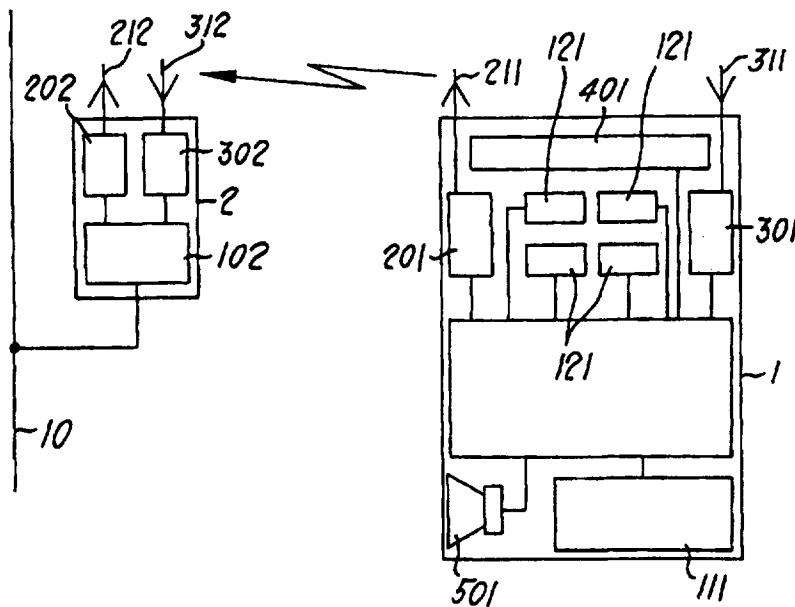




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : H04B 7/26, G08G 1/0968</p>	<p>A1</p>	<p>(11) International Publication Number: WO 98/10536 (43) International Publication Date: 12 March 1998 (12.03.98)</p>
<p>(21) International Application Number: PCT/EP97/04527 (22) International Filing Date: 20 August 1997 (20.08.97) (30) Priority Data: GE96A000075 4 September 1996 (04.09.96) IT (71) Applicant (for all designated States except US): TELOS TELECOMMUNICATIONS S.P.A. [IT/IT]; Via Lungomare di Pegli, 35/2, I-16155 Genova (IT). (72) Inventor; and (75) Inventor/Applicant (for US only): ZIPOLI, Claudio [IT/IT]; Via Molfino, 6/40, I-16154 Genova (IT). (74) Agents: PORZIA, Attilio et al.; Succ. Ing. Fischetti & Weber, Via Caffaro, 3/2, I-16124 Genova (IT).</p>		<p>(81) Designated States: AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GE, HU, IL, IS, JP, KP, KR, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, RU, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>

(54) Title: SIGNAL RECEPTION AND TRANSMISSION SYSTEM



(57) Abstract

Signal reception and transmission system for telecommunication network, comprising a receiver/transmitter mobile terminal coupled to a receiver/transmitter pick up element, said pick up element being coupled to a communication network. Said mobile terminal comprises a processor, transmitting means and receiving means, said transmitting means being controlled by said processor to send out the signal on a 1 to 4 kHz amplitude channel on a 1-4 MHz band, between 400 and 420 MHz, said channel being selected in a random way; said pick up comprises a processor, reception means and transmitting means, said receiving means being controlled by the processor to effect: continuous scanning of 1-4 MHz range wherein said terminal transmits on 25-100 kHz channels; channel selection wherein a transmission is provided with recognition codes, channel lock-in and band restriction.

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TITLE OF THE INVENTION

Signal reception and transmission system

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BACKGROUND OF THE INVENTION

The present invention relates to signal reception and transmission systems; it relates in particular to a signal receiving and transmitting system for a telecommunication network.

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There has been for quite a time established the need to improve systems which may assure to citizens a timely intervention in answer to the most common emergency necessities, that is medical necessities, public order necessities or necessities connected to accidental events such as fires or floodings. Furthermore the request for a more efficient management of the public transportation, of the private traffic, and generally for a better accessibility to the basic services from both citizens and visitors of our towns, is more and more pressing.

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It is therefore important to realize an integrated and flexible system which may allow, by means of a common support structure, to furnish amply and qualitatively diversified performances, and thus to be able to satisfy request which are of kinds also apparently very different from one another.

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In the italian patent application No. T096A000183 a signaling system is described, which uses the town lighting pre-existent network and the relating electric lines to create a communication network. There is provided for the use of a transmitter sending the intervention requests to a receiver/conveyer connected to the network, but the

communication is practically unidirectional, if it is
excepted the possibility of a consent signal from the
receiver/conveyer which can be received by the transmitter.
Furthermore the signal transmitted by the portable
5 transmitter can be easily disturbed, considering that it
makes use of an accessible radio channel, and therefore an
extraneous person can get into the network with false
intervention requests. Finally there is not provided for the
availability of the use of the network for performing
10 diversified services.

