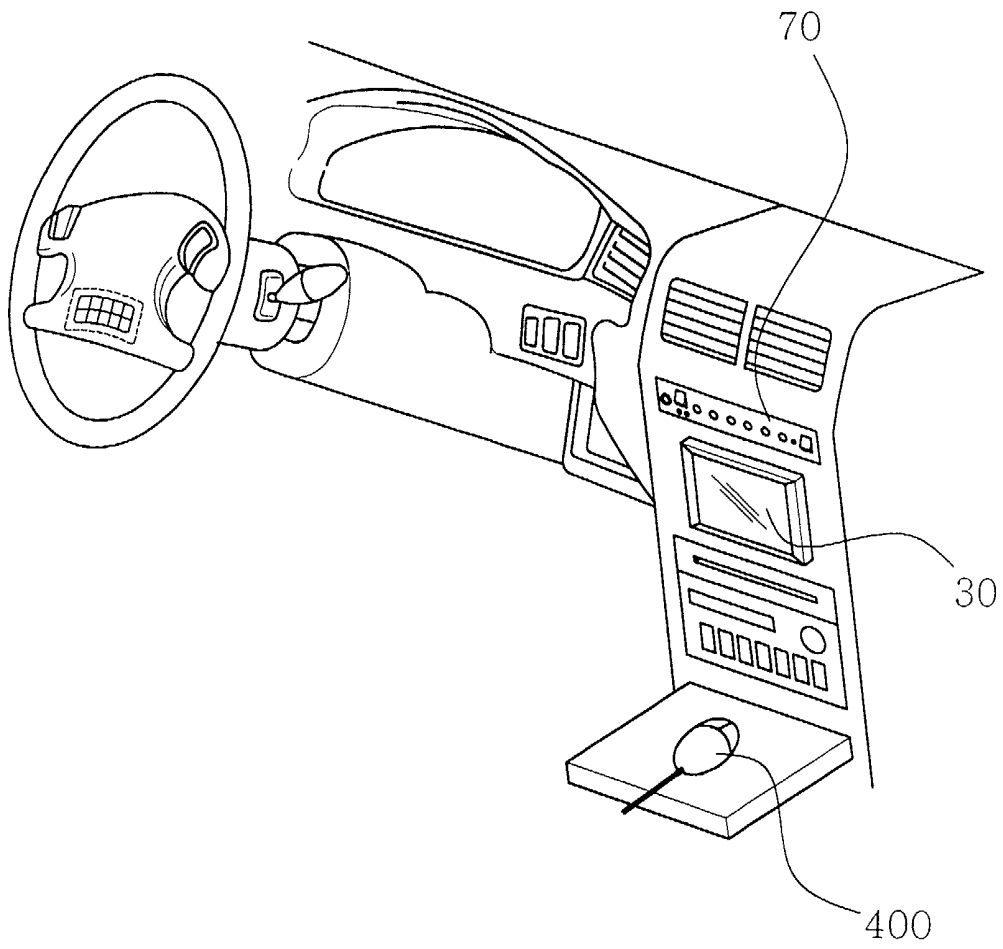


FIG.3

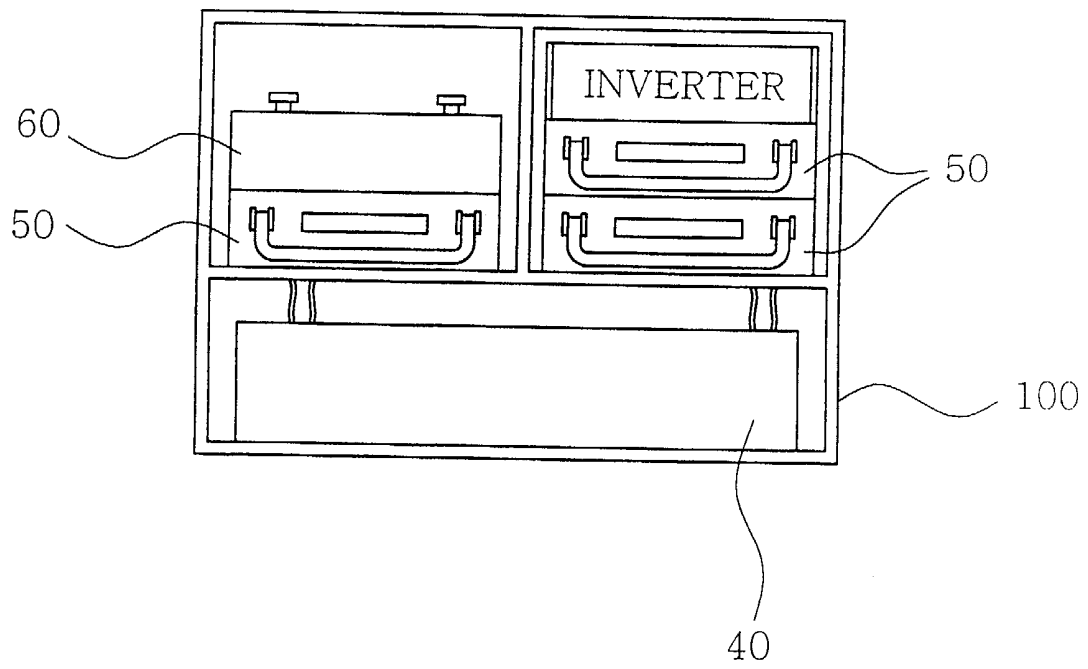


FIG. 4

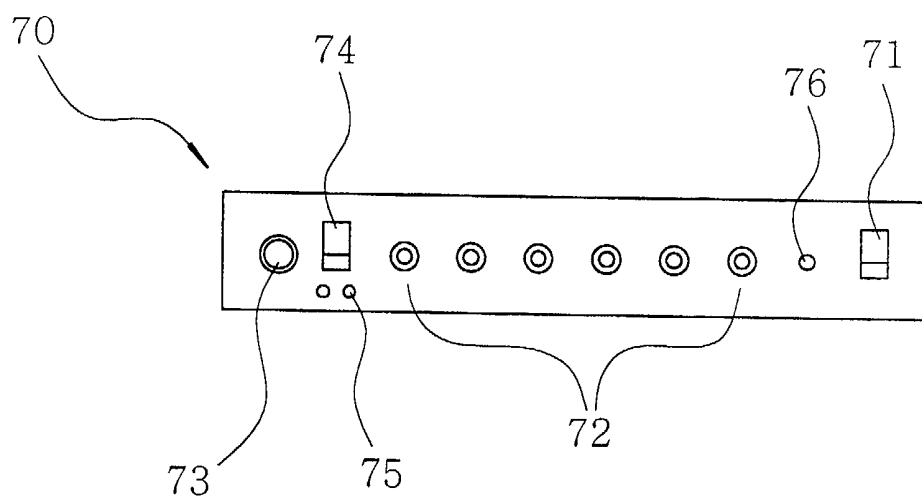


FIG.5

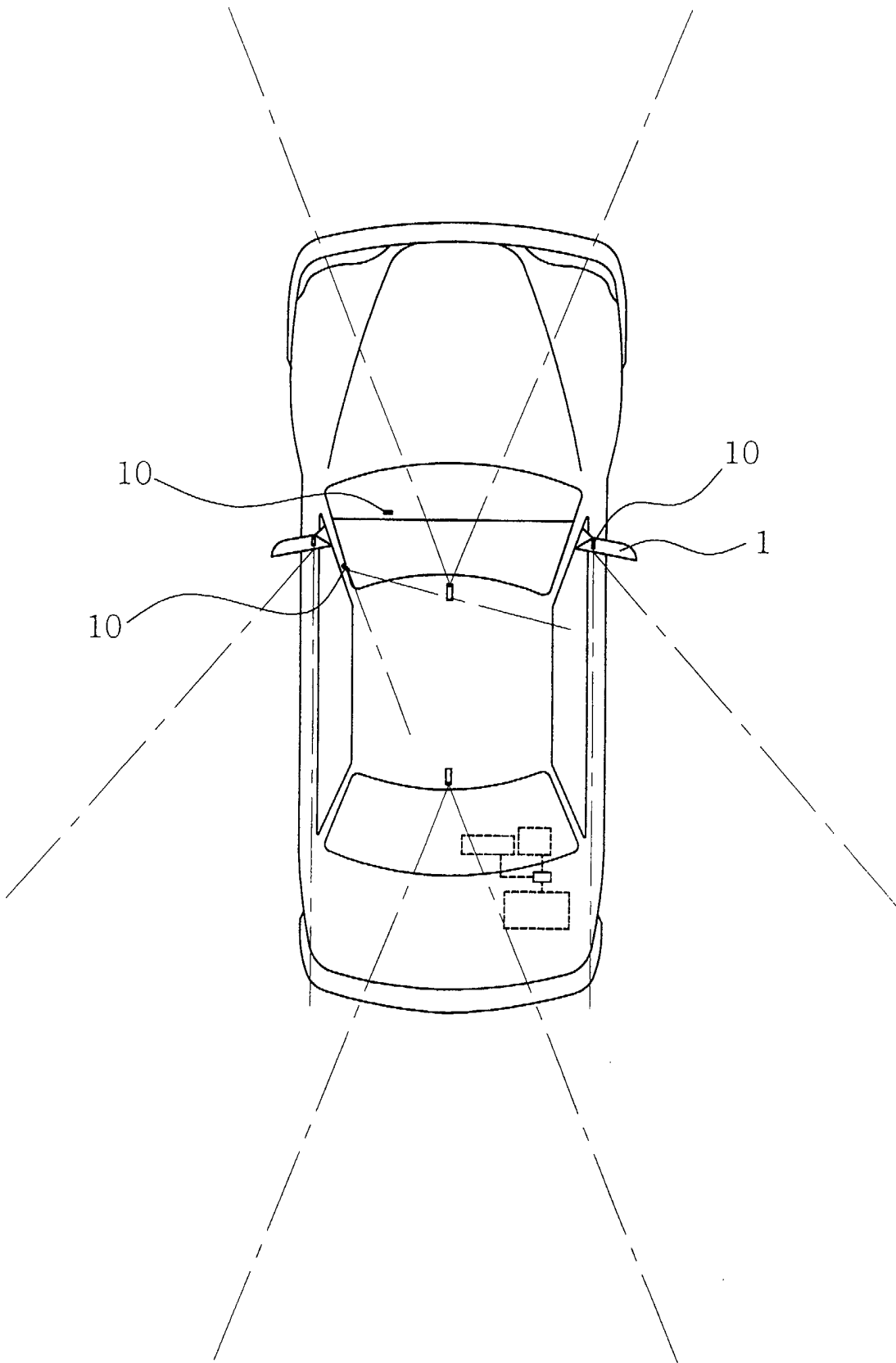


FIG.6

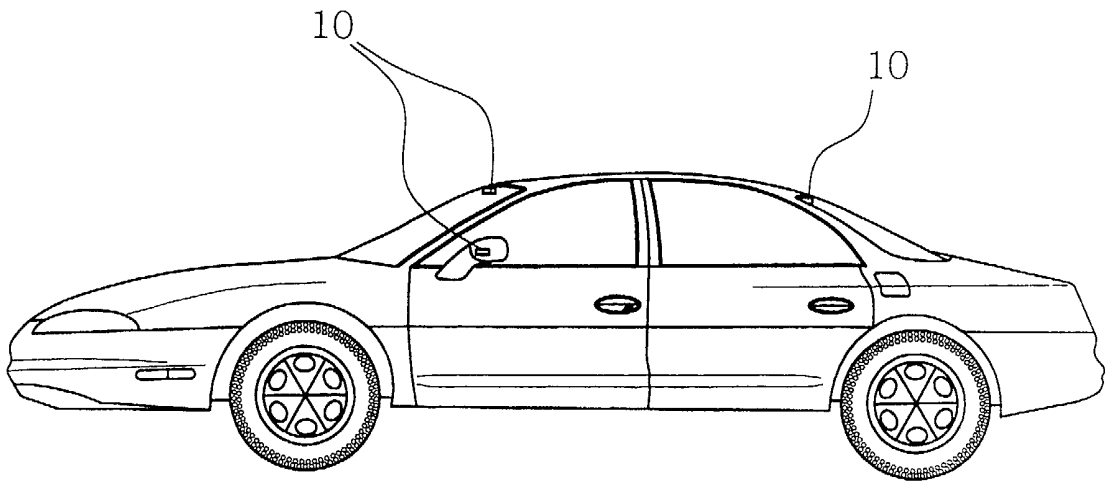


FIG.7

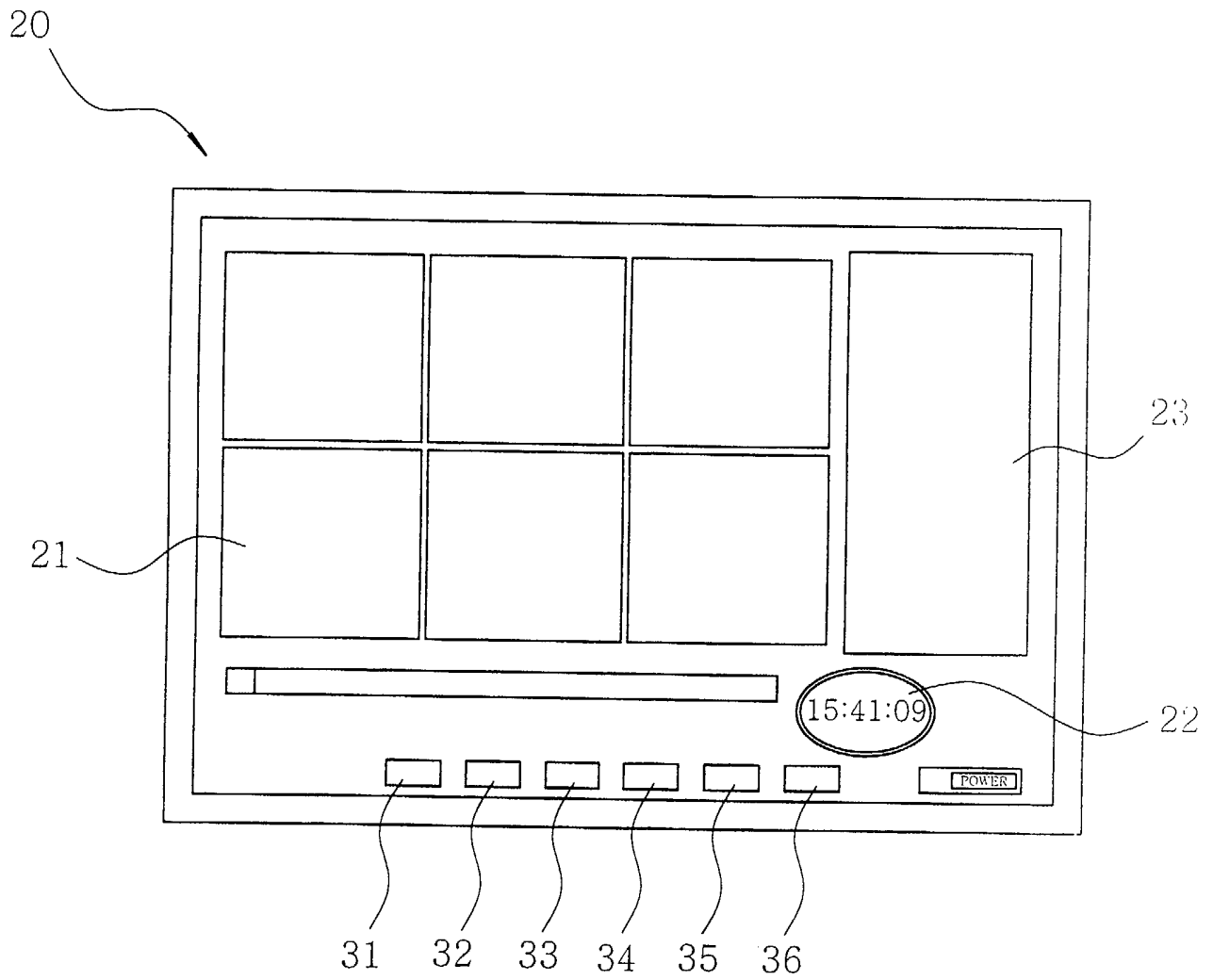


FIG.8

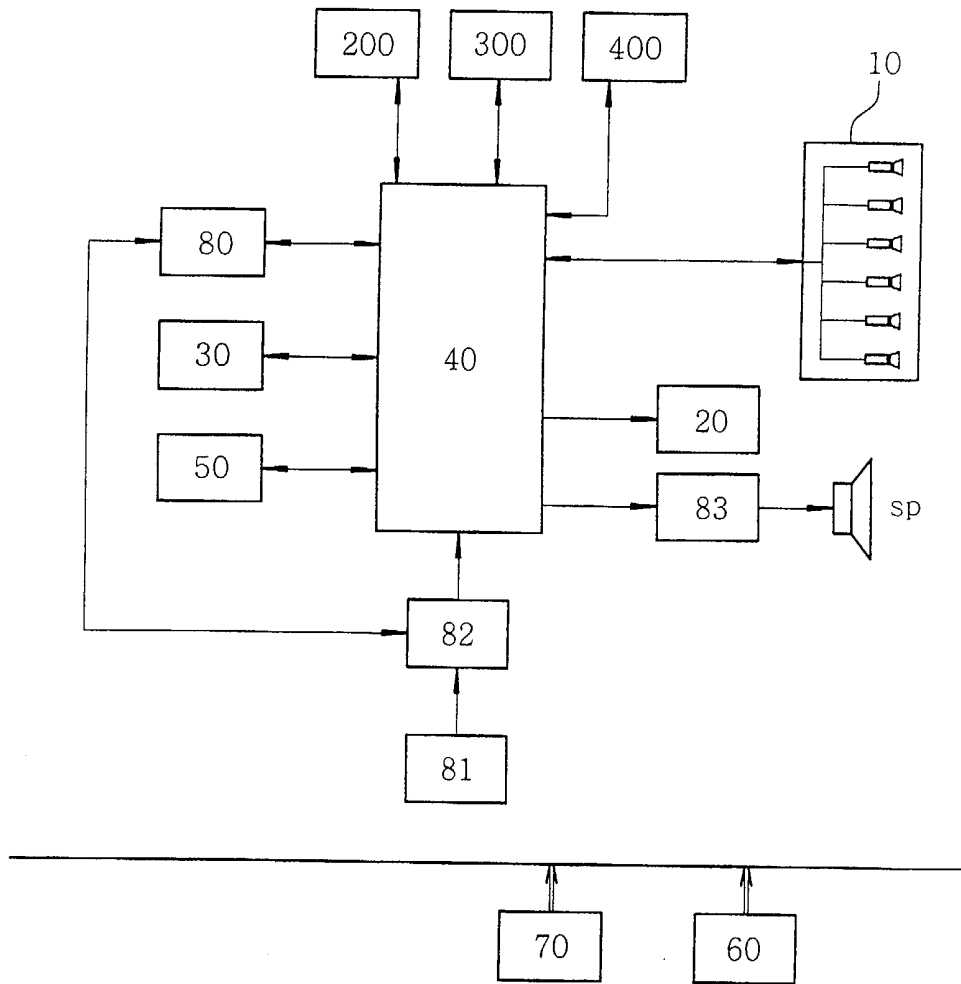


FIG. 9

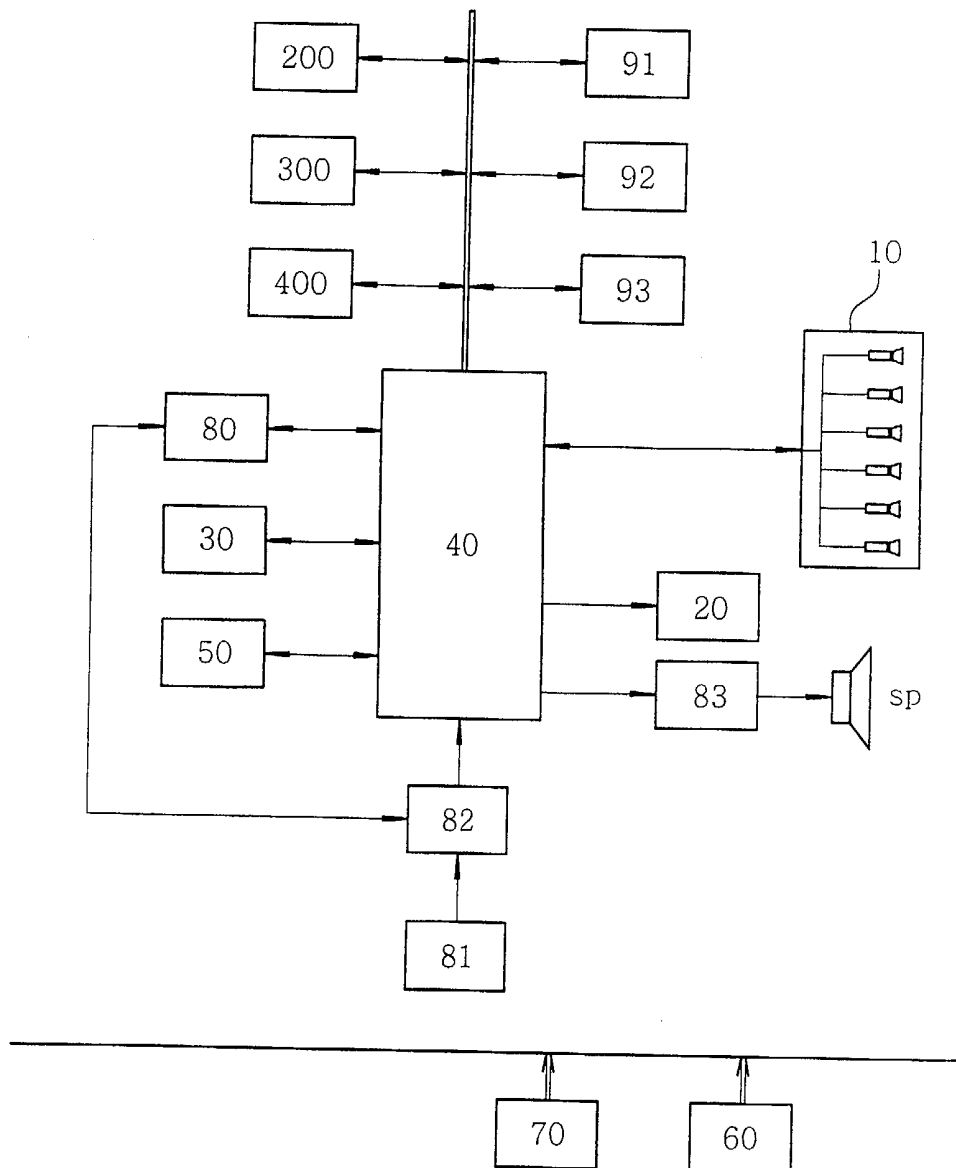


IMAGE AND VOICE RECORDER OF VEHICLE

BACKGROUND OF THE INVENTION

5 1. Field of the Invention

The present invention relates to an image recorder and a voice recorder of a vehicle that enables a driver to perceive the outer and inner situation of the vehicle while driving. In particular, the present invention relates to an image recorder and a voice recorder of a vehicle that enables a driver (or a passenger on the front seat) to see
10 the outside views of all direction that are photographed by a minicam mounted at the outside of the vehicle (i.e., on the side mirrors), and to see the information on a dashboard and interior images of the vehicle that are also photographed by a minicam mounted at the inside of the vehicle (i.e., on the ceiling of the internal panel) through a monitor, and that enables a driver to prevent or, at least, to take proper action against car
