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EUROPEAN PATENT APPLICATION

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(54) Method and device for electronic recording of an incident, for instance a traffic offence.

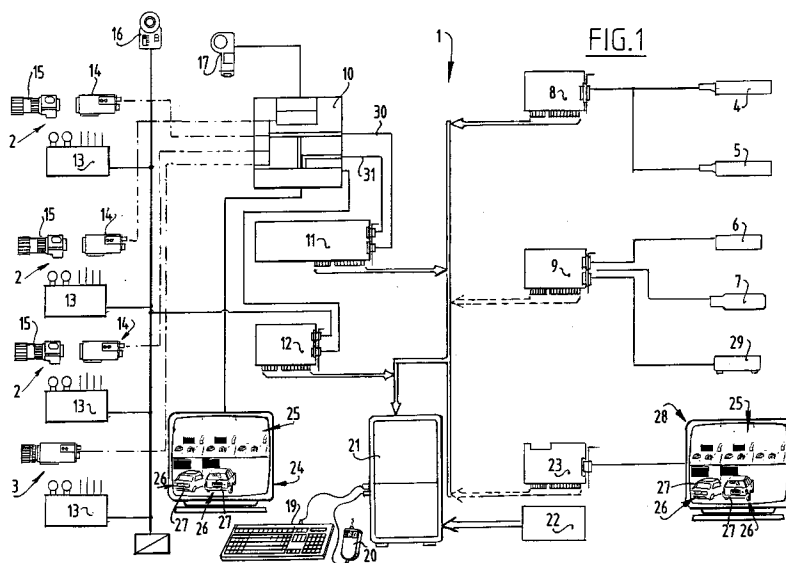
57 The invention relates to a method for recording an incident, in particular a traffic offence, by electronically making at least one picture record of this incident and electronically storing the record, wherein at least two picture records are made simultaneously from different angles of view.

The electronic image data of the two picture records are therein entered into a single collective data file and this data file is encrypted and then

stored.

The invention further relates to a device for performing this method provided with means for making a picture record in electronic manner, with electronic storage means, with programmable input means and with encrypting means.

The electronic image recording means can be adapted to make at least two records simultaneously from different angles of view.



The invention relates to a method for recording an incident, in particular a traffic offence, by making at least one picture record of this incident and storing the record.

Such methods are generally applied for automatically recording traffic infractions, such as driving through a red light or exceeding the maximum speed limit. In the known methods the infraction is recorded, whereafter a camera, optionally together with a flash device, is activated and the offender is thus photographed. In order for it to function as valid testimony in the case against the offender, at least the licence plate of the offending vehicle and the vehicle type must be unambiguously distinguishable in the picture record, while the record must further provide a clear picture of the overall traffic situation at the time of the observed offence. In the known methods use was always made for this purpose of a photo or film camera with which very sharp records can be made from which the required information can easily be obtained.

A drawback to the known methods however is that only a comparatively limited number of records can be made with a photo or film camera before the film is used up and has to be replaced, while such photographic records moreover do not lend themselves well to automatic processing, whereby this method is labour-intensive and costly.

The invention therefore has for its object to provide a method for recording a traffic offence wherein these drawbacks do not occur. This is achieved according to the invention in that the making of the picture record and the storing thereof take place electronically. By making electronic records use can be made for storing the records of the currently available mass storage means of electromagnetic or opto-electronic type, such as a so-called hard disk or optical disk. A considerably larger number of offences can hereby be recorded than in the known methods before replacement of the storage medium is necessary. The electronically captured records can also be transmitted in simple manner, for instance via telephone lines or through the air, and such records lend themselves well to further automated electronic processing.

At least two picture records are preferably made at substantially the same time from different angles of view. Thus, despite the often relatively limited resolution of electronic image recording means, the data required for legal use of the records can nevertheless be recorded. One picture record can herein be made of the overall traffic situation while another picture record can show the offending vehicle in detail.

