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(71) Applicant: **Gaggioli, Graziano**
40040 Silla, Bologna (IT)

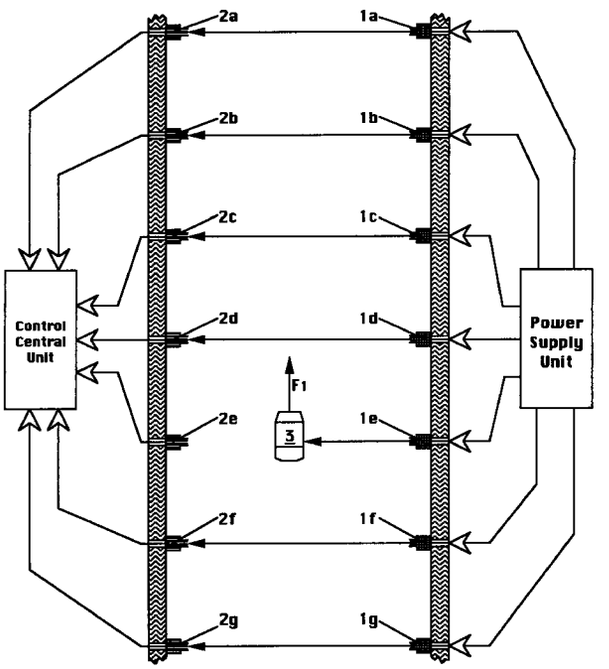
(72) Inventor: **Gaggioli, Graziano**
40040 Silla, Bologna (IT)

(74) Representative: **Rinaldi, Carlo**
c.o. Studio Brevetti Nazionali ed Esteri
dell'Ing. Carlo Rinaldi & C. s.d.f.
Piazza di Porta Castiglione, 16
40136 Bologna (IT)

(54) Equipment for signalling the vehicular traffic in motorways, freeways, one-way street and the like

(57) An equipment for signalling the course of the traffic comprises a series of photo-sensible elements (1a,2a,1b,2b, 1c,2c,1d,2d,1e,2e,1f,2f,1g,2g) located at a pre-established distance one from the other; the emitters (1a,1b,1c,1d,1e, 1f,1g) of each photo-sensible element (1a,2a,1b,2b,1c,2c, 1d,2d,1e,2e,1f,2f,1g,2g) are connected to a power supply unit, while the receptors (2a,2b,2c,2d,2e,2f,2g) to a central control unit; each photo-sensible element (1a,2a, 1b,2b,1c,2c,1d,2d,1e, 2e,1f,2f,1g,2g) is located at a height suitable for allowing a travelling vehicle (3) to intercept the electromagnetic radiation coming from the emitters (1a,1b,1c,1d,1e,1f,1g); the central control unit is fitted with devices which detect the course of the traffic and apparatuses which send operative signals to warning signals or panels connected to the central control unit in order to indicate the course of the traffic to the following vehicles.

Fig.3



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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an equipment capable of signalling the position, the speed and the stopping state of vehicles running in motorways, freeways, one-way streets and the like. The aim of the equipment consists in decreasing the risk of telescoping in the case of intense traffic, fog, haze or other phenomena which diminish visibility.

STAND OF THE TECHNIQUE

[0002] Equipments or apparatuses are presently known, the aim of which is to invite the drivers to drive cautiously in the case of said phenomena; these apparatuses consist of luminescent panels, located at the sides of the lanes at constant distances, the panels bearing warnings to invite the drivers to keep the speed allowing the reading of said warning.

[0003] US-A - 5,187,373 discloses an emitter assembly for use in an optical traffic pre-emption system. The optical signal emitter assembly emits light pulses which are received by an optical traffic pre-emption system detector. The optical signal emitter assembly employs a honeycomb element positioned in front of a light source which collimates light emitted by the optical signal emitter assembly. The optical signal emitter assembly is convertible from a stand-alone unit containing power supply circuit, timing circuit, and a light source in a single housing, to a unit wherein the light source can be mounted independently from a housing containing the power supply circuit and the timing circuit.
Essentially, this assembly presents the disadvantage of not detecting the position and the speed of the vehicles and is only used for regulating a heavy traffic.

[0004] Systems of detecting the position and speed of vehicles are also known based on radar or sonar effects.

[0005] US- A - 5,691,724 shows a police radar utilising digital data transmission from the antenna unit to a separately housed counting and display unit. The antenna has a double balanced mixer to suppress even order harmonics. The counting and display unit has a computer programmed to perform digital signal processing on the digital data received from the antenna to improve the quality and accuracy of calculated speeds for patrol speed, strongest target speed and fastest target speed. Fastest target speed can be displayed simultaneously with strongest target speed. Signal processing techniques are used to suppress false signals caused by double and triple bounce, harmonics, inter modulation products, video display terminal interference, etc.

[0006] Only very skilled persons can properly use a radar equipment for the evaluation of the course of the traffic; a radar equipment installed in a private vehicle distracts the driver and can cause damage, instead of advantages.

AIM AND FEATURES OF THE INVENTION

[0007] The present invention, as claimed, solves the problem of creating an equipment for signalling the vehicular traffic in motorways, freeways, one-way streets and the like. By using the present invention the relative position, the speed and the eventual stopping state of vehicles which run on the road section, in which the equipment is installed, are calculated and shown; these data are reported on luminous signals or panels located at pre-established intervals along the sides of the road section; the reading of the luminous signals or panels by the drivers is immediate and easy.

[0008] Therefore, each driver travelling in the section of the equipment knows how the vehicle ahead travels and behaves consequently.

[0009] The equipment according to the invention comprises a series of photo-sensible elements located at a pre-established distance one from the other; the emitters of each photo-sensible element are connected to a power supply unit, and the receptors to a central control unit; each photo-sensible element is located at a height suitable for allowing a travelling vehicle to intercept the electromagnetic radiation coming from the emitters; the central control unit is fitted with devices which measure the course of the traffic (position, travelling speed, time length of the intercepting of the electromagnetic radiation and stopping state of the vehicles) and with apparatuses capable of sending operative signals to luminous signals or warning panels connected to the central control unit in order to indicate the course of the traffic to the following vehicles.

[0010] The central control unit is also fitted with a data processing device; said data processing device recognising the stopping state of a vehicle on the carriageway considering the instant of the changing of state of the receptor of at least one photo-sensible element, the intercepting time length of the electromagnetic radiation and the number of vehicles passing between at least one photo-sensible element; in the case of stopping of one vehicle the data processing device processes signals for an outlet device of the central control unit which in turn sends operative signals to the luminous signals or panels preceding the position held by the stand still vehicle to indicate its stopping state, so that the following vehicles may be warned of the danger.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Other advantages, features and aims of the invention may be more readily understood by referring to the accompanying drawings which concern preferred embodiments, in which:

Fig.1 schematically represents a road section in which an equipment is installed and a travelling

vehicle;

Fig.2 schematically represents the road section in which an accident has occurred;

Fig.3 schematically shows a road section in which the equipment is installed and a travelling vehicle;

Fig.4 schematically represents a road section and two travelling vehicles;

Fig.5 shows the road section of Figs 1, 3 in which warning panels are installed;

Fig.6 indicates a first warning condition of a panel;

Fig.7 shows a second warning condition of the panel;

Fig.8 is a block diagram indicating the main components of the equipment;

Fig.9 is a block diagram of an embodiment of the central control unit of the equipment; and

Fig.10 is a flow chart explaining the working of the equipment.