SUMMARY OF THE INVENTION

Scope of the present invention is to provide a signal
receiving and trasmitting system for telecommunication
networks which may allow an effective data flow
15 bidirectionality, avoiding, at the same time a transmission
easily subject to interferences and intrusions by
unauthorized persons. Moreover, said system must be able,
through low entity modifications, to be adapted to
utilization situations also very diversified from one
20 another.

Object of the present invention is therefore a signal
receiving and transmitting system for telecommunication
networks, comprising a receiver/transmitter mobile terminal
coupled to a receiver and transmitter pick up element, said
25 pick up element being coupled to a telecommunication
network, characterised by the fact:

said mobile terminal comprises a processor,
transmitting means and receiving means said transmitting
means being controlled by said processor in order to send
30 out the signal on a channel of amplitude 1 to 4Khz, in a 1-
4Mhz band, said channel being selected in a random way; and

said pick up comprising a processor, receiving means and transmitting means, said receiving means being controlled by the processor to effect: a continuous scanning of the 1-4Mhz range wherein said terminal transmits on 25-100Khz channels; a channel selection in which there is a transmission having the requested features and channel locking-in.

According to one embodiment said mobile terminal is at least provided with three keys for sending signals processed by, or stored in, the processor to the network, a display element, such as an alphanumeric display, and an acoustic emitter.

According to a further embodiment said mobile terminal is placed on a motor vehicle provided with a collision sensor and with e.g. an infra-red sensor, for communication with a remote control provided with a display and a keyboard, also said remote control being a mobile terminal.

BRIEF DESCRIPTION OF THE DRAWINGS

Further advantages and features will be evident from the following description of some embodiments of the receiving and transmitting system according to the invention made, by way of non limiting example, with reference to the accompanying drawings, in which:

In Figure 1 the signal reception and transmission system according to the present invention is schematically shown;

In Figure 2 the mobile terminal of figure 1 is shown, in side elevation view.

In Figure 3 a second embodiment of this invention is shown;

In Figure 4 a further modification of the embodiment

shown in figure 3 is shown.

In Figure 5 still a further modification of the embodiment of Figure 3 is shown;

In Figure 6 a further embodiment of this invention is
5 shown; and

In Figure 7 another embodiment of the present invention is shown.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In Figure 1 the signal reception and transmission system
10 according to the present invention is schematically shown;
with numeral 1 the mobile terminal of the system is
indicated, and with numeral 2 the pick up is shown connected
to the line 10 of the telecommunication network, for instance
the supply line of the town lighting network. The terminal
15 1 comprises a processor 101 provided with a power supply 111
and connected to four keys 121 and to a display 401. Said
processor 101 controls a transmitter 201 provided with an
antenna 211 and a receiver 301 also provided with an antenna
311. An acoustic emitter 501 is further connected to the
20 processor 101. The pick up 2 is also provided with a
processor, which controls the transmitter 202 provided with
an antenna 212, and the receiver 302 provided with an
antenna 312; said processor 102 obviously supervises the
communication with the network by means of the line 10 to
25 the pick up 2, in a way and by means which are beyond the
scope of the present invention and which will not be further
described.

In Figure 2 the terminal 1 is shown in a side elevation
view; in said Figure it can be noted that the keys 121,
30 which are arranged on one side of the terminal 1, have
corresponding co-axial keys 121' on the opposite side, the

scope of which will be described later on.

In Figure 3 a second embodiment of the invention is shown. In this case the mobile terminal 3 is carried by a motor vehicle, the car 20 in this case, and it is fed by the same car battery 21. Also this terminal 3 is provided with a processor 103, which controls a transmitter 203 provided with an antenna 213 and a receiver 303 provided with an antenna 313. Besides, to the processor 103 a collision sensor 403 is connected as well as an IR sensor 503 which may allow the communication to a remote control 4.

According to the executive modification shown in Figure 4, the mobile terminal 3, similar to that shown in the figure described before, is additionally provided with an interface 603 for a card 5 of magnetic or logic-magnetic type. Furthermore, a receiver 6 equipped with a processor 106 supplied by the power supply 116, a receiving group 206 equipped with an antenna 216, and a display 306, is provided.

In figure 5 a further executive modification of the transmitter-receiver system of Figure 3 is shown in a schematic top plan view; the terminal 3, which has a similar configuration to that shown in figure 4, is placed in this case on a public transport vehicle, such as a bus 30. Such terminal 3 is further provided with a sensor 703 which is coupled to the doors 31 of the public transport vehicle 30, the scope of which will be described later on. On the sidewalk 40, along the street passed through by the vehicle 30, a series of street-lamps 12 connected to the line 10 carry the pick up 2 communicating to the mobile terminal 3 of the vehicle 30. Moreover, the public terminal 7 is provided in the cage 41 placed near a stop 30 of the public

transport vehicle, the scope of which will be described later on.