The electronic image data of the two picture records are preferably entered into a single collective data file, which data file is encrypted and then stored. In this way it can be legally established with

sufficient certainty that the vehicle shown in detail on one of the picture records has indeed committed the traffic offence shown as a whole in another picture record.

5 In order to enable a simple processing and transmission of the records, the electronic image data is preferably digitized and stored digitally.

10 A very great certainty as to the mutual correspondence of the records of the offence and the detail record of the vehicle is obtained when each picture record is built up of a number of parallel picture lines and only a limited number of mutually spaced picture lines of each picture record is included in the data file and stored, wherein the total number of picture lines included in the data file corresponds with the number of picture lines of a single picture record. Multiple images are thus as it were mutually interwoven, whereby in terms of legal evidence it is sufficiently clear that these picture records are made at the same moment.

20 The invention also relates to a device for recording an incident, in particular a traffic offence, with which the above described method can be performed. Such a device is provided according to the invention with means for making a picture record in electronic manner in addition to electronic storage means.

25 In preference the electronic image recording means are adapted to make at least two records at substantially the same time from different angles of view. For this purpose the electronic image recording means can comprise at least two separate cameras, but it is also conceivable that the image recording means comprise a single camera with very fast zoom lens. The camera can be a video camera, for instance a so-called CCD camera.

30 The invention is now elucidated on the basis of two embodiments, wherein reference is made to the annexed drawing, in which corresponding components are designated with corresponding reference numerals, and in which:

fig. 1 is a schematic representation of a first embodiment of a device according to the invention,

45 fig. 2 is a representation corresponding with fig. 1 of a second embodiment of the device according to the invention, and

fig. 3 shows a top view of a traffic highway along which the second embodiment of the device according to the invention is disposed.

50 A device 1 for recording an incident, in particular a traffic offence, is provided with electronic image recording means 2,3, and with electronic storage means 4,5,7. The recording means 2,3 can be formed by video cameras, each provided with a shutter (not shown). The camera 2 for the detail image consists of a camera housing 14 and a zoom lens 15 arranged thereon. Cameras 2,3 are

fed by a power supply 18 and are each provided with a control unit 13 with which different parameters of the cameras can be adjusted, such as the focus and distance, the shutter time, the iris (to optimize light/depth of field), the amplification factor of the video signal and the correction factor for day or night recordings. The control units 13 are connected to an exposure meter 16. The control units 13 are further connected via a so-called SCI-bus to a processor card 12 from which they receive instructions.

The cameras 2,3 are each connected to a central recording control device 10 which receives control signals from processor card 12 on which inter alia are arranged encrypting means. This card 12 also supplies instructions to the recording control device 10 to cause the image data from cameras 2,3 to be entered into a collective data file. The central recording control device 10 is also connected to a flash installation 17. The central recording control device 10 is further connected via an output line 30 and an input line 31 to a card 11 which carries the digitizing means and which, like the card 12 carrying the encrypting means, forms part of a computer 21.

The device can be programmed in different ways. The storage means can for instance comprise a hard disk 7 on which a boot program is present. Also present is a floppy disk drive 6 in which a boot disk can be placed. It is further possible to boot the system via a modem 29 with which a user located remotely of the device 1 can communicate with the device. The floppy disk drive 6, hard disk 7 and modem 29 are connected to the device via a so-called multi-I/O card 9 on which a so-called IDE-bus and RS232-bus are arranged. Finally, it is of course possible to connect a keyboard 19, optionally with mouse 20 and monitor 24 to computer 21 of device 1 and thus start up the latter by entering the appropriate commands.

When the device 1 is booted the cameras 2,3 are first of all properly adjusted. For this purpose the image of one or more of cameras 2,3 can be projected under the influence of control device 10 directly onto monitor screen 24, so that the adjustment of cameras 2,3 can be directly monitored. It is also possible to project on screen 24 a processed image which is generated from the digitized data by a DA converter on the digitizing card 11 and transmitted via line 31 to the central recording control device 10.