DESCRIPTION OF PREFERRED EMBODIMENTS OF THE EQUIPMENT

[0012] Fig.1 shows a section of a motorway in which the equipment as in the present invention is installed; an electrical power supply unit is connected to a plurality of emitters 1a, 1b, 1c of photocells located on the right side of a carriageway, while the corresponding receptors 2a, 2b, 2c collimating to the relative emitters are located on the left side of the carriageway.

Therefore, the electromagnetic radiation coming from the emitter 1a is normally received by the receptor 2a, the radiation of the emitter 1b is sent to the receptor 2b and so on.

The receptors 2a, 2b, 2c are connected to a central control unit which processes the signals coming from the receptors in order to obtain operative signals acting on warning panels or luminous signals.

[0013] In this equipment the distances between the photocells are comparable to the cross dimensions of a small vehicle or a motorcycle to detect the stopping or rollover in carriageway zones very near one to the other.

[0014] When the electromagnetic radiation coming from the emitter 1b is intercepted by a vehicle 3, the receptor 2b passes from the state of conduction to the state of non-conduction of electric energy. This changing of state varies the level of the signal sent by the receptor 2b to the central control unit, detecting which photocell has undergone the changing of state, the instant when the changing of state started, the intercepting time length; finally, the central control unit stores these data.

The vehicle 3 continues its running in the direction indicated by the arrow F_1 until it reaches the following photo-cell 1a, 2a; in this way, the vehicle 3 intercepts the electromagnetic radiation of the emitter 1a; the central control unit calculates the speed of the vehicle 3 considering the distance between the two subsequent photocells and the time lag between the two interceptions.

The course of the traffic in a road section is indicated by luminous signals 5a, 5b, 5c, 5d, 5e, 5f, 5g located at the side of the carriageway in positions suitable for being noticed by the drivers of the vehicles 3, 4 running in both the traffic lane and in the passing lane (Fig.5). If the traffic is smooth, the central control unit processes operative signals allowing the luminous signals 5a, 5b, 5c, 5d, 5e, 5f, 5g to emit green or white light to warn the drivers of the regular course of the traffic.

[0015] If the vehicle 3 has an accident and stops between the photocells 1a, 2a, 1b, 2b, 1c, 2c of Fig.2 the receptor 2b remains in the state of non-conduction for an indefinite time; in this case the central control unit processes operative signals for changing the colour of the luminous signals 5a, 5b, 5c, 5d, 5e, 5f, 5g from white or green to red (Fig.5).

[0016] The equipment of Fig.3 differs from the one of Figs 1, 2 since the photocells are located at distances of some tens of meters one from the other. The emitters 1a, 1b, 1c, 1d, 1e, 1f, 1g are joined to an electrical power supply unit, while the receptors 2a, 2b, 2c, 2d, 2e, 2f, 2g collimating to the relative emitters are connected to a central control unit.

[0017] When the electromagnetic radiation coming from the emitter 1e is intercepted by a vehicle 3, the receptor 2e passes from the state of conduction to the state of non-conduction of electric energy. This changing of state varies the level of the signal sent by the receptor 2e to the central control unit, which detects which photocells has undergone the changing of state, the instant when the changing of state started, the intercepting time length; finally the central control unit stores these data.

[0018] The vehicle 3 continues its running in the direction indicated by the arrow F_1 until it reaches the following photocell 1d, 2d; in this way, the vehicle 3 intercepts the electromagnetic radiation of the emitter 1d; the central control unit calculates the speed of the vehicle 3 considering the distance between the two subsequent photocells and the time lag between the two interceptions; in addition, the central control unit stores the data relative to this interception.

[0019] The course of the traffic in a road section is indicated by luminous signals 5a, 5b, 5c, 5d, 5e, 5f, 5g situated on the carriageway side in positions suitable for being noticed by the drivers of the vehicles 3, 4 running in both the traffic lane and in the passing lane (Fig.5).

Advantageously, the luminous signals 5a, 5b, 5c, 5d, 5e, 5f, 5g of Fig.4 consist of panels indicating to the vehicles 3, 4 the speed and the distance of the slowest vehicle ahead in a prefixed road section (for example as far as next exit); if the speed is low and the distance is near the safety distance for the speed of the vehicles 3, 4 calculated by the central control unit during the latest detecting, the panels advise to slow down. On the contrary, if the speed is standard and the distance exceeds the safety distance, the panels propose to keep the speed held so far. These suggestions are indicated by the col-

ours appearing on the panels.

[0020] If, very rarely (Fig.4), the vehicle 3 stops in the position of interception of the photocell 1e, 2e, the central control unit easily detects its stopping; in fact, the central control unit knows the instant when the changing of state started and notices that this change lasts in time. In this case, the central control unit sends operative signals to the panels located before the position in which the vehicle 3 is still to indicate the stopping state of the vehicle 3, so that the following vehicles may be warned of the danger.

[0021] However, the stopping of the vehicle 3 generally occurs between two subsequent photocells (for example between the photocells 1e, 2e and 1d, 2d of Fig.4); also in this case the central control unit easily detects the stopping of the vehicle 3; in fact, the central control unit knows the instant when the changing of state of the photocell 1e, 2e started, but it has not detected the instant of the interception of the subsequent photocell 1d, 2d by the same vehicle 3; in this case, the ratio between the length of the road section, in which both photocells 1e, 2e and 1d, 2d are installed, and the covered time (theoretically infinite) indicates the stopping of the vehicle 3 in said road section. Therefore, the central control unit sends operative signals to the panels before the position in which the vehicle 3 is still, so that the following vehicles may be warned of the danger. This easy calculation is only possible when few vehicles (two or three) travel in the road section; actually, numerous vehicles per minute travel in the road section, the carriageway is divided in several lanes and the visibility may be poor because of fog, haze or air pollution; therefore, the control of the traffic must follow strategies suitable for these conditions.

[0022] The central control unit stores the starting instants and the time lengths of the interceptions of the electromagnetic radiation of all photocells intercepted by all the vehicles travelling in the road section where the equipment is installed and checks if all the vehicles passing between the elements of a photocell have also passed between the elements of the subsequent photocell.

[0023] In case the road section of Fig.4 is covered by two vehicles 3, 4, the slower vehicle 3 being ahead of the faster vehicle 4; in a given instant the vehicle 3 passes between the elements of a photocell 1e, 2e; the central control unit stores this instant and the time length of the interception of the electromagnetic radiation; subsequently, the vehicle 4 passes between the elements of the photocell 1e, 2e, therefore, the central control unit also stores the instant and the time length of the passing of the second vehicle 4; the central control unit has detected that in the time interval Δ both vehicles 3, 4 have passed between the elements of the photocell 1e, 2e; when one of the vehicles 3, 4 reaches the following photocell 1d, 2d, the central control unit detects the passing, but it is not capable of checking which of the two vehicles has passed between the elements of the photocell 1d, 2d; indeed, the slow vehicle 3 might not have been reached by the fast vehicle 4, or the contrary might have occurred. If both vehicles reach the following photocell 1d, 2d, the central control unit calculates a speed given by the ratio between the length of the road section, in which both photocells 1e, 2e and 1d, 2d are installed, and the time interval comprising both the instant of the passing of the vehicle 3 between the elements of the photocell 1e, 2e and the instant of passing between the elements of the photocell 1d, 2d of the vehicle 3 or 4 which last intercepted the photocell 1d, 2d.