15 damages or a car theft using the information from the image recorder as well as voice information provided by a voice detection system that is capable of reading voice information about the car damage or theft especially when any disturbing voice information that is most likely to damage the car is detected from the outside, and of outputting a designated alarm based on the detection result.

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2. Description of the Related Art

In general, transportation facilities like vehicles are operated mainly by drivers. And, the vehicles are mounted with room mirrors and side mirrors for the drivers to be able to look around any direction they want while driving.

25 Only problem with the room mirrors and the side mirrors is that they do have

blind spots according to the angles that the drivers cannot see. Hence, if the drivers are not careful enough, they often find themselves in serious traffic accidents.

That is to say, when the drivers try to go backward looking over the room mirror or the side mirror mounted on the car, they cannot see an object or a child in the
5 blind spot of each mirror, which sometimes brings mishaps to the people involved in the accident.

In addition, although a great number of drivers have one or another kind of alarm systems installed to their cars to protect the cars from any damage or theft, such alarms often mistakenly make sounds regardless of surroundings, which again causes
10 very disturbing noises to the neighbors.

SUMMARY OF THE INVENTION

From the foregoing, it may be appreciated that a need has arisen for a new solution for overcoming the problems described above with the traditional vehicle. It
15 is, therefore, an object of the present invention to provide an image recorder and a voice recorder for a vehicle that enables the driver to see blind spots of the room mirror and the side mirrors and to check the inside of the vehicle and to prevent any car damage or theft, by mounting minicams both at the outside and the inside of each vehicle to photograph the surroundings and to perform mutual supervision, installing a means for
20 saving and displaying the pictures or images photographed by the minicams at the inside of the vehicle, and mounting a voice detection system for reading voice information on the car damage or the car theft and outputting a designated alarm based on a detection result, especially when the warning voice information that might damage the vehicle is detected from the outside at a time when the driver tries to park the
25 vehicle at the parking lot.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects and features of the present invention will become more fully apparent from the following description and appended claims, taken