When all settings have been made, the system can further function independently. The system is activated by a device designated schematically with 22 which senses a traffic offence, such as driving through a red light or exceeding the maximum speed limit. This device 22 can consist for example of a number of loops in the road surface

or a radar speed measuring device. When the device 22 gives a signal that an infraction is detected, this signal is transmitted via card 12 to control device 10 which synchronously operates the shutters of cameras 2,3 and optionally the flash 17. The images of the cameras 2,3 are fed to control device 10, from which they are transmitted via line 30 to the digitizing card 11 on which is located a number of AD converters. The transmission of the images to digitizing card 11 is adapted under the control of device 10 and processor card 12 such that part of the picture lines, for instance the odd picture lines, of the image from camera 2 are combined with part of the picture lines, for instance the even picture lines, of the other camera 3 and a digital composite picture is thus formed which includes half the image of each camera 2,3. This composite picture or combined image data file is subsequently encrypted under the control of processor card 12 and stored on for instance a removable hard disk 4 or a tape drive 5, which can be connected to computer 21 via a so-called SCSI card 8. Prior to encrypting and storage further information concerning the subject of the records (an offending vehicle 27) can be added to the data file. This information is provided by the equipment 22 detecting the offence and can be presented visually in the picture in any desired manner during playback thereof.

The stored image can also be presented visually on for instance a monitor 28 connected via a video (SVGA) card 23 to the computer 21. For this purpose the stored composite picture is again disassembled into an overall picture 25 recorded by camera 3 and a detail picture 26 recorded by camera 2. Although each of these pictures 25,26 has in one direction only half the original resolution (because only half the picture lines are stored) this is still sufficient for the intended application and it is even possible to read (if necessary electronically) the licence plate of the offending vehicle 27 from the detail record 26. Various operations can be performed on the digital record. When a large number of records is stored the removable hard disk 4 can be removed. It is also possible to periodically transfer the image data on hard disk 4 or tape streamer 5 to a central processing unit via modem 29.

The encrypting in the card 12 serves to ensure that the electronic data file which must serve as evidence of an offence cannot be manipulated. Any accepted protocol is suitable as encrypting protocol.

In order to limit the amount of data which has to be stored and possibly transferred, use can be made of compression techniques, at least when the legislation in the country of use deems such a manipulation of the stored data permissible. As

compression technique can be used so-called "lossless" techniques with which the memory requirement can be reduced by about fifty percent, or, legislation permitting, non-lossless techniques with which reduction to ten percent of the original amount of data is possible.

The alternative embodiment of the device according to the invention shown in fig. 2 has four cameras, a fixed RGB camera 3 and three black and white zoom cameras 2. The digitizing card 11 is an RGB digitizing card which, like the black and white digitizing card shown in fig. 1, has two fields for respectively the even and odd picture lines. In this embodiment half the picture lines (e.g. the even picture lines) of the RGB camera 3 are "interwoven" with half the picture lines (the odd picture lines) of each of the three black and white cameras 2. The latter are connected for this purpose to respectively the R, G or B input of the RGB digitizing card 11. In this manner and with relatively little equipment three black and white detail pictures and an RGB overall picture can be reliably stored in digital form. It is also possible to thus process the images from several camera combinations as shown in fig. 1 in a single digitizing card. Use of a single digitizing card results not only in a relatively low purchase price of the device 1 but also in low power consumption, while the use of space in computer 21 (the number of slots required) is moreover reduced.

With such a device three lanes 33,34,35 (fig. 3) of a highway 32 can for instance be monitored. The fields of view of two of the three black and white cameras 2 are herein shown schematically with 36 and 37 respectively. In this embodiment it is of course important that the three black and white cameras 2 and the RGB camera 3 are carefully synchronized.

Claims

1. Method for recording an incident, in particular a traffic offence, by making at least one picture record of this incident and storing the record, **characterized in that** the making of the picture record and the storing thereof take place electronically.
2. Method as claimed in claim 1, **characterized in that** at least two picture records are made at substantially the same time from different angles of view.
3. Method as claimed in claim 2, **characterized in that** the electronic image data of the two picture records are entered into a single collective data file and this data file is encrypted and then stored.