[0024] If the vehicle 3 has stopped before reaching the photocell 1d, 2d, the central control unit does not easily detects the stopping; in fact, the central control unit knows the instant when the change of state of the previous photocell 1e, 2e started, but it has not detected the instant of the passing of the vehicle 3 between the elements of the second photocell 1d, 2d; in this case, the ratio between the length of the road section where both photocells 1e, 2e and 1d, 2d are installed and the covered time (theoretically infinite) is only an indication of the stopping of one of the two vehicles in the road section containing said photocells, since a similar phenomenon occurs when both vehicles 3, 4 pass side by side between the elements of the photocell 1d, 2d; in this case it is possible to notice only a longer time of interception, as the two vehicles do not run at the same speed, they do not present the same length and do not reach the photocell 1d, 2d at the same instant.

[0025] Therefore, the central control unit sends operative signals to the panels preceding the position held by the vehicles 3, 4 to indicate that one of the vehicles is in phase of passing and the other one might be still so that the following vehicles may be warned of the danger.

[0026] If the central control unit detects a longer time of interception, it waits for the signal of the following photocell 1c, 2c in order to process the operative signals; considering the level of the signal of the photocell 1c, 2c, the central control deduces whether an overrunning has occurred or the vehicle 3 has stopped; in this second case the central control unit sends operative signals to the panels preceding the position held by the vehicles 3, 4 to indicate that one of vehicles is still.

[0027] If the central control unit does not detect a longer time of interception, it deduces that the vehicle 3 is standing and consequently sends operative signals to the panels preceding the position held by the vehicles 3, 4 to indicate that the vehicle 3 is still.

All these data and indications are very useful in case of poor visibility.

[0028] An analogous strategy is followed by the central control unit in the presence of numerous travelling vehicles. In this case, n vehicles pass between the elements of the photocell 1e, 2e in the time interval Δ_1; if after a time t_o all n vehicles have passed between the elements of the following photocell 1d, 2d, the central control unit processes operative signals acting on warn-

ing panels to signal the speed and the distance of the slower vehicles in the queue. On the contrary, if after the time t_o n-1 vehicles have passed between the elements of the photocell 1d, 2d, the central control unit processes operative signals acting on warning panels to signal the possible stopping of one vehicle and that some vehicles are surely going to overtake.

[0029] If the central control unit detects longer time of interception, it delays the processing until the receipt of the signal of the photocell 1d, 2d, considering the running speed of the queue, the number of vehicles and the length of the single interceptions; according to the level of the signal of the photocell 1d, 2d, the central control unit is capable of determining whether an overtaking has occurred or if a vehicle has stopped; in fact, in case of an overtaking all n vehicles pass one by one between the elements of the photocell 1d, 2d, consequently the central control unit can count their number; on the contrary, in case of a still vehicle, the central control unit only counts n-1 vehicles; in this second case the central control unit sends operative signals to the panels located before the position held by the photocell 1d, 2d to indicate that one of vehicles is still.

[0030] A queue at low speed is signalled by the central control unit considering the increase in the intercepting time of various photocells and the measured low speed. In this case, the central control unit processes operative signals acting on the warning panels to signal the presence of a queue, the speed and the distance of the vehicles travelling at the end of the queue.

[0031] Fig.5 represents the road section covered by two vehicles 3, 4; warning panels 5a, 5b, 5c, 5d, 5e, 5g, 5f are found on the side of the carriageway; the white panels 5d, 5e, 5f, 5g indicate the regular course of the traffic, while the dark panels 5a, 5b, 5c signal slowing down, bottlenecks, accidents or the like; the dark panels are fitted with screens briefly explaining the reasons for the irregularity of the traffic.

[0032] The panel of Fig.6 contains warning notices; the screen 6 is yellow, the screen 7 indicates the speed of the previous slower vehicle and the screen 8 signals its distance. In this equipment the distance unit is based on the distance between the subsequent photocells; however, the indication in the screen 8 is given in meters in order not to confuse the drivers.

The panel of Fig.7 contains stop commands; the screen 6 is red, the screen 7 commands to stop and the screen 8 signals the stopping of previous vehicles and their distances from the panel.

The panel of Figs 6, 7 is well visible both from the vehicles running in the traffic lane and from those going in the passing lane.

[0033] The main components of the equipment are shown in Fig.8; the photocells connected to the electrical power supply unit send signals to the corresponding decoders A, B, C, D, E, F, G which are used for changing the electrical quantities of the signals of the photocells into quantities to be used by the central control unit which processes operative signals to send to the panels connected to said central control unit.

Each photocell sends a signal which can have two levels; the first level of conduction of the receptor indicates that no vehicle is passing between the emitter and the receptor; while, the second level of non-conduction presumes that a vehicle is passing between the emitter and the receptor. The central control unit processes operative signals considering the levels of the signals coming from the photocells.

[0034] The central control unit is shown in Fig.9; a feeding device supplies the power required for the working of all the devices of the central control unit; the inlet device corresponds to the decoders of Fig.8; a timer provides the time intervals required for calculating the speed of the vehicles, the definition of the time intervals Δ for counting the vehicles passing between the elements of the photocells and the time length of the interceptions of all the photocells of the equipment, the timer is connected to a data processing device; a position detecting device indicates the positions of the vehicles on the carriageway; a counting device calculates the number of the vehicles passing between the elements of each photocell during every time interval Δ defined by the timer and sends a signal representing the counting to the data processing device.

[0035] The working of the central control unit has been concisely explained in the previous description; the data processing device also comprises a memory for the data supplied by the timer, the position detecting device and the counting device; in addition, the data processing device is capable of processing all the data for obtaining operative signals to send to an outlet devices used for changing the electrical quantities of the operative signals into electrical quantities to be utilized by the luminous panels or signals.

The time intervals Δ are defined considering the travelling average speed of the vehicles in the road section controlled by the equipment; the calculations are preferably zero set whenever all vehicles, which have passed in front of a photocell, have been counted by a subsequent photocell; therefore, for each photocell a time interval Δf is defined depending on the travelling speed of the vehicles in the road section containing the same photocell; during this interval the vehicles are counted considering the changes in the level of the signals of the receptors and their number is stored by the data processing device.

[0036] A fault signalling device is also provided for detecting faults in the photocells, the working of the fault signalling device is explained by the flow chart in Fig.10.

[0037] If in a time $t<t_o$ ($= < \Delta$) n vehicles have passed in front of several subsequent photocells, the road is free; otherwise, if only one photocell signals the stopping of vehicles, it means that the photocell is in failure; if all photocells signal the stopping of vehicles, it means that the vehicles are queuing.

[0038] In order to prevent the failure of a photocell

from damaging the working of the equipment, it is possible to switch on a spare photocell situated in parallel to the faulty photocell.

[0039] In case of failure the fault signalling device signals failure to the road police.

Claims

1. Equipment for signalling the vehicular traffic in motorways, freeways, one-way streets and the like, characterised by the fact that a series of photo-sensible elements is provided, said photo-sensible elements being located at a preestablished distance one from the other; the emitters of each photo-sensible element being connected to a power supply unit, and the receptors to a central control unit; each photo-sensible element being located at a height suitable for allowing a travelling vehicle to intercept the electromagnetic radiation coming from the emitters; the central control unit being fitted with devices which measure the course of the traffic (position, travelling speed, time length of the intercepting of the electromagnetic radiation and stopping state of the vehicles) and with apparatuses capable of sending operative signals to luminous signal or warning panels connected to the central control unit in order to indicate the course of the traffic to the following vehicles.

2. Equipment for signalling as in claim 1, wherein the central control unit comprises a timer device which provides the time intervals required for calculating the speed or detecting of the stopping state of each vehicle; the timer device co-operates with a position detecting device to define the time length of the interceptions of the electromagnetic radiation according to signals coming from at least two photo-sensible elements following one another in the series.