Another embodiment of the present invention is shown in figure 6. The terminal 8 is provided, such as in the cases
5 described before, with a processor 108 provided with a power supply 118, a display 408, an acoustic emitter 608, a transmitter 208 provided with an antenna 218 and a receiver 308 provided with an antenna 318. Furthermore, the alphanumeric keyboard 138, the backing storage unit 128, and
10 the electronic compass 508 are connected to the processor 108.

Finally, a further embodiment of the invention is shown in figure 7. The terminal 9 comprises a processor 109 provided with a power supply 119, a transmitter 209 provided
15 with an antenna 219, and a receiver 309 provided with an antenna 319, as well as an acoustic emitter 509 and a display 409. The terminal 9 comprises also a connection interface to the reader 609 of CD-ROM 619.

The operation of the system according to the present
20 invention will be evident from the following description. The mobile terminal 1 shown in figure 1 contains in the memory of its processor 101 a data series relating to standard messages to be sent to the network by means of the pick up 2. Said data are sent in the form of radio signals,
25 in a 1-4 Mhz band, preferably of 2 Mhz, within 400-420 Mhz, and preferably between 417 and 419 Mhz, on a 1-4 Khz channel, and preferably of 2 Khz. The channel is assigned to the transmitter 301 in an absolutely random manner, thus avoiding that disturbs or interferences may occur either
30 between two terminals which belong to different users, or due to intervention of extraneous third parties who would

prevent communications. The terminal 1 is provided with four keys which identify four different messages that can be sent to network. The keys are all coupled to the same number of keys on the opposite side of terminal, so that only by the simultaneous pressure of each opposite pair of keys the emission of the signal be generated. The transmission technique of the signal can be the PMW technology (Pulse Width Modulation), but other similar techniques can be provided.

10 The pick up 2 has the receiving unit 302 totally interlocked to the processor 102. Said receiving unit effects a continuous scanning of 1-4 Mhz frequency range, within which the terminal 1 transmits, which is divided into channels each from 25 to 100 khz. When the transmission relating to the features stored in the processor 102 is met, the channel in question is locked-in and the transmission band is therefore selected and restricted. In order to facilitate the said identification operation, the mobile terminal 1 transmits its code for a period of time at least a three times greater than one scanning cycle of the receiver of the pick up element. At this point, a note is directed to the terminal 1 through the transmitter, in order to signal that its message has been received. A second note will be directed as soon as the pick up will start to send the message to network, in a manner not better described here. Finally a third note will be directed, when the pick up will have received the confirmation from network of the effective reception and of the resulting reaction from operative power-station which leads to the network. Said reaction may consist in sending of medical, civil defence or public order transport means, depending on the kind of

request from the user, but it can also consist in the answer to a call of a public car, in which case the consent message will also contain the data of the car and its estimated coming time. For this purpose the mobile terminal 1 is
5 advantageously supplied with a display, which may allow to show messages data of the type described above.

The mobile terminal power supply 111 can consist in standby batteries which are supplied by solar celles; standby charge adjustment is obtained by using a LED
10 connected in series in the connection between cells and batteries. The scope of the LED is to adjust as well as to stop the flow of the current to the cells, when these are not lighted.

The embodiment of Figure 3 and its executive
15 modifications in figures 4 and 5, are provided wih a mobile terminal 3 disposed into a motor vehicle, or a car 20 in figures 3 and 4, and a bus 30 in figure 5. This kind of terminal has the same operation than terminal 1 previously described; however, all the terminal communication part,
20 that is the signal sending keys, the acoustic emitter and the display, are placed on a remote control, connected through the communication sensor 503, for example a IR sensor. Furthermore, the terminal 3 is connected to a collision sensor 403, of a type similar to that provided for
25 airbags, which may allow, in a case of accident, the automatic sending of a message to the communication network. The power to the terminal 3 will be in this case supplied by the car battery 21. Advantageously, the remote control 4 can also consist in a terminal of type shown in Figures 1 and 2,
30 which is able, by suitable means, to communicate with terminal 3 which is fitted on the car 20.

In Figure 4 is shown an executive modification of a particular application of terminal 3. Said terminal results in this case further provided with an interface 603 for a card 5 of magnetic or so-called "intelligent" type, namely provided with a microchip able to perform determinate functions. If car 20 is in a transit or parking toll area, the user can make the payment through the card 5. The transmitter 303 of terminal 3 will send a "payment made" message to the network. Said message can also to be received by a receiver given as equipment to responsible staff for supervision of the said area. This type of control is also applicable on limited traffic areas, and in the opposite point of view it can also inform the user if variations are occurred about the location of said areas.