4. Method as claimed in claim 3, **characterized in that** the electronic image data is digitized and stored digitally.
5. Method as claimed in claim 3 or 4, **characterized in that** each picture record is built up of a number of parallel picture lines and only a limited number of mutually spaced picture lines of each picture record is included in the data file and stored, wherein the total number of picture lines included in the data file corresponds with the number of picture lines of a single picture record.
6. Method as claimed in any of the foregoing claims, **characterized in that** information relating to the subject of the records is also included in the data file.
7. Device (1) for recording an incident, in particular a traffic offence, provided with means (2,3) for making a picture record in electronic manner and with electronic storage means (4,5,7).
8. Device (1) as claimed in claim 7, **characterized in that** the electronic image recording means (2,3) are adapted to make at least two records at substantially the same time from different angles of view.
9. Device (1) as claimed in claim 8, **characterized by** programmable means (10) connected between the recording means (2,3) and the storage means (4,5,7) for entering into a collective data file electronic image data coming from the recording means (2,3) and corresponding with different records, and means (12) for encrypting the data file.
10. Device (1) as claimed in any of the claims 7-9, **characterized in that** the storage means (4,5,7) comprise at least one digital storage medium and means (11) are connected between the recording means (2,3) and the storage means (4,5,7) for digitizing the electronic image data.
11. Device (1) as claimed in claim 9 or 10, **characterized in that** the recording means (2,3) are adapted to make picture records built up of a number of parallel picture lines and the means (10) forming the data file are programmed such that they only enter a number of mutually spaced picture lines of each picture record into the data file, this such that the total number of picture lines in the file corresponds with the number of picture lines of a single picture record.