3. Equipment for signalling as in claim 1, wherein the central control unit is fitted with a counting device which calculates the number of the vehicles passing in front of each photo-sensible element during every time interval (Δ) defined by the timer device; the counting device sending a signal representing the calculation obtained to a data processing device.

4. Equipment for signalling as in claim 3, wherein the data processing device comprises a memory for the data supplied by the timer device, the position detecting device and the counting device; in addition, the data processing device is capable of processing all data for obtaining operative signals to send to an outlet device used for changing the electrical quantities of the operative signals into electrical quantities to be utilized by the luminous panels or signals.

5. Equipment for signalling as in claim 4, wherein the data processing device recognises the stopping state of a vehicle (3) on the carriageway considering the instant of the changing of state of a receptor (2e) of at least one photo-sensible element (1e,2e), the intercepting time length of the electromagnetic radiation and the number of vehicles (3, 4) passed between at least two photo-sensible elements (1e, 2e,1d,2d); in the case of stopping of the vehicle (3) the data processing device processes signals for the outlet device which sends operative signals to the panels located before the position where the vehicle (3) is still to indicate the stopping state of the vehicle (3) so that the following vehicles may be warned of the danger.

6. Equipment for signalling as in claim 5, wherein the data processing device recognises the state of stopping or passing of a vehicle (3) by detecting a longer interception time than the one due to the vehicle (3) running at the speed defined by the ratio between the distance of two photo-sensible elements (1e,2e,1d,2d) and the time taken to cover this distance; in order to exactly know the state of the vehicle (3) the data processing device waits for the data of the photo-sensible element (1c,2c) located past the two photo-sensible elements (1e,2e,1d,2d) in the direction of the running of the vehicle (3); according to the level of the signal of the photo-sensible element (1c,2c), the data processing device stabilises if an overrunning has occurred or if the vehicle (3) is still; in both cases the panels, located before the position held by the vehicles (3,4), are switched on to indicate that the vehicle (3) is standing on the carriageway or an overrunning is occurring.

7. Equipment for signalling as in claim 1, wherein the central control unit comprises a fault signalling device of the photo-sensible elements; spare photo-sensible elements situated in parallel to the commonly used photo-sensible elements being provided, and a signaller of failures in the photo-sensible elements being advisable from the road police.

8. Equipment for signalling as in claim 1, wherein the distances between the photo-sensible elements are comparable to the cross dimensions of a small vehicle or a motorcycle to detect the stopping or rollover in carriageway zones very near one to the other.

9. Equipment for signalling as in claim 1, wherein the distances between the photo-sensible elements are of some tens of meters.

10. Equipment for signalling as in claim 1, wherein luminous signals (5a,5b,5c,5d,5e,5f,5g) are provided to indicate the course of the traffic in the road section where the equipment is installed; the luminous signals (5a,5b,5c,5d,5e, 5f, 5g) being located at the side of the carriageway in positions suitable for being noticed by the drivers of the vehicles (3,4) running in both the traffic lane and in the passing lane; if the traffic is smooth, the luminous signals (5a,5b,5c,5d,5e,5f,5g) emit a green or white light; in case of slow traffic or an accident, the colour of the luminous signals (5a,5b,5c,5d,5e,5f,5g) is yellow or red to inform the vehicles about the dangerous course of the traffic.