The executive modification of Figure 5 provides for the use, on a bus 30, of a terminal 3 of type shown in figure 4, that is also provided with the interface 603 to the card 5. Furthermore, the terminal 3 is connected to a sensor 703 coupled to the bus doors 30. The sensor 703, whenever the doors open, that is at any stop requested by users of the vehicle, sends a signal to the processor of the terminal 3, which in turn transmits the data relating to the bus to the communication network, or to the nearest pick up 2. The pick up will send the position of the bus to network and the network will be therefore able, by means of the public terminals 7 placed in the cages 41 on the sidewalk 40, to furnish the data relating to coming buses and estimated times thereof. Such data, will be of course also available for the terminals of type in figure 1, active in that area, and which may request said information. The card 5 will be in this case the timetable card of the bus driver, who will

therefore give an exact report of his service to the transport company.

The terminal 8 shown in figure 6, consists of a real telematic navigation system. In fact in the backing storage 5 128 in the terminal 8, the data relating to street-guide of the town in which the user is, are contained ordered on a database that is questioned by the processor 108 according to the movements which the same user wants to effect. The electronic compass 504 supplies to the processor in a real 10 time a location datum check obtained by network communication. Furthermore, the alphanumeric keyboard 138 allows a large range of questions available to user.

Finally, the mobile terminal 9 shown in figure 6 may allow to approach to such historic-touristic informations 15 about the zone that it is crossing. In fact, the processor 109 signals its location to network, and receives a signal therefrom which may allow the research, on a reader 609 of CD-ROM 619, for a digitized text piece relating to that particular zone of transit. Listening of the text is 20 effected by means of the acoustic emitter 509, which in this case will consist in real loudspeaker. The text alternately can be read in the display 409.

The signal reception and trasmission system thus conceived, may allow a very elevated operation security and 25 discretion within an also very large communication and/or signalling network on one hand, and has a large range of possibilities of application possibility to many sectors on the other hand, thanks to a very flexible and suitable structure of its components.

CLAIMS

1. Signal reception and transmission system for telecommunication network, comprising a receiver/transmitter mobile terminal (1; 3; 8 ;9) coupled to a receiver/transmitter pick up element (2), said pick up element being coupled to a communication network, characterized by the fact that:

said mobile terminal (1; 3; 8; 9) comprises a processor (101; 103; 108; 109), transmitting means (201; 203; 208; 209) and receiving means (201; 203; 208; 209), said transmitting means (201; 203; 208; 209) being controlled by said processor (101; 103; 108; 109) to send out the signal on a 1 to 4 Khz amplitude channel on a 1-4 Mhz band, between 400 and 420 Mhz, said channel being selected in a random way; and

said pick up (2) comprises a processor (102), reception means (302) and transmitting means (202), said receiving means (302) being controlled by the processor (102) to effect: continuous scanning of 1-4 Mhz range wherein said terminal (1; 3; 8; 9) transmits on 25-100 khz channels; selection of the channel in which a transmission is being made provided with recognition codes, channel lock-in and band restriction.

2. System according to claim 1, characterized by the fact that said signal sent out by the mobile terminal (1; 3; 8; 9) is provided with a mobile terminal (1; 3; 8; 9) recognition code, which is repeated several times for a time three times greater time than the scanning time of the receiver (302) of the pick up element (2).

3. System according to claim 1 or 2, characterized by the fact that said mobil terminal (1) is provided with at least

one key (121) for sending data processed or stored in the processor (101), in the form of radio signals, and an acoustic emitter (501).

4. System according to claim 2 or 3, characterized by the fact that said pick up (2) sends to said terminal (1; 3; 8; 9) a first signal in the form of tone sent out by the acoustic emitter of said terminal, on signal reception; a further tone is transmitted and sent out by the pick up (2), on transmission on network; and finally a third tone is transmitted and sent out just as the confirmation from network of occurred reception of message.

5. System according to any of the preceding claims, characterized by the fact that said mobile terminal (1; 8; 9) comprises an alphanumeric display screen (401; 408; 409), e.g. liquid crystals, for receiving messages sent by the pick up (2).

6. System according to any of the preceding claims, in which the power supply (111; 118; 119) of said mobile terminal (1; 8; 9) comprises at least a standby battery, at least a solar cell and a LED connected in series to the connection between standby battery and said solar cell.

7. System according to any of the preceding claims 2 to 6, characterized by the fact that said terminal (1) comprises at least two keys (121, 121') for sending any message processed or stored in the processor (101), said keys (121, 121') being co-axial and placed on the mobile terminal (1) opposite sides, simultaneous pressure of both the keys (121, 121') allowing signal sending.

