

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 087 353 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

28.03.2001 Bulletin 2001/13

(51) Int Cl.7: **G08B 27/00**

(21) Application number: **99118053.0**

(22) Date of filing: **22.09.1999**

(84) Designated Contracting States:

**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**

Designated Extension States:

AL LT LV MK RO SI

(71) Applicant: **Houlden, Gregory**

40489 Düsseldorf (DE)

(72) Inventor: **Houlden, Gregory**

40489 Düsseldorf (DE)

(74) Representative: **Heselberger, Johannes et al**

Bardehle, Pagenberg, Dost,

Altenburg, Geissler, Isenbruck,

Galileiplatz 1

81679 München (DE)

(54) **Satellite warning system**

(57) A warning system comprising a central unit, a satellite, and a plurality of receiver units, said central unit being able to send signals to said satellite, said satellite being able to transmit said signals to said receiver units, wherein each of said receiver units being individualized by means of a receiver unit specific code, wherein said receiver unit specific code represents the location of the

receiver unit, said central unit having means for storing said receiver unit specific codes and means for selectively addressing a plurality of said receiver units by selecting from said receiver unit specific codes in order to transmit said signals selectively to said plurality of receiver units, and said signals are warning signals which represent information about a danger for individuals or property.

EP 1 087 353 A1

Description

[0001] The present invention relates to a satellite warning system, particularly for warning individuals of dangers for their health and property.

[0002] Dangers for the health and the property of individuals, caused by either natural occurrences, like thunderstorms, or by accidents, like fires or explosions, would frequently be less dramatic in its consequences if the individuals which are actually affected could be warned in due time before the danger becomes present. Today, many warning systems are non-selective, for example the systems using TV and Radio. Here, the warning is spread out to all individuals being located in the area of the respective TV or Radio station. Since the individual is not aware of a warning being issued via TV or Radio, such warning frequently does not reach its aim. Other warning systems are selective, for example the direct information of the inhabitants of a neighborhood by police officers or firemen. This requires time and manpower and is in remote areas in dangerous situations almost impossible to establish.

[0003] Therefore, the object of the present invention is to provide a warning system for dangers for the health or property of individuals which avoids the above drawbacks. In particular, the object is to provide a warning system which is able to selectively warn individuals securely and immediately, without involvement of excessive time and effort.

[0004] The present invention solves these problems by providing a warning system comprising a central unit, a satellite, and a plurality of receiver units, said central unit being able to send signals to said satellite, said satellite being able to transmit said signals to said receiver units, each of said receiver units being individualized by means of a receiver unit specific code, wherein said receiver unit specific code represents the location of the receiver unit. Furthermore, said central unit has means for storing said receiver unit specific codes and means for selectively addressing a plurality of said receiver units by selecting from said receiver unit specific codes in order to transmit said signals selectively to said plurality of receiver units. The signals are warning signals which represent information about danger for individuals or property.

[0005] The present invention provides an early warning system which is able to quickly and effectively warn individuals selectively of any possible threat in a certain area/sector. An individual who desires to be protected by the inventive warning system will be in possession of a receiver.

[0006] The receiver unit will be individualized by a receiver unit specific code which represents the location of the respective receiver unit in a certain sector. In order to allow as much as possible the pinpointing of a danger, such sectors should be as compact as possible. These sectors may follow political or geographical data. However, it is preferred that they are scoped after features

which may be relevant for an expected significant danger, for example: in an area where wood fires are to be expected it may be advantageous to assign each side of a wide highway to a separate sector. Or: a river tending to flood the river banks in spring may be most favorably dealt with by setting up a sector along this river. Such distinction may also be favorable in view of emergency services being alarmed by the warning system. Frequently, in mainly rural areas the sector dimensions will be larger than in densely populated urban areas. For example, in rural areas sectors may extend 30 kilometers by 30 kilometers, while urban sectors should not exceed 10 kilometers by 10 kilometers.

[0007] Preferably said individual receiver unit specific code comprises information about the country (e.g. USA), the state (e.g. Iowa), the area (e.g. Tearfield) and the sector (No. 8 - woodland hights) in which the receiver unit is located. This location will regularly be fixed, since the receiver unit will be located in the user's home. However, the receiver unit may also be employed in a vehicle which does not move very far away from a standard location, such as bulldozers or tractors. Furthermore, it is possible to implement a function in the receiver units to communicate to the central unit its temporary location or the central unit may even be able to locate the receiving units on its own, for example by means of a satellite navigation system. Such location update may be implemented in regular or irregular time periods.