12. Device (1) as claimed in any of the claims 7-11, **characterized by** means (22) connected to the means (10) forming the data file for generating other information relating to the subject (27) of the records which is to be entered into the file. 5
13. Device (1) as claimed in any of the claims 7-12, **characterized in that** the electronic image recording means (2,3) comprise at least one video camera. 10
14. Device (1) as claimed in claim 13, **characterized in that** the video camera is a so-called CCD camera. 15
15. Device (1) as claimed in any of the claims 10-14, **characterized in that** the digitizing means (11) comprise a so-called RGB digitizer and the electronic image recording means (2,3) comprise at least one RGB camera (3) and three black and white cameras (2), wherein the black and white cameras (2) are each connected to respectively an R, G or B input of the digitizer (11). 20
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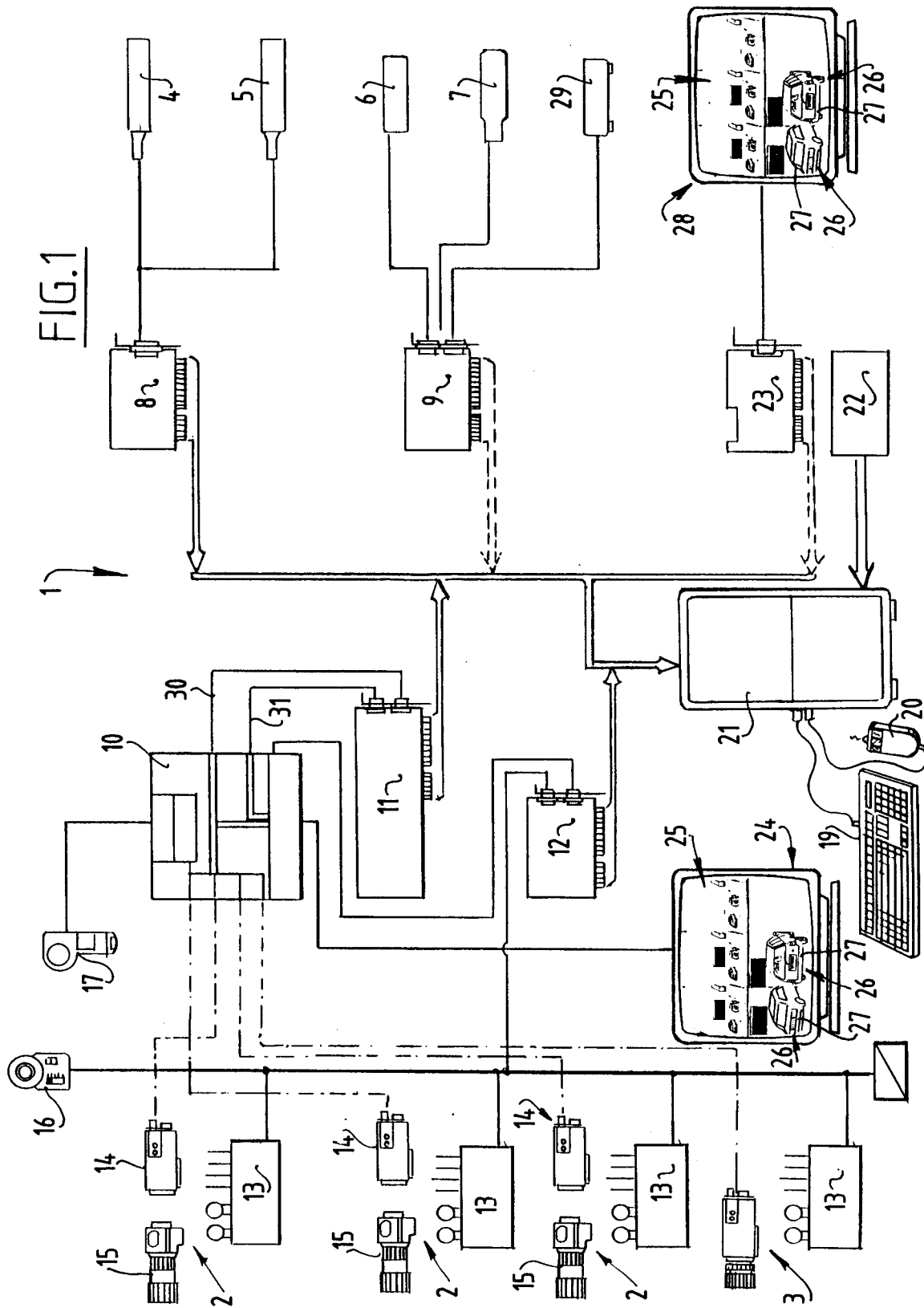
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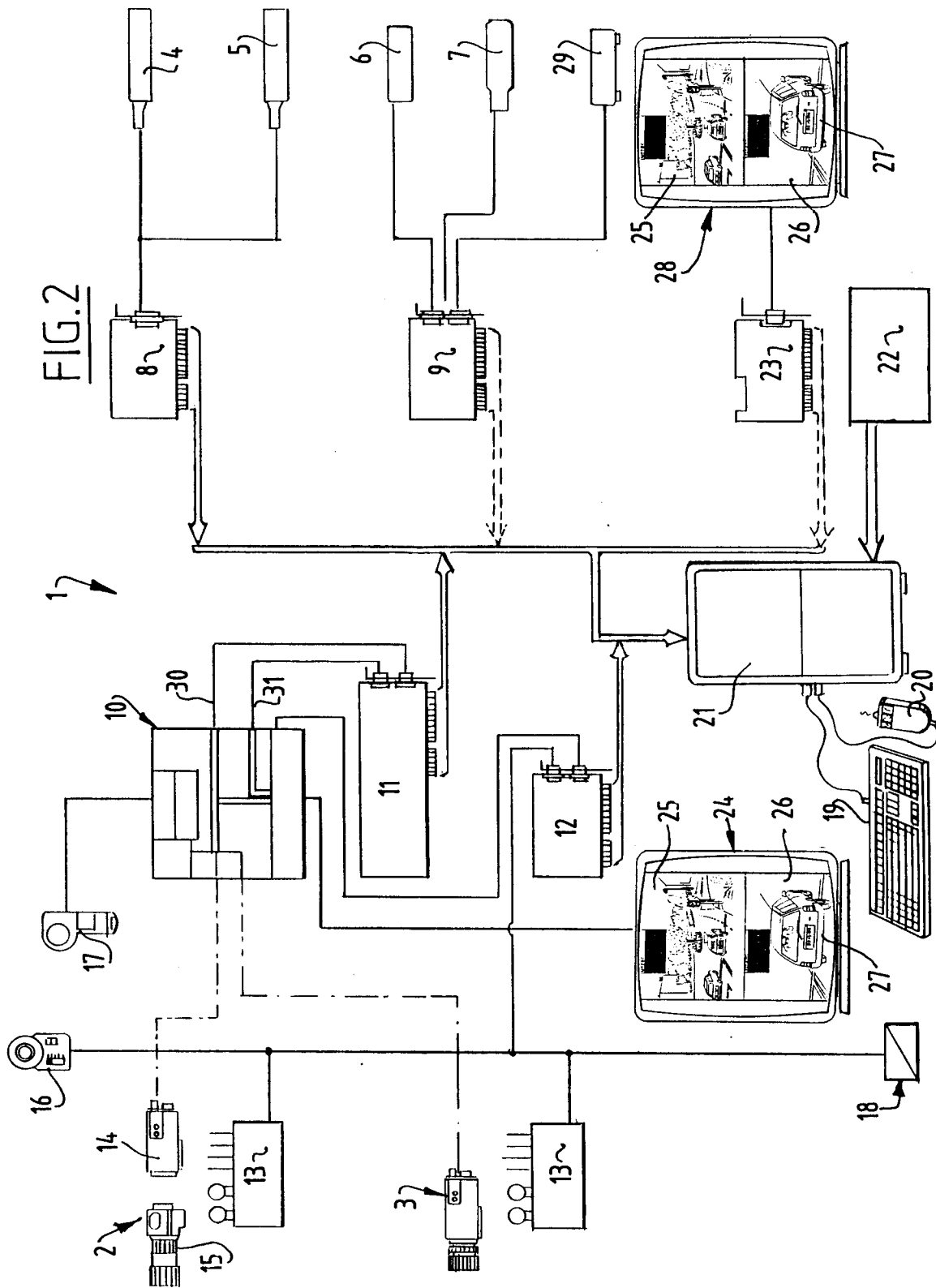
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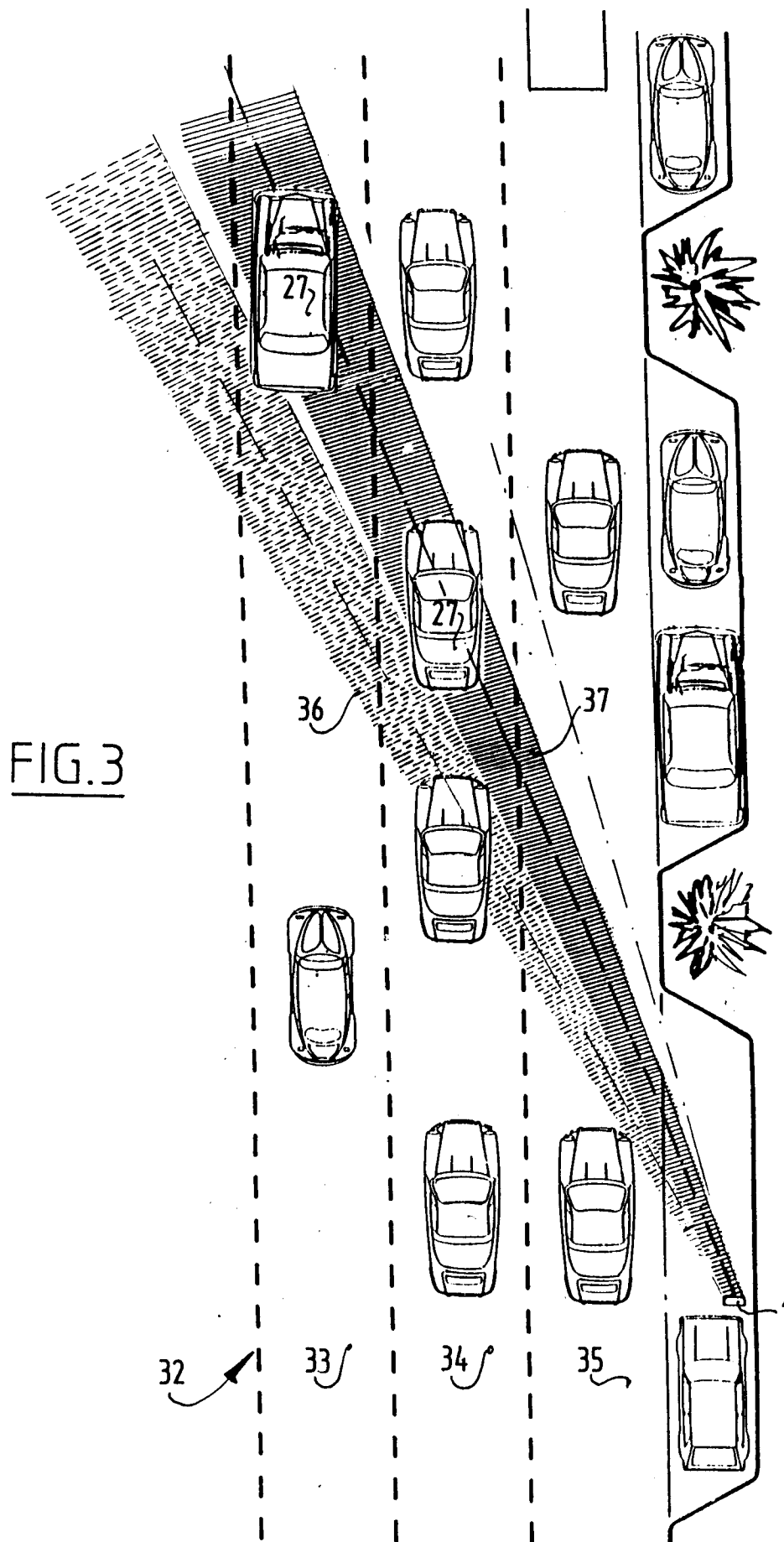
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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 1086