8. System according to claim 1 or 2, characterized by the fact that said mobil terminal (3) is placed on a motor vehicle (20; 30), and that it comprises a collision sensor

(403) and a communication sensor (403), preferably an IR sensor, with a remote control (4), provided with sending keys, acoustic emitter and possible display.

9. System according to claim 8, characterized by the fact
5 that said remote control (4) is in turn a mobile terminal not depending on mobile terminal (3) placed into the motor vehicle (20; 30), and alternatively able to communicate to network or said terminal.

10. System according to claim 8 or claim 9, in which said
10 mobile terminal (3) is further provided with an interface (603) for cards (5) of magnetic type or so-called "intelligent" type.

11. System according to claim 10, in which said mobile
15 terminal (3) is placed on a public transport means (30), said terminal further comprising a sensor (703) coupled to the doors opening device (31) of the public transport means (30).

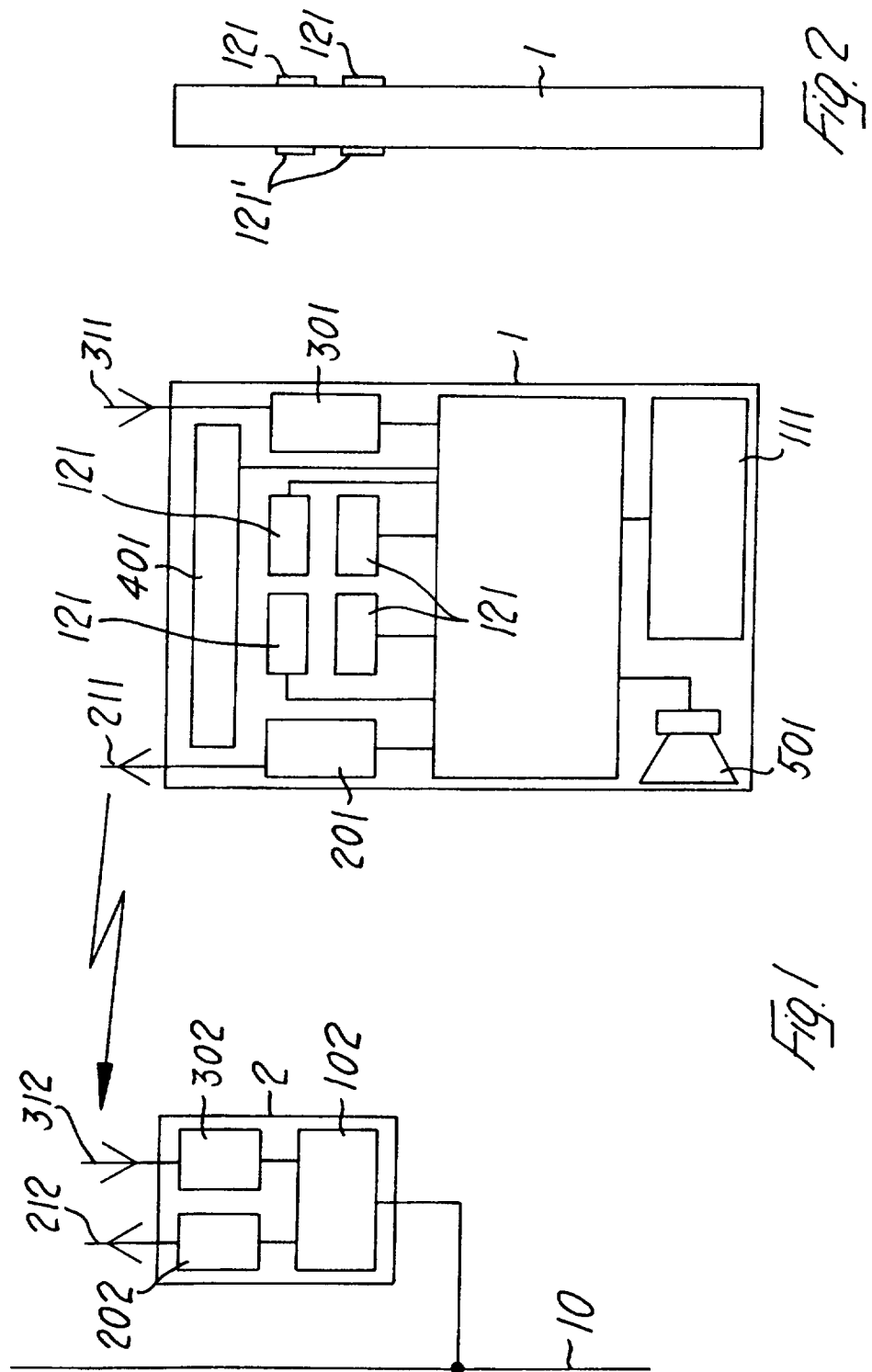
12. System according to claim 6, characterized by that said
20 mobile terminal (8) comprises a backing storage unit (128), an alphanumeric keyboard (138) and an electronic compass (508).