[0008] The system of sectors may be extended worldwide, for example by using the above addressed data scheme of country, state, area and sector. This would allow for an international, fully integrated warning system. Such system would, for example, allow to warn individuals in different parts of the world of a storm or simply of bad weather.

[0009] The central unit will regularly be a centrally located station which can send signals over wide distances via satellite to the plurality of receivers. The central unit contains a computer terminal which stores the receiver unit specific codes. The central unit further comprises means for receiving and coordinating information about dangers, for example a natural disaster. The computer terminal of the central unit accordingly selects the receiver unit specific code of a plurality of potentially affected receiver units. The central unit contains also a transmitter means for sending the warning signals to the plurality of receiver units, which may then issue a warning.

[0010] The information about the danger may be received by the central unit from State Authorities, for example from the National Weather Service or the Federal Disaster Relief groupings, as well as from local authorities, for example from the local Police Department or from the local Fire Department. The central unit may also collect information from decentralized individuals, who may simply call the central unit's operator to tell him or her about a danger. However, in an advanced system the information may also additionally come from the in-

dividuals having such receiver units.

[0011] One central unit may be installed for every country or territory, like Europe. However, each state may also have its central unit. As stated above, with the implementation of sectors, the central unit's territorial competence will preferably be determined according to danger factors, for example a river, a chemical plant area or a coastal area.

[0012] The receiver units are able to receive warning signals. For this purpose they must have means for receiving such warning signals, means for processing said warning signals and means for displaying either said warning signals or messages derived from said warning signals in the receiver unit. For example, the receiver unit may rest in a "low power" stand-by mode as long as it is turned on for minimizing operating costs and saving the unit's elements, but does not receive any warning signals. If a receiver unit is selected by the central unit as a recipient of a warning signal, because this receiver unit is located in a dangerous sector, the receiver unit issues a warning signal or message. This warning may be in the form of a sound signal, like an alarm clock, or it may be visual, like the warning light of a home alarm system. However, all other kinds of warnings are imaginable and appropriate. Moreover, other information, like safe escape routes, location of public bunkers or shelter rooms, may also be scheduled to be displayed by the receiver unit. The alarm may follow different warning levels, for example pre-warning, urgent pre-warning, urgent warning, immediate danger. If such a warning scheme is known to the users of the warning system, then the individually warned user may take appropriate steps to secure his life or property. For example, in some instances there may be time to rescue property and thereafter the own life, in other situations no time has to be lost to save the own life. If, for example a tornado crosses the border between two sectors the former level one sector changes to a level two sector and the former level two sector changes to a level one sector with the respective alert.

[0013] Preferably, the receiver unit of the warning system contains a self-diagnostic means for running periodically a self-diagnostic test to secure the proper functioning of the receiver unit and notifying means for notifying the user of the result of such self-diagnostic test. Thereby, it can be assured that the receiver unit works properly and that the warning signals sent to such receiver unit are not lost. In the case of an error an intelligent display may notify the error to the user. Furthermore, the receiver unit may also have a visual warning system of lights to warn of problems i.e. signal loss or power loss. In addition, the receiver unit may dispose of an on-board emergency power supply sufficient for a significant number of hours, for example for at least 24 hours.

[0014] In a preferred embodiment the central unit of the warning system contains encryption means for encrypting the warning signals. In such warning system the

receiver unit then comprises decryption means for decrypting said encrypted warning signals after transmission to the receiver unit. Said warning signals may be encrypted to avoid false or mischievous alerts. For example, alerts which lead to the people in a neighborhood to stay at home might be used by robbers to have free streets for their activities. On the contrary, warning messages which drive people out of their homes might be used by burglars as a means to arrive at easy break-ins.