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	EP-A-0 396 432 (GOLDEN RIVER LIMITED)	1,7,10	G08G1/017
Y	* page 2, column 2, line 39 - page 3, column 3, line 34; figures 1-3 *	2-4,6,8,9,12,13	G08G1/054
Y	1988 INTERNATIONAL CARNAHAN CONFERENCE ON SECURITY TECHNOLOGY : CRIME COUNTERMEASURES ; OCTOBER 5-7, 1988, IEEE(US) pages 105 - 109 PONG-FUI CHANG ET AL. 'A REMOTE MULTI-CAMERA VISUAL SURVEILLANCE SYSTEM USING FRAME-SWITCHING TECHNOLOGY' * page 108, column 1, line 7 - column 2, line 12; figure 8 *	2	
Y	EP-A-0 356 734 (SIEMENS AKTIENGESELLSCHAFT) * page 2, column 1, line 34 - page 3, column 3, line 47 *	2-4,8,9	
Y	WO-A-91 07850 (ZONE TECHNOLOGY PTY LIMITED) * page 2, line 14 - page 3, line 22; claims *	3,9,13	TECHNICAL FIELDS SEARCHED (Int.Cl.5)
Y	EP-A-0 496 607 (NORTHERN TELECOM LIMITED) * page 3, column 4, line 40 - line 48 *	6,12	G08G G08B H04N
A	* page 3, column 4, line 58 - page 4, column 5, line 15 *	5,11	
P,X	WO-A-93 21617 (TRAFFIC TECHNOLOGY LIMITED) * the whole document *	1-4, 6-10, 12-14	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 5 August 1994	Examiner Reekmans, M
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			