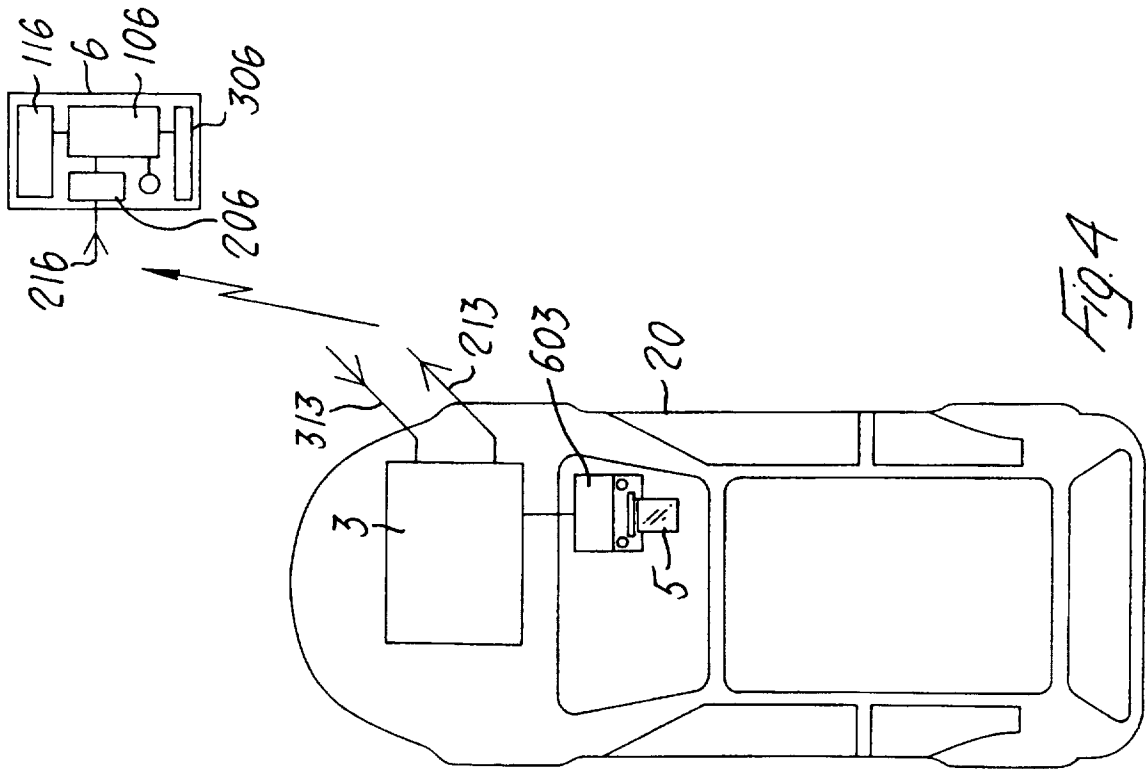
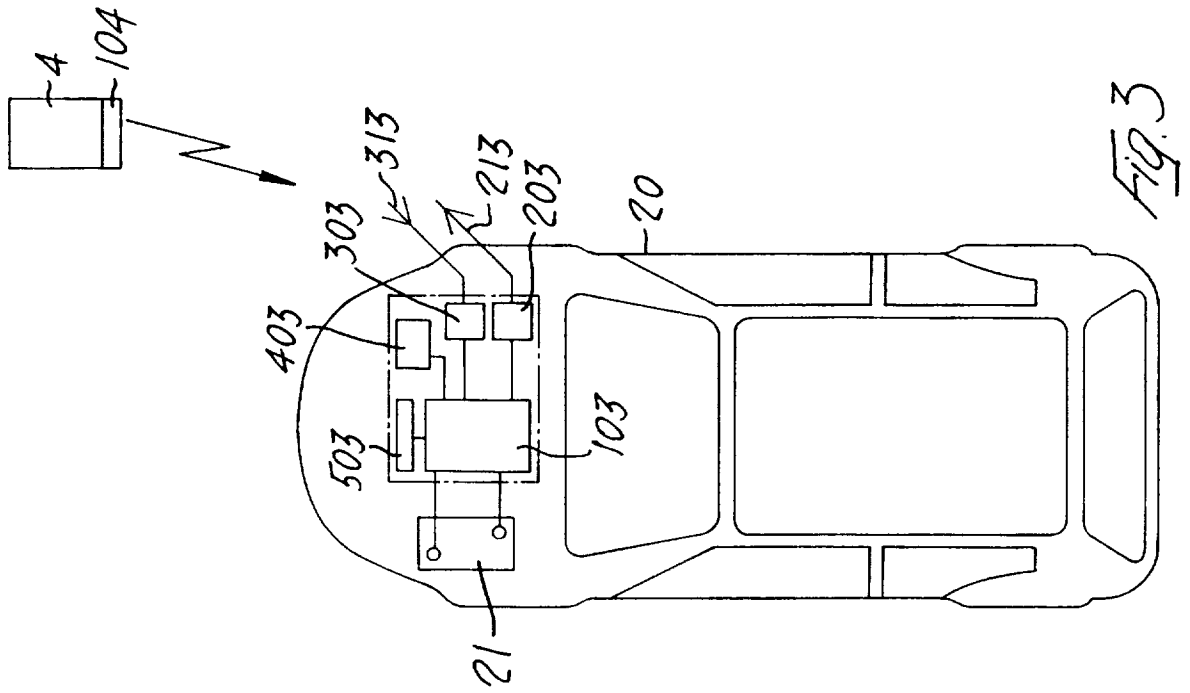
13. System according to claim 6, characterized by that said
mobile terminal (8) comprises a connection interface to a CD-ROM reader (609).