[0015] A further preferred embodiment of the warning system contains a receiver unit comprising input means for user messages and transmitter means for transmitting said user messages to said satellite, where said satellite comprises means for transmitting said user messages to said central unit, and said central unit comprises means for receiving said user message. Preferably, such user messages are automatically processed in said central unit. This preferred embodiment of the invention allows the use of feedback from the front at which the users of the addressed receiver units are located. For example, a thunderstorm progresses rapidly, the individuals in a certain sector are warned, the people in another sector are pre-warned, whereas the potentially also endangered inhabitants of a third sector are not pre-warned, because the thunderstorm is expected to pass the third sector without touching it. If now the users of receiver units are able to provide feedback about the track of the thunderstorm, the already issued pre-warning in one sector may be cancelled, while the third sector may be urgently warned. Here, the user of the receiver unit is part of the comprehensive danger information system. The user message input means may, in a simple version, only a pressing button. Upgraded versions of the receiver units may input means which allow the user of the receiver unit to dispatch more detailed messages; this may, for example, be a keyboard.

[0016] Preferably, the central unit of the warning system comprises means for processing said user messages in order to automatically produce new or upgraded warning signals. This is particularly possible with simple "yes/no" input means for the user of the receiver units, wherein "yes" may, for example, simply mean "yes, the thunderstorm has passed us".

[0017] In another embodiment of the invention the warning system comprises a plurality of designated response units having means for transmitting a pre-warning signal to said central unit, wherein said pre-warning signal includes a designated response unit individual code representing the location of said designated response unit. Therein, said central unit comprises means for receiving said pre-warning signals. The pre-warning signals are then, manually or automatically, processed and issued, if appropriate, as warning signals by the central unit. Such a preferred warning system offers the advantage of an early and exact location of dangers. This requires that each designated response unit is able to recognize specific dangers, for example a storm. In

the latter example, the response unit would have to have specific recognition means in order to recognize a storm of a certain magnitude. This information may be automatically transferred to the central unit, which may allow the manual or automatic evaluation of the information and the appropriate update of the warning signals. Therefore, the central unit of the warning system comprises means for processing said pre-warning signals, taking into account the location of said designated response units, in order to issue new or updated warning signals.

[0018] The present invention also provides a method for sending signals from a central unit to a plurality of receiver units via a satellite comprising the following steps: assigning a receiver unit specific code to each receiver unit, wherein said receiver unit specific code represents the location of the receiver unit; storing said receiver unit specific codes in said central unit; selectively addressing a plurality of said receiver units by selecting from said receiver unit specific codes in order to transmit said signals selectively to said plurality of receiver units from the central unit, wherein said signals are warning signals which represent information about a danger for individuals or property.

[0019] Furthermore, the present invention relates to a receiver unit for receiving signals being individualized by a receiver unit specific code and comprising receiving means for receiving signals from a satellite, processing means for processing said signals, display means for displaying a message derived from said signals, wherein said receiver unit specific code represents the location of the receiver unit. Preferably, this receiver unit comprises self-diagnostic means for running periodically a self-diagnostic test to secure the proper functioning of the receiver unit and notifying means for notifying a user of said receiver unit of the result of said self-diagnostic test.

[0020] Herewith, the present invention provides a warning system and a corresponding method for warning individuals in an early stage selectively as the situation requires and with a high likelihood of success. Such a system may be provided at low purchase cost and low running costs.

Claims

1. A warning system comprising a central unit, a satellite, and a plurality of receiver units, said central unit being able to send signals to said satellite, said satellite being able to transmit said signals to said receiver units,
characterized in that

each of said receiver units being individualized by means of a receiver unit specific code, wherein said receiver unit specific code represents the location of the receiver unit,

said central unit having means for storing said receiver unit specific codes and means for selectively addressing a plurality of said receiver units by selecting from said receiver unit specific codes in order to transmit said signals selectively to said plurality of receiver units, and said signals are warning signals which represent information about a danger for individuals or property.

2. A warning system according to claim 1, characterized in that said receiver units comprise receiving means for receiving said warning signals from said satellite, processing means for processing said warning signals and display means for displaying said warning signals.
3. A warning system according to claim 1 or 2, characterized in that said receiver units comprise self-diagnostic means for running periodically a self-diagnostic test to secure the proper functioning of the receiver unit and notifying means for notifying the user of the result of such self-diagnostic test.
4. A warning system according to any of the preceding claims, characterized in that said central unit comprises encryption means for encrypting said warning signals and in that said receiver units comprise decryption means for decrypting said encrypted warning signals.
5. A warning system according to any of the preceding claims, characterized in that said receiver units comprise input means for user messages and transmitter means for transmitting said user messages to said satellite, said satellite comprises means for transmitting said user messages to said central unit, and said central unit comprises means for receiving said user messages.
6. A warning system according to claim 5, characterized in that said central unit comprises means for processing said user messages in order to automatically produce new or updated warning signals.
7. A warning system according to any of the preceding claims, characterized in that said warning system comprises a plurality of designated response units having means for transmitting a pre-warning signal to said central unit, wherein said pre-warning signal includes a designated response unit individual code representing the location of said designated response unit, and in that said central unit comprises means for receiving said pre-warning signals.
8. A warning system according to claim 7, characterized in that said central unit comprises means for processing said pre-warning signals, taking into ac-

count the location of said designated response units, in order to issue new or updated warning signals.