5 in conjunction with the accompanying drawings. Understanding that these drawings depict only typical embodiments of the invention and are, therefore not to be considered limiting of its scope, the invention will be described with additional specificity and detail through use of the accompanying drawings in which:

Figure 1 is a block diagram showing a vehicle surrounding image recorder
10 according to one embodiment of the present invention;

Figure 2 is a magnified view of inside of a vehicle mounted with a monitor and a key operator that are applicable to the vehicle surrounding image recorder according to one embodiment of the present invention;

Figure 3 is a schematic view of a memory and a controller that are applicable to
15 the vehicle surrounding image recorder according to one embodiment of the present invention;

Figure 4 is a magnified view of the key operator according to one embodiment of the present invention;

Figure 5 is a plane view of a vehicle mounted with digital cameras inside and
20 outside of the vehicle according to one embodiment of the present invention;

Figure 6 is a side view of a vehicle mounted with digital cameras inside and outside of the vehicle according to one embodiment of the present invention;

Figure 7 is a schematic view of a monitor according to one embodiment of the present invention;

25 Figure 8 is a block diagram showing a constitution of a vehicular voice detector

according to another embodiment of the present invention; and

Figure 9 is a block diagram showing a connection state of the vehicle image recorder and peripheral devices (i.e., DC, DVD and so forth) according to still another embodiment of the present invention.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Preferred embodiments of the present invention will now be described with reference to the accompanying drawings. In the following description, same drawing reference numerals are used for the same elements even in different drawings. The matters defined in the description are nothing but the ones provided to assist in a comprehensive understanding of the invention. Thus, it is apparent that the present invention can be carried out without those defined matters. Also, well-known functions or constructions are not described in detail since they would obscure the invention in unnecessary detail.

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Figure 1 is a block diagram showing a vehicle surrounding image recorder according to one embodiment of the present invention, and Figure 2 is a magnified view of inside of a vehicle mounted with a monitor and a key operator that are applicable to the vehicle surrounding image recorder according to one embodiment of the present invention.