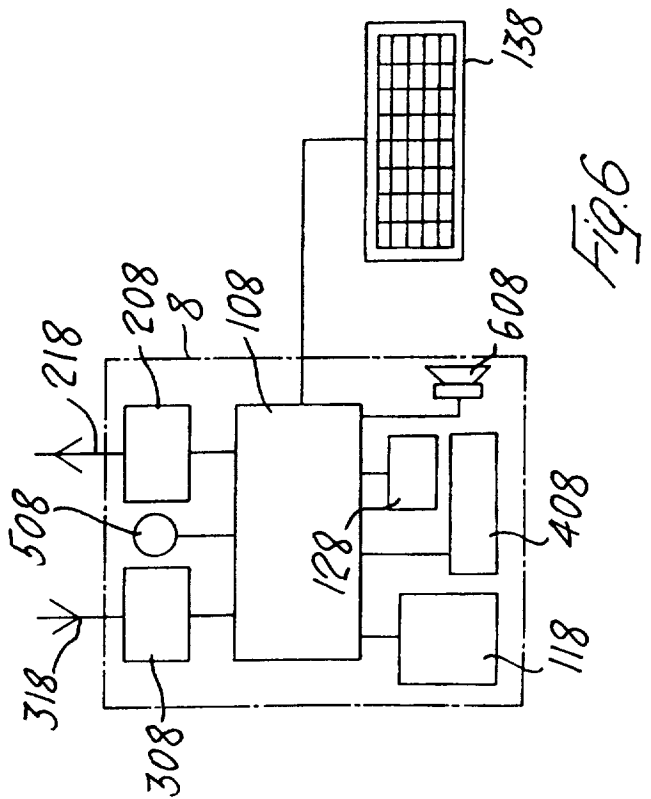
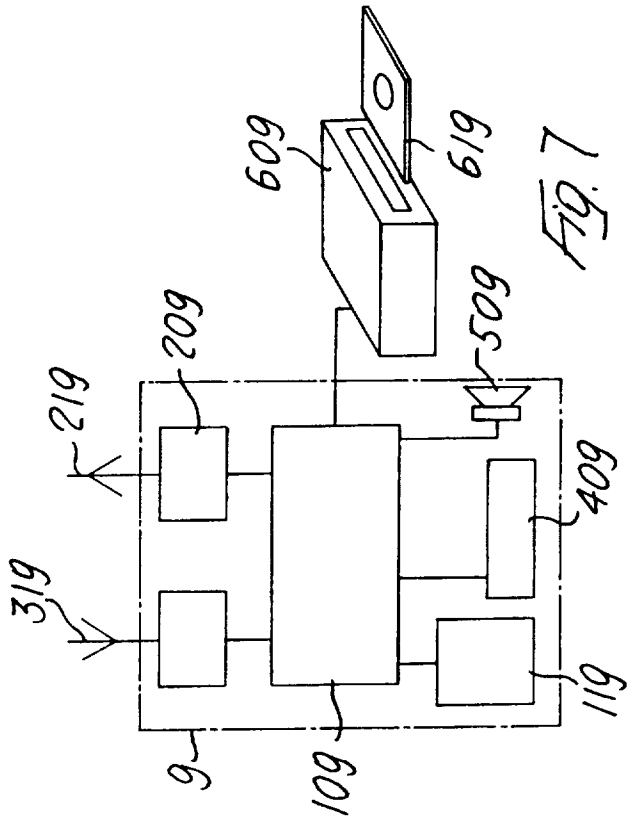
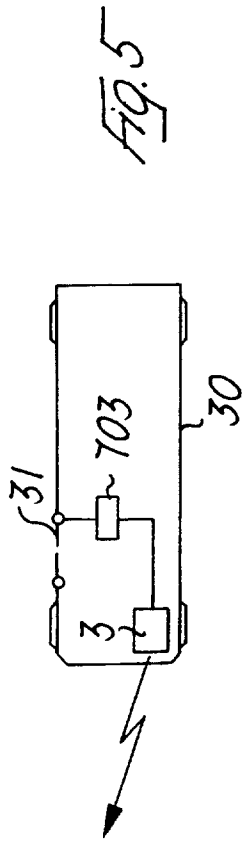
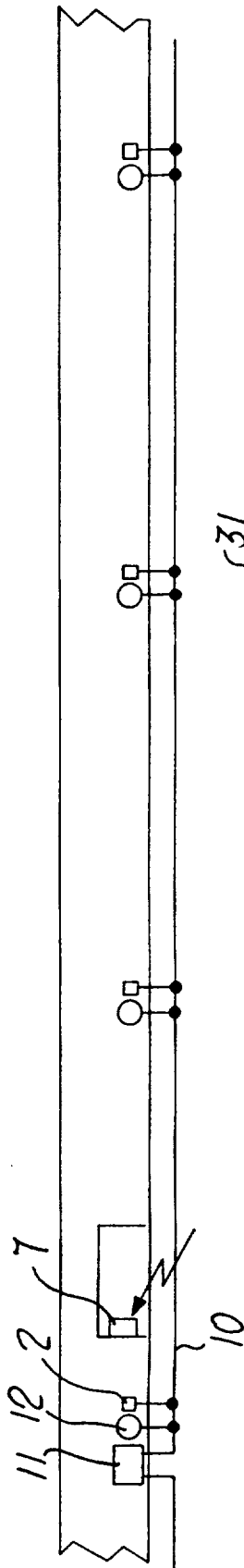
25 14. System according to any of the preceding claims 1 to 13, in which the transmitting band of the mobile terminal (1; 3; 8; 9) is preferably 2 Mhz, between 417 and 419 Mhz.