Fig.1

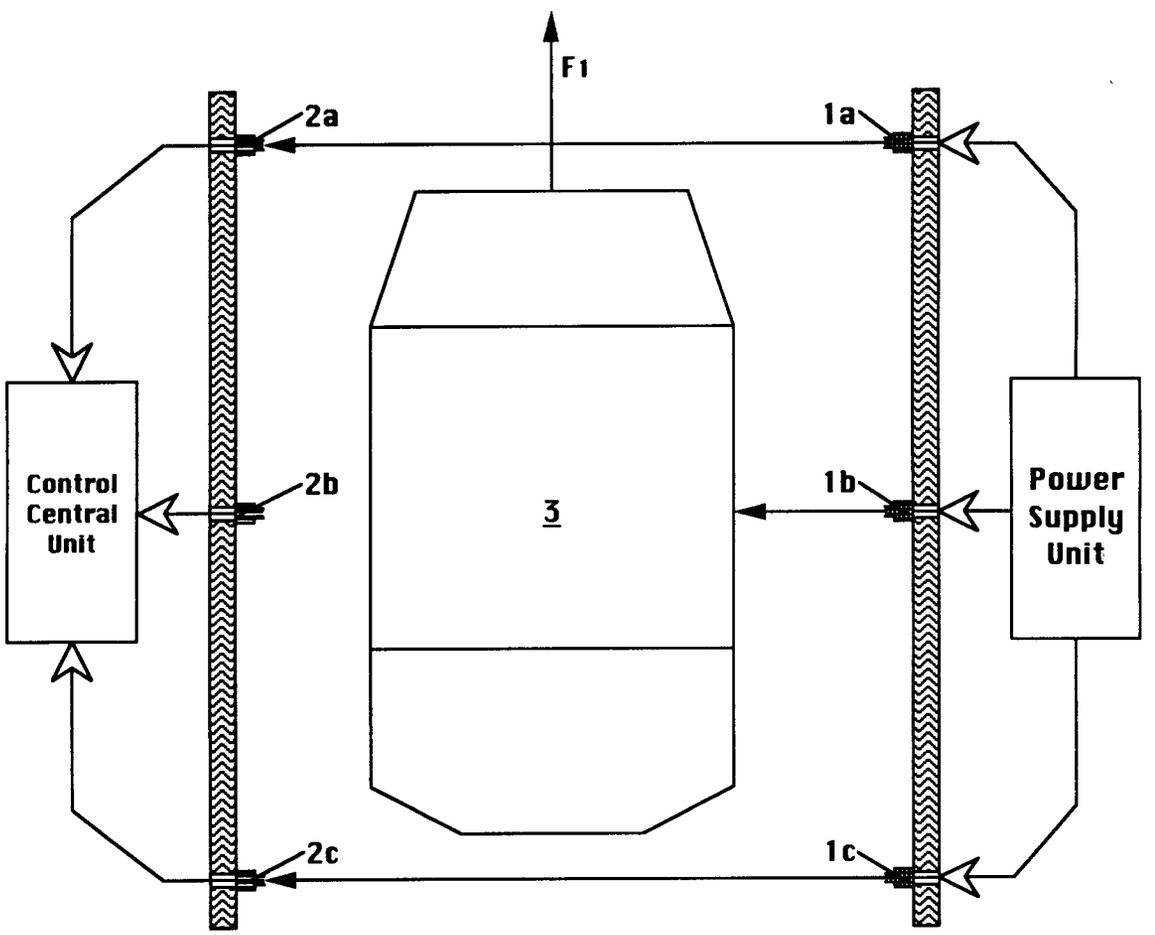


Fig.2

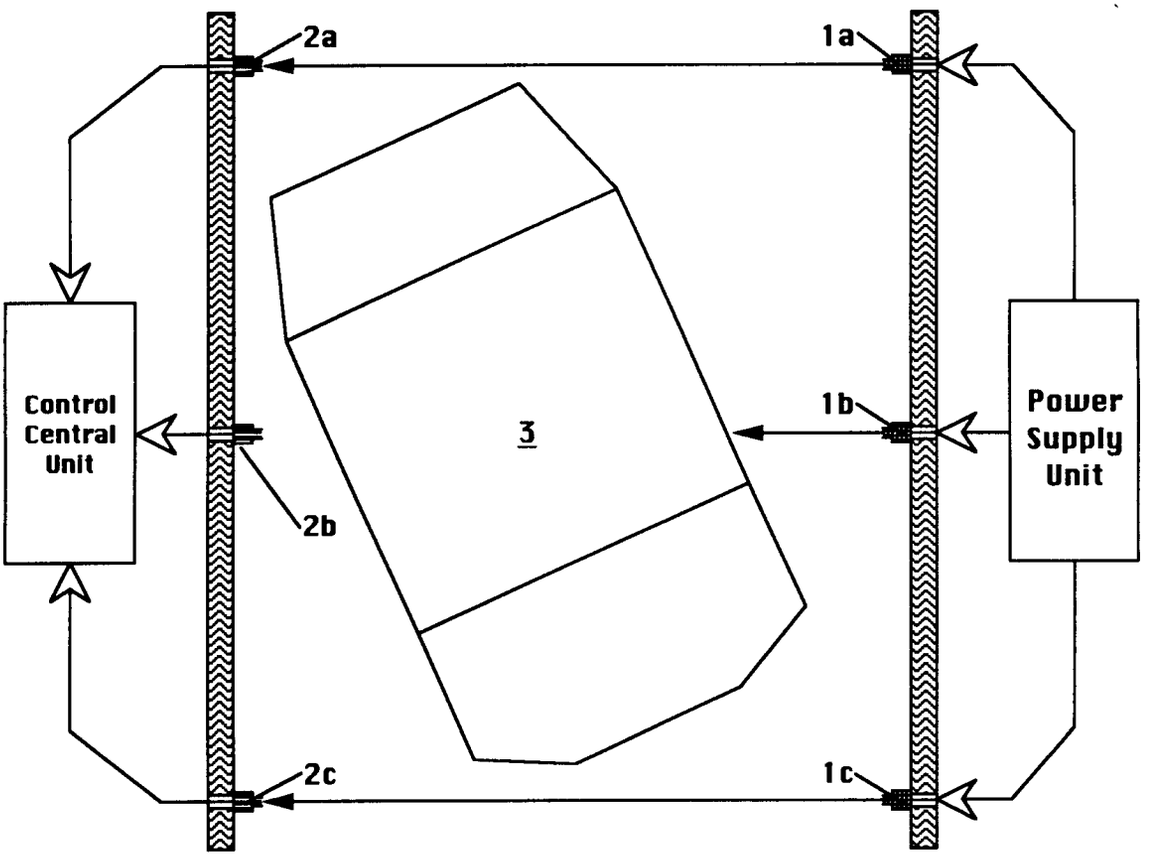
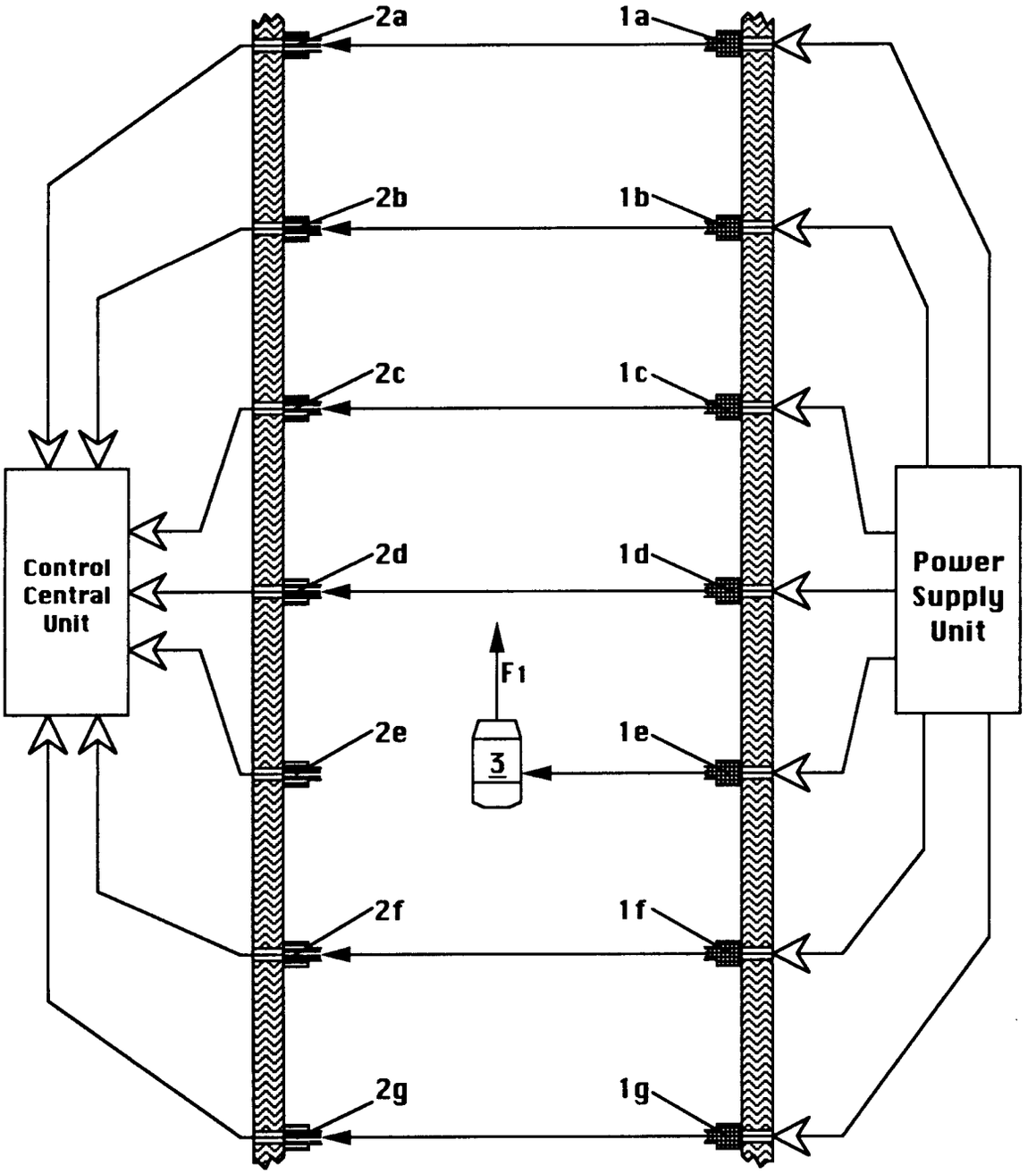


Fig.3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1a
2b
1b
2c
1c
Control Central Unit
2d
1d
Power Supply Unit
F1
3
2e
1e
2f
1f
2g
1g