9. A method for sending signals from a central unit to a plurality of receiver units via a satellite comprising the following steps:

assigning a receiver unit specific code to each receiver unit, wherein said receiver unit specific code represents the location of the receiver unit;

storing said receiver unit specific codes in said central unit;

selectively addressing a plurality of said receiver units by selecting from said receiver unit specific codes in order to transmit said signals selectively to said plurality of receiver units from the central unit, wherein said signals are warning signals which represent information about a danger for individuals or property.

10. A receiver unit for receiving signals being individualized by a receiver unit specific code and comprising receiving means for receiving signals from a satellite, processing means for processing said signals, display means for displaying a message derived from said signals, characterized in that said receiver unit specific code represents the location of the receiver unit.

11. A receiver unit according to claim 10, characterized in that it comprises self-diagnostic means for running periodically a self-diagnostic test to secure the proper functioning of the receiver unit and notifying means for notifying a user of said receiver unit of the result of said self-diagnostic test.



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 11 8053

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.7)
Y	US 5 121 430 A (FESSLER MICHAEL A ET AL) 9 June 1992 (1992-06-09) * the whole document *	1-3,5, 9-11	G08B27/00
Y	US 5 628 050 A (MCGRAW THOMAS F ET AL) 6 May 1997 (1997-05-06) * the whole document *	1-3,5, 9-11	
A	EP 0 738 992 A (NIPPON ELECTRIC CO) 23 October 1996 (1996-10-23) * the whole document *	4	
A	US 5 278 539 A (LAUTERBACH LYN ET AL) 11 January 1994 (1994-01-11) * the whole document *	1,9,10	
A	US 3 848 193 A (JONES C ET AL) 12 November 1974 (1974-11-12) * the whole document *	1,9,10	
A	WO 95 08243 A (METEOMEDIA INC ;MACKINNON RUSSELL D N (CA); BOULANGER JEAN PIERRE) 23 March 1995 (1995-03-23) * the whole document *	1,9,10	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G08B
A	US 4 956 875 A (BERNARD WILLIAM B ET AL) 11 September 1990 (1990-09-11) * the whole document *	1,9,10	
A	PATENT ABSTRACTS OF JAPAN vol. 016, no. 535 (E-1288), 5 November 1992 (1992-11-05) & JP 04 199922 A (KOKUSAI ELECTRIC CO LTD), 21 July 1992 (1992-07-21) * abstract *	3	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 1 February 2000	Examiner Kelperis, K
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			

EPO FORM 1503 03/82 (P04C01)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 11 8053

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.7)
A	US 5 504 476 A (MARRS MICHAEL R ET AL) 2 April 1996 (1996-04-02) * the whole document * -----	1,9,10	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 1 February 2000	Examiner Kelperis, K
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			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 11 8053

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

01-02-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5121430 A	09-06-1992	AU 654703 B	17-11-1994
		AU 1444692 A	15-09-1992
		WO 9215160 A	03-09-1992
US 5628050 A	06-05-1997	NONE	
EP 0738992 A	23-10-1996	JP 2772252 B	02-07-1998
		JP 8294150 A	05-11-1996
		AU 697135 B	24-09-1998
		AU 5076296 A	31-10-1996
		CA 2174300 A	21-10-1996
		US 5729610 A	17-03-1998
US 5278539 A	11-01-1994	NONE	
US 3848193 A	12-11-1974	NONE	
WO 9508243 A	23-03-1995	CA 2106223 A	16-03-1995
		AU 7649694 A	03-04-1995
US 4956875 A	11-09-1990	NONE	
JP 04199922 A	21-07-1992	NONE	
US 5504476 A	02-04-1996	CA 2196083 A	08-02-1996
		CN 1157047 A	13-08-1997
		EP 0772848 A	14-05-1997
		SG 42763 A	17-10-1997
		WO 9603724 A	08-02-1996