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Figure 3 is a schematic view of a memory and a controller that are applicable to the vehicle surrounding image recorder according to one embodiment of the present invention, Figure 4 is a magnified view of the key operator according to one embodiment of the present invention, and Figure 5 is a plane view of a vehicle mounted with digital cameras inside and outside of the vehicle according to one embodiment of the present invention.

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Figure 6 is a side view of a vehicle mounted with digital cameras inside and outside of the vehicle according to one embodiment of the present invention, and Figure 7 is a schematic view of a monitor according to one embodiment of the present invention.

5 As depicted in Figures 1 through 7, a vehicle according to the present invention includes a designated number of digital cameras 10 mounted at the outside and inside of the vehicle for photographing driving information of the vehicle (i.e., a dashboard) and indoor environment and outside views of all direction;

10 a monitor 20 mounted on a front panel of the vehicle for displaying image information photographed by each digital camera 10 by splitting or magnifying the image information;

a key operator 30 integrated into the monitor 20 for splitting and inverting the image information displayed through the monitor 20, and for setting a schedule of photographing for the digital cameras 10;

15 a system controller 40 for controlling every part of an image recorder in consecutive order according to an inputted signal from the key operator 30;

a memory 50, being attachable/detachable with the system controller 40 through a communications port (COM), for sequentially saving the image information photographed by the digital cameras 10 under the control of the system controller 40;

20 a power supplier 60, being charged by a car battery, for supplying power to every part of the image recorder system; and

an operation controller 70 for turning on/off the power supplier 60 and every part of the system.

25 According to another aspect of the present invention, the operation controller 70 includes a charging switch 71 for charging the power supplier 60 through the car

battery; a camera operation switch 72 for turning on/off the operation of each digital camera 10; a control switch 73 for controlling the operation of the system controller 40; a power supply switch 74 for supplying power provided by the power supplier 60 to each part of the image recorder system; a light emitting diode or device (LED) 75 for
5 indicating an operating status of the system controller 40; and a reset switch 76 for initializing the operating status of the system controller 40.

The memory 50 has enough capacity to save the image information photographed for about 14 days, given that the digital cameras 10 can photograph 12 hours a day. This means that if one can install three memories 50, he can save the
10 image information as long as 45 days.

On the other hand, to save the image information from the memory 50 in a separate diskette, the system controller 40 has a special port just like one in a computer for the diskette to be inserted, and a COM that connects a printer 200, a keyboard 300, and a mouse 400 together. Moreover, the system controller 40 can immediately output
15 the image information saved in the memory 50 through the printer connected to the COM.

Preferably, a hard disk can be used for the memory 50 to allow the data move freely.

Also, the mouse 400 disposed at the front panel of the vehicle is connected to
20 the system controller 40 and the COM for controlling the screen through the monitor 20.

Here, the system controller 40, the memory 50, and the power supplier 60 are stored in a case 100. Preferably, the case 100 is installed inside of the trunk of the vehicle.

The digital cameras 10 are mounted on the side mirrors 1 of the vehicle for
25 photographing the rear, and on the front and the rear ceiling (roof) of the vehicle for

photographing the outside views of the vehicle. Further, the digital cameras 10 are mounted on the front ceiling of the inside of the vehicle at a designated angle for photographing the dashboard and indoor environment. In total, 6 digital cameras are necessary to do the photographing, and sometimes, more than 6 digital cameras can be installed as well.

In the meantime, the monitor 20 includes a screen 21 for displaying the images photographed by the digital cameras 10; a time display window 22 for displaying date and time of the photographing; and an information display window 23 for displaying the information on the image photographs of each digital camera 10 using the type of letters that a user can easily recognize.

Here, each screen 21 of the monitor 20 can have an additional function of varying the size thereof based on a touch screen method.

The key operator 30 preferably includes a primary button 31, a secondary button 32, and a third button 33 for inverting, split-inverting, and splitting the images displayed by the screen 21; a motion tracer button 34 for tracing the motions of the images; a search button 35; and a setup button 36.

More specifically, the primary button 31 inverts the images, which have been photographed by each digital camera 10 and displayed by the screen 21, to pictures one at a time in consecutive order.

The secondary button 32 splits the images, which have been photographed by each digital camera 10 and displayed by the screen 21, into 4, and inverts the split images.

The third button 33 splits the screen 21 into several regions in the same manner that has been set up by the setup button 36.

The search button 35 searches or deletes the image information saved in the

memory 50 having been photographed by each digital camera 10.

The setup button 36 sets channels for the screen 21 which displays the image information photographed by each digital camera 10, a display screen color of the screen 21, a photographing schedule for every digital camera 10, and a photographing speed of the digital cameras 10, respectively.

Additionally, the setup button can set the recording speed of the images photographed by the digital cameras 10, and adjust blocks and sensitivities of the images designated through the motion tracer button 34.

Based on the constitution described above, the operation of the present invention is now explained with reference to Figures 1 through 7.

First of all, using the setup button 36 mounted on the key operator 30 of the monitor that is installed at the front panel of the vehicle, it is possible to set the channels of the digital cameras 10 both at the inside and at the outside of the vehicle, the display screen color of the screen 21, and the photographing schedule and the photographing speed for each digital camera 10, respectively.

And, when the driver turns on the operation controller 70 disposed at the front panel of the vehicle, more particularly, the charging switch 71 included in the operation controller 71, the car battery at the time of starting the car successfully charges the memory 50, the system controller 40, and the power supplier 60 under the protection, respectively, complying with the on-operation of the charging switch 71, which is enabled by the case 100 at the inside of the trunk.

Furthermore, when the driver turns on a camera operation switch 72, a control switch 73, and a power supply switch 73 all included in the operation controller 70, each digital camera mounted on the outside and on the inside of the vehicle starts to photograph the outside views and the indoor environment of the vehicle under the

command of each switch, 72, 73 and 74, and the photographed images are later stored in the memory 50.