15. System according to claim 14, in which the transmitting channel band of the mobile terminal (1; 3; 8; 9) is 2 Khz.

16. System according to claim 15, in which the receiver (302) of said pick up (2) effects a scanning over 40 channels of 50 Khz.







INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 97/04527

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 6 H04B7/26 G08G1/0968

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 H04B G08G G08B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 94 11853 A (ANAGNOSTOPOULOS PANAGIOTIS A) 26 May 1994 see page 2, line 18 - page 4, line 21 see page 11, line 4 - line 15 see page 15, line 8 - page 17, line 29 see page 27, line 13 - line 26 see page 29, line 25 - line 36 see figures 1-7, 11 ---	1-3, 5, 8-10, 12, 13
Y	US 5 311 541 A (SANDERFORD JR H BRITTON) 10 May 1994 see column 4, line 2 - line 22; claims 1, 4 --- -/--	1-3, 5, 8-10, 12, 13

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
11 December 1997	19/12/1997
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Wanzeele, R

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 97/04527

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 684 592 A (EQUOS RESEARCH CO LTD) 29 November 1995 see page 3, column 4, line 1 - line 15; claims 1,4; figure 2 -----	8,9
Y	DE 44 37 360 A (FELTES ASTRID ;FOERSTER STEFAN DR ING (DE)) 25 April 1996 see abstract; claims 1-4 -----	13
A	US 4 064 367 A (O'MALLEY LARRY V) 20 December 1977 see abstract -----	4
A	US 5 289 183 A (HASSETT JOHN J ET AL) 22 February 1994 see column 7, line 16 - line 20; claim 1; figures 1-3 -----	1,6
A	DE 93 15 479 U (TACK ACHIM DIPL ING) 5 January 1994 see page 2, line 26 - page 3, line 15; claims 1,4; figures 1,2 -----	1,6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP 97/04527

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9411853 A	26-05-94	GR 92100495 A	29-07-94
US 5311541 A	10-05-94	WO 9428663 A AU 4393693 A US 5377222 A US 5668828 A EP 0700616 A	08-12-94 20-12-94 27-12-94 16-09-97 13-03-96
EP 0684592 A	29-11-95	JP 7311738 A US 5654908 A	28-11-95 05-08-97
DE 4437360 A	25-04-96	NONE	
US 4064367 A	20-12-77	BR 7704757 A CA 1074934 A	25-04-78 01-04-80
US 5289183 A	22-02-94	US 5347274 A	13-09-94
DE 9315479 U	05-01-94	NONE	