Fig.4

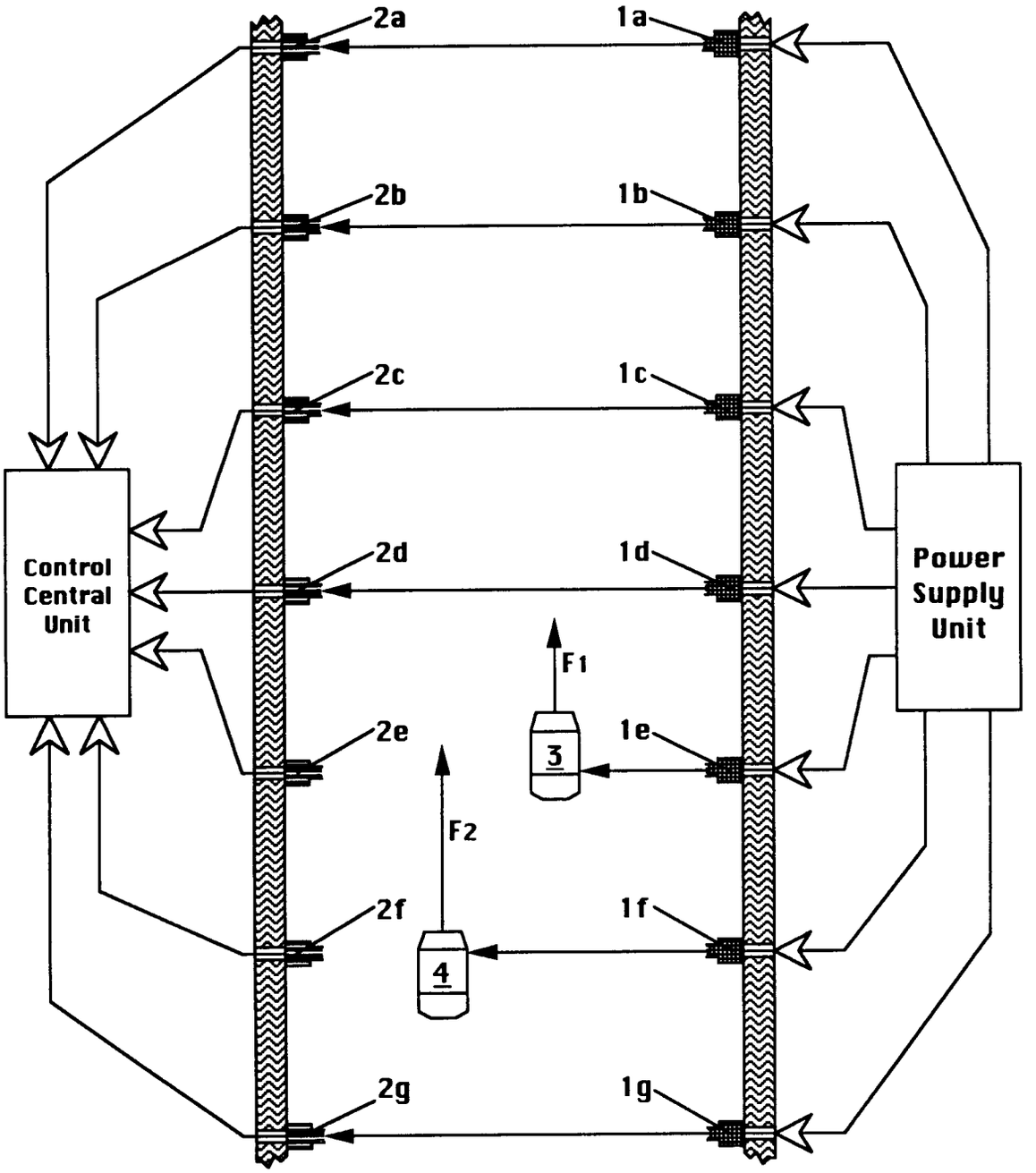

2a
1a
2b
1b
2c
1c
Control Central Unit
2d
1d
Power Supply Unit
F1
2e
1e
3
F2
2f
1f
4
2g
1g