That is to say, the system controller 40 in the trunk starts to operate after every switch, 72, 73 and 74 is turned on.

5 Here, the system controller 40 controls each digital camera 10 according to the setup conditions of the setup button 36 included in the key operator 30, and photographs the indoor and outdoor environment of the vehicle. Then, the system controller 40 has the photographed image information be saved in the memory 50 that is attachable/detachable to the case 100, and displays the image information photographed
10 by the digital cameras 10 to the driver through the screen 21 of the monitor on the front panel of the vehicle.

As mentioned before, about 6 digital cameras 10 are mounted on the side mirrors 1 of the vehicle for photographing the rear, and on the front and the rear ceiling (roof) of the vehicle for photographing the outside views of the vehicle, and on the front
15 ceiling of the inside of the vehicle at a designated angle for photographing the dashboard and indoor environment.

Therefore, the system controller 40 is very useful for the drive because it detects the outside and the inside situation of the vehicle through each digital camera 10 even when the car is being parked. In addition, the system controller 40 provides the
20 sense of security to the driver while he is driving the car by showing the driver the blind spots of the room mirror and the side mirrors 1 of the car through the screen 21 of the monitor 20 positioned on the front panel of the car. To be short, the system controller 40 helps the driver park more safely, and provides him with wider vision while driving.

In other words, supposing that such image recorders are mounted on every
25 vehicle, the digital cameras 10 will photograph other vehicles, consequently preventing

the cars from being damaged or stolen. Of course, the cars can be damaged or stolen nonetheless. If that happens, the digital cameras 10 will come in very handy to trace who or what possibly damaged or stole the car(s).

The memory 50, as described above, is attachable/detachable to the case 100.

5 Thus the memory 50 can be connected to another computer through which one can see the image information saved in the memory. The system controller 40 includes the COM for connecting the printer 200 to the keyboard 300.

Through the printer 200, the image information saved in the memory 50 can be outputted on the paper.

10 As shown in Figure 8, according to the present invention, the image recorder and the voice recorder for the vehicle include: a designated number of digital cameras 10 mounted on the outside and the inside of the vehicle for photographing the driving information (i.e., the dashboard) and the indoor environment of the vehicle, and for photographing the outside views of the vehicle in all direction;

15 a monitor 20 mounted on the front panel of the vehicle for splitting or magnifying the image information photographed by each digital camera 10;

a key operator 30 integrated to the monitor 20 for splitting and inverting the image information displayed through the monitor 20, and for setting the photographing schedule for the digital cameras 10;

20 a system controller 40 for controlling every part of the image recorder in consecutive order according to an inputted signal from the key operator 30;

a memory 50, being attachable/detachable with the system controller 40 through a communications port (COM), for sequentially saving the image information photographed by the digital cameras 10 under the control of the system controller 40;

25 a power supplier 60, being charged by a car battery, for supplying power to

every part of the image recorder system;

an operation controller 70 for turning on/off the power supplier 60 and every part of the system;

a voice memory 80 for saving a car damage or a car theft warning voice
5 information;

a voice detector 81 for detecting voices from the outside of the car that has been parked by a key operation of the key operator 30;

a voice reader 83 for searching the warning voice information saved in the voice memory 80 when a voice information is detected by the voice detector 81, for
10 reading the warning voice information to find out if the warning voice information coincides with the detected voice information, and for outputting the warning information to the system controller 40; and

an alarm generator 83 for outputting a designated level of alarm through a speaker to the outside under a control of the system controller 40 based on the reading
15 result from the voice reader 82.

Referring to Figure 8, the operations of the image recorder and the voice recorder according to another embodiment of the present invention are now explained as followings.

To begin with, the photographing schedule for each digital camera 10 at the
20 outside and the inside of the vehicle and the photographing speed thereof are set by the key operator 30 of the monitor 20 that is mounted on the front panel of the vehicle.

When the driver operates the operation controller 70 placed on the front panel of the vehicle, the car battery at the time of starting the car charges the image memory 50, the system controller 40, and the power supplier 60 under the protection through the
25 case 100 inside of the trunk.

Then the outside views and the indoor environment of the vehicle, after being photographed by the digital cameras 10 mounted on the outside and the inside of the vehicle, are saved in the image memory 50.

Here, the system controller 40 controls each digital camera 10 according to the key operation of the key operator 30, and photographs the indoor and the outdoor environment of the vehicle. Then, the system controller 40 has the photographed image information be saved in the memory 50 that is attachable/detachable to the case 100, and displays the image information photographed by the digital cameras 10 to the driver through the screen 21 of the monitor on the front panel of the vehicle.

Similar to before, about 6 digital cameras 10 are mounted on the side mirrors 1 of the vehicle for photographing the rear, and on the front and the rear ceiling (roof) of the vehicle for photographing the outside views of the vehicle, and on the front ceiling of the inside of the vehicle at a designated angle for photographing the dashboard and indoor environment.

Therefore, the system controller 40 is indeed very useful for the drive because it detects the outside and the inside situation of the vehicle through each digital camera 10 even when the car is being parked. In addition, the system controller 40 provides the sense of security to the driver while he is driving the car by showing the driver the blind spots of the room mirror and the side mirrors 1 of the car through the screen 21 of the monitor 20 positioned on the front panel of the car. In short, the system controller 40 helps the driver park more safely, and provides him with wider vision while driving.

In other words, supposing that this image recorder is mounted on every vehicle, the digital cameras 10 photograph other vehicles, consequently preventing the cars from being damaged or stolen. Of course, the cars still can be damaged or stolen no matter what. In that situation, the digital cameras 10 will come in very handy to trace who or

what possibly damaged or stole the car(s).

On the other hand, as the driver operates the key operator 30 intending to park his vehicle for a long-term period, the voice detector 81 detects the voices around the vehicle being parked, and then transmits the detected voices (or information) to the voice reader 82.

Then the voice reader 82 searches the warning voice information saved in the voice memory 80 to read whether the saved warning voice information includes the voice information detected by the voice detector 81, and outputs the reading result to the system controller 40.

At this time, based on the reading result from the voice reader 82, if the detected voice information collected from around the vehicle turns out to be harmful (i.e., relevant to the car theft or the car damage), the system controller 40 controls the alarm generator 83.

The major function of the alarm generator 83 is to make a designated level of alarm through the speaker to the outside so that no harm or damage can be done on the vehicle.

On the other hand, in result of the reading result of the voice reader 82, if the voice information detected from around the vehicle is regarded as harmless, the alarm generator 83 is not operated accordingly.

The present invention, therefore, can prevent the car from being damaged or stolen using the detected voice information. Even if the alarm is sometimes neglected or disregarded, the image information including the photographing time and date by the digital cameras 10 is definitely very crucial to trace any evidence on the car theft or the car damage. Hence, the drivers do not have to be insecure any more about parking their cars in the parking lot for long-term periods.

Here, to transfer the video information saved in the video memory 50 to a separate diskette, the system controller 40 includes a port as in a computer, to which a diskette is inserted, and a communications port (COM) for connecting a printer 200, a keyboard 300, and a mouse 400.

5 Yet another embodiment of the present invention provides a peripheral device that is connected to the image recorder and the voice recorder inside of the vehicle as illustrated in Figure 9.

Namely, the system controller 40 in Figure 9 can further include a digital moving image processor, and a digital video disk (DVD) port connected to a digital
10 video disk player 91. In this way, the digital moving images can be seen through the monitor 20.

In addition, the system controller 40 mounted with a moving image processor of a compact disk (CD), and with a CD port connected to a compact disk player 92 enables the driver to see the CD moving images through the monitor 20.

15 Furthermore, the system controller 40 includes a television receiver 93, through which the driver can watch general public broadcasting while driving the car. Although not shown in the figure, the COM (i.e., a wireless lan card) can be installed as well for a wireless transmission of the photographed image information to a third place.

In conclusion, the present invention is very advantageous in that it enables the
20 driver to see blind spots of the room mirror and the side mirrors and to check the inside of the vehicle and to prevent any car damage or car theft, by mounting minicams both at the outside and the inside of each vehicle to photograph the surroundings and to perform mutual supervision, installing a means for saving and displaying the pictures or images photographed by the minicams at the inside of the vehicle, and mounting a voice
25 detection system for reading the voice information relevant to the car damage or the car

theft, and for outputting a designated alarm based on the detection result, especially when the warning voice information that might damage the vehicle is detected from the outside at a time when the driver tries to park the vehicle at the parking lot.

5 While the invention has been described in conjunction with various embodiments, they are illustrative only. Accordingly, many alternative, modifications and variations will be apparent to persons skilled in the art in light of the foregoing detailed description. The foregoing description is intended to embrace all such alternatives and variations falling with the spirit and broad scope of the appended claims.

What Is Claimed Is:

1. An image recorder for a vehicle, comprising:

a designated number of digital cameras mounted on an outside and an inside of a vehicle for photographing a driving information and an indoor environment of the vehicle, and for photographing outside views of the vehicle in all direction;

a monitor mounted on a front panel of the vehicle for splitting or magnifying an image information photographed by each digital camera;

a key operator integrated to the monitor for splitting and inverting the image information displayed through the monitor, and for setting a photographing schedule for the digital cameras;

a system controller for controlling every part of an image recorder in consecutive order according to an inputted signal from the key operator;

a memory, being attachable/detachable with the system controller through a communications port (COM), for sequentially saving the image information photographed by the digital cameras under the control of the system controller;

a power supplier, being charged by a car battery, for supplying power to every part of the image recorder system; and

an operation controller for turning on/off the power supplier and every part of the system.

2. A voice recorder for a vehicle, comprising:

a voice memory for saving a vehicle damage or a vehicle theft warning voice information;

a voice detector for detecting voices from an outside of the vehicle that has been parked by a key operation of a key operator;

a voice reader for searching the warning voice information saved in the voice memory when a voice information is detected by the voice detector, for reading the warning voice information to find out if the warning voice information coincides with the detected voice information, and for outputting the warning information to the system controller; and

5

an alarm generator for outputting a designated level of alarm through a speaker to the outside under a control of a system controller based on the reading result from the voice reader.



INVESTOR IN PEOPLE

Application No: GB 0201710.1
Claims searched: 1

Examiner: Jeremy Cowen
Date of search: 12 July 2002

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.T): B7J J69 H4F FAAE,FAAX,FKX
Int Cl (Ed.7): B60R 1/00,11/04 H04N 7/18
Other: WPI,EPODOC,PAJ

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
Y	GB 2341028 A Chun-Jung Tseng - see whole document, especially figures 2 & 3 (split screen monitor)	1
Y	GB 2329540 A Sony UK Ltd - see abstract & figure 4 (programmable split screen CCTV monitoring)	1
Y	US 5793420 Schmidt - see whole document (internal <u>and</u> external cameras with recording means)	1
Y	JP 110298853 Matsushita - see abstract & figure 2 (Note use of internal <u>and</u> external monitoring cameras and recording means)	1
Y	JP 110240422 Satu Minoru - see abstract (Note use of internal <u>and</u> external monitoring cameras and recording means)	1

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.