Fig.5

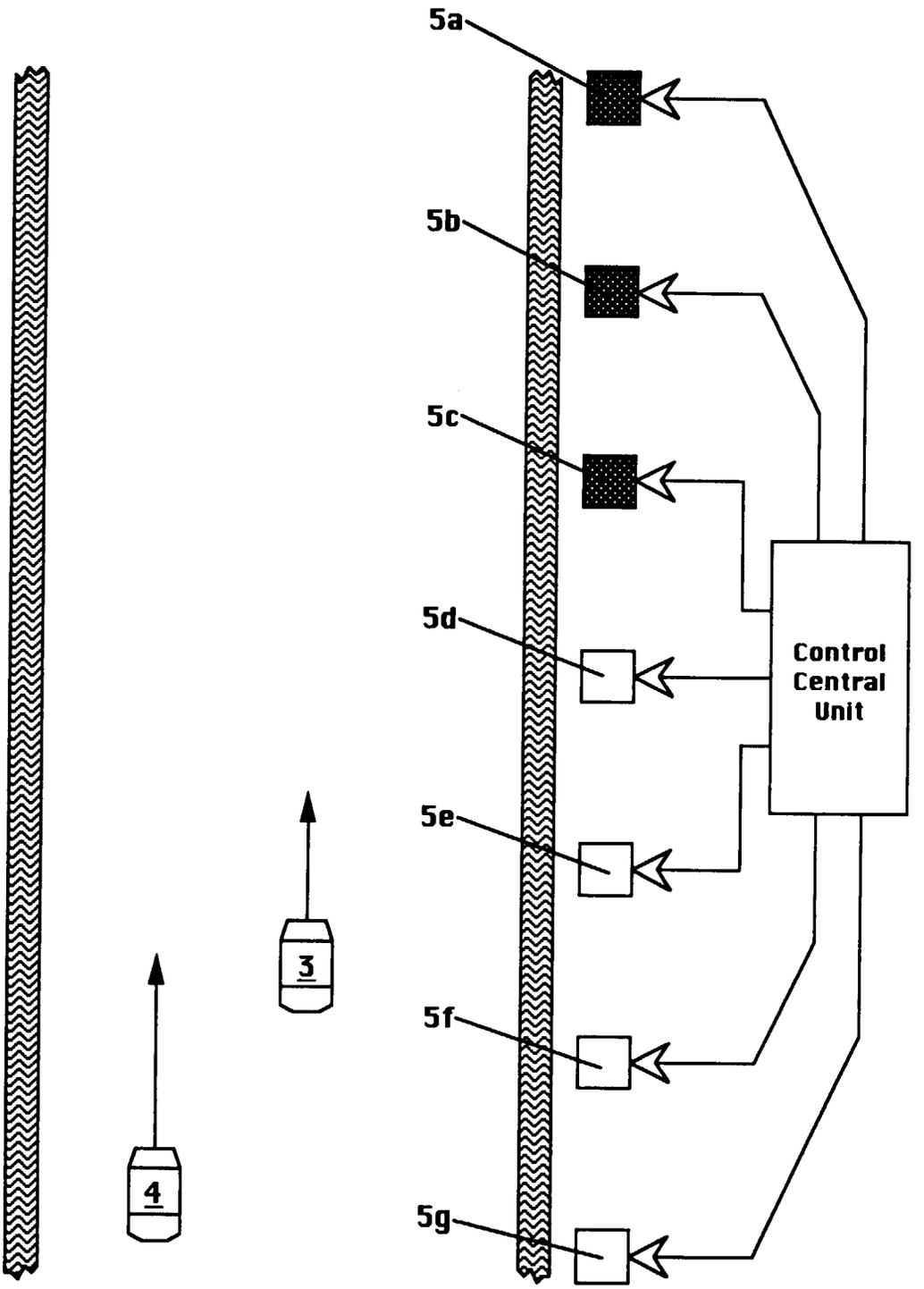


Fig.6

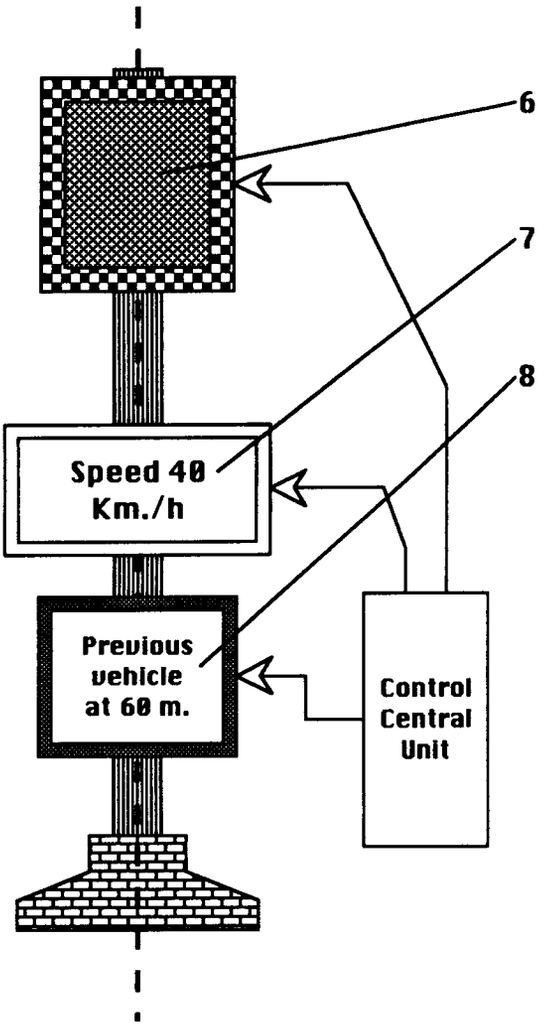

6
7
8
Speed 40
Km./h
Previous
vehicle
at 60 m.
Control
Central
Unit

Fig.7

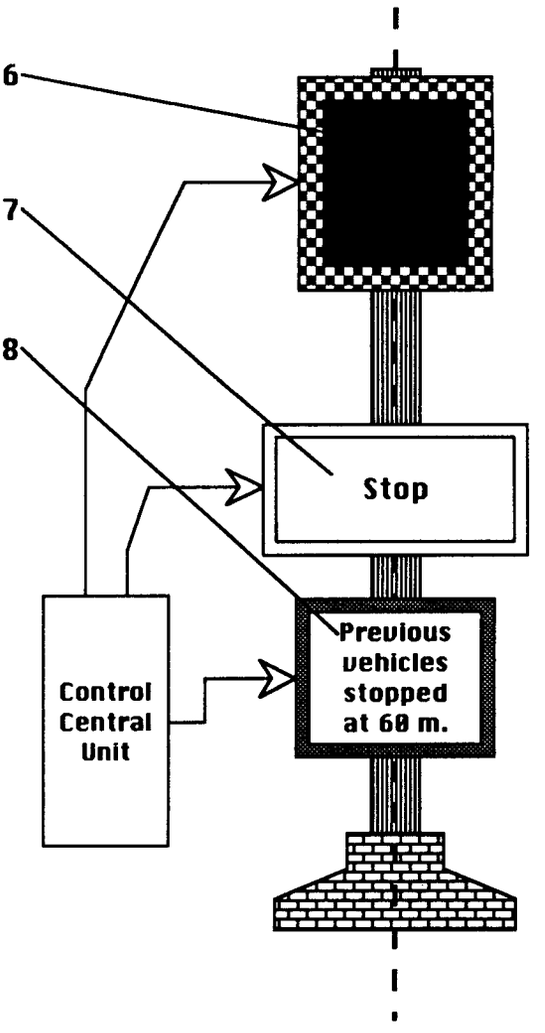

6
7
8
Stop
Previous
vehicles
stopped
at 60 m.
Control
Central
Unit

Fig.8

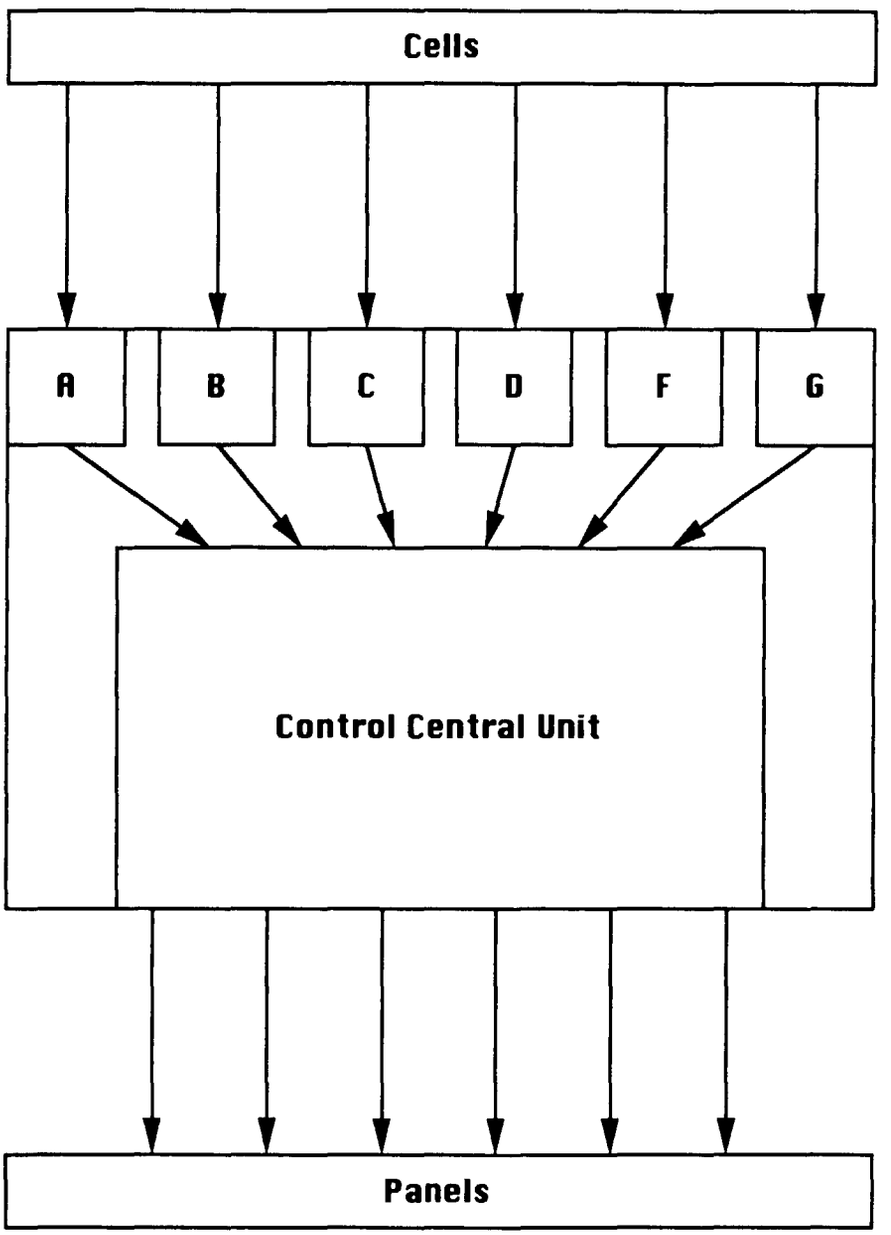


Fig.9

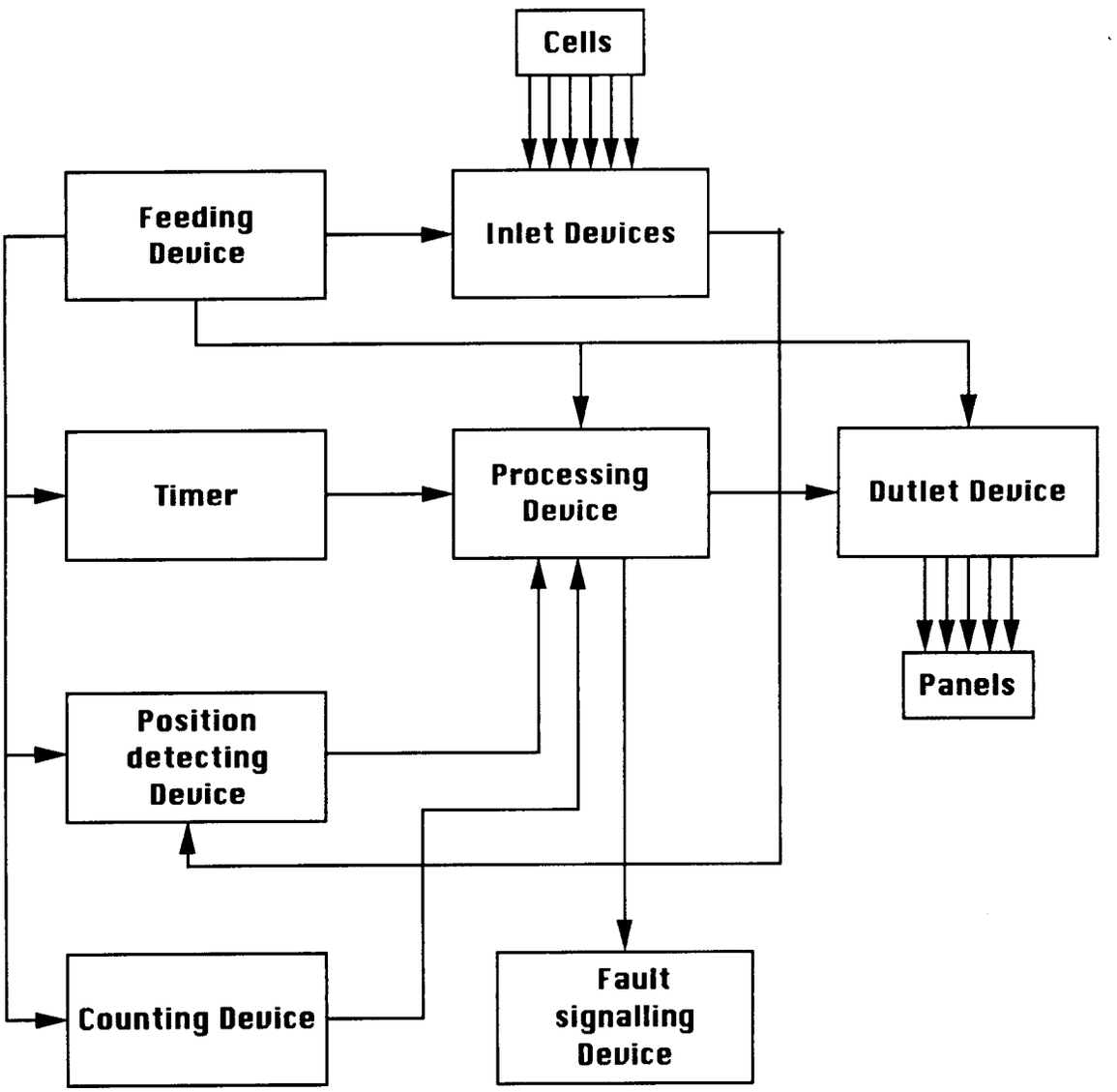
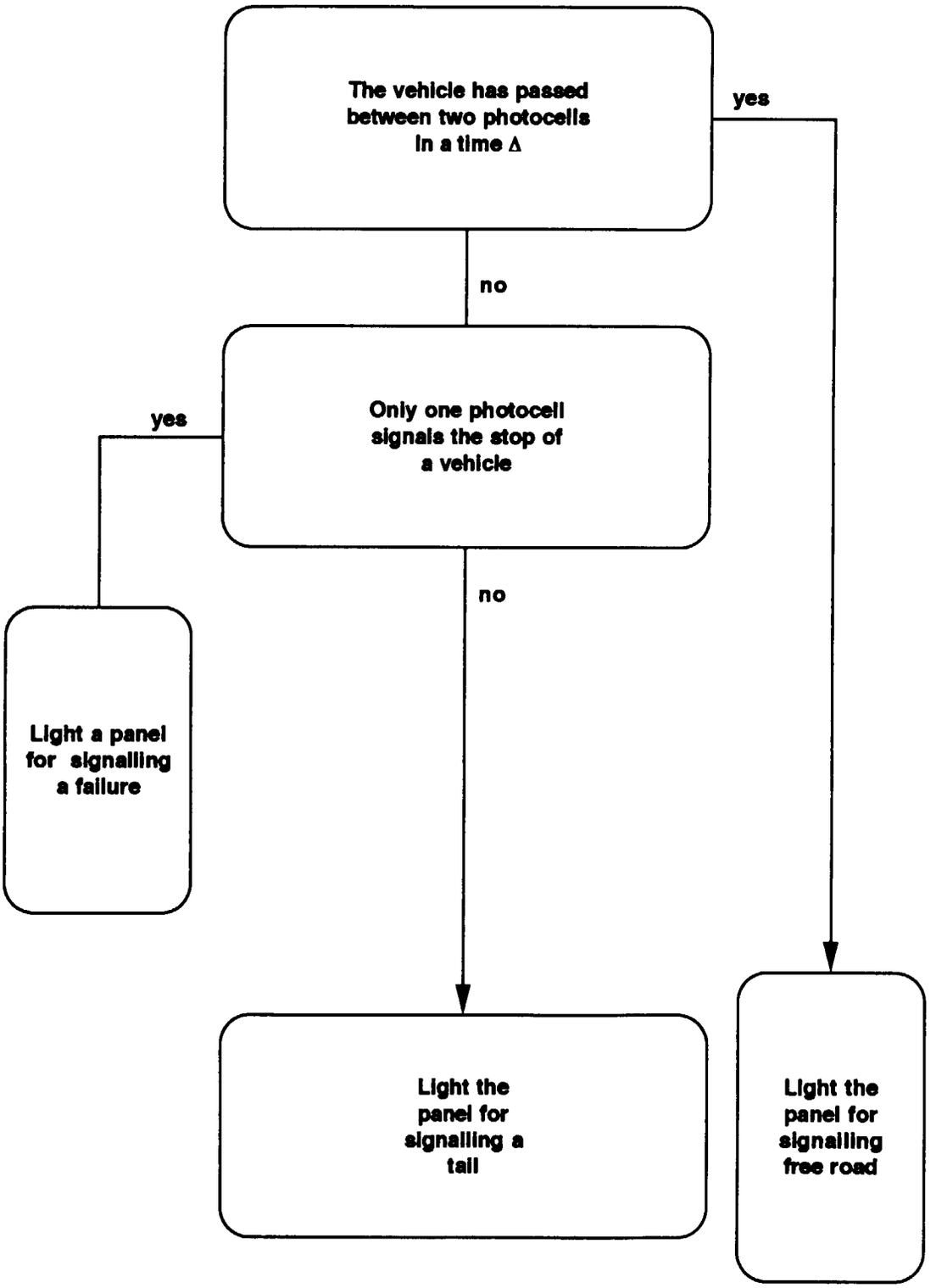

Cells
Feeding Device
Inlet Devices
Timer
Processing Device
Outlet Device
Panels
Position detecting Device
Counting Device
Fault signalling Device

Fig.10


The vehicle has passed between two photocells in a time Δ
yes
no
Only one photocell signals the stop of a vehicle
yes
no
Light a panel for signalling a failure
Light the panel for signalling a tail
Light the panel for signalling free road

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 10 6419

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.6)
X	EP 0 318 260 A (COMBUSTION DEV LTD) 31 May 1989	1-6,8-10	G08G1/00
Y	* the whole document *	7	G08G1/04
	---		G08G1/16
Y	EP 0 563 516 A (CONTROL CARD SRL) 6 October 1993	7	
A	* claims *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

G08G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	22 September 1998	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
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