

(43) Date of A Publication 11.01.1995

(21) Application No 9313811.3	(51) INT CL ⁶ G01S 5/02
(22) Date of Filing 03.07.1993	(52) UK CL (Edition N) H4D DPX D267 D268 D34X D349 D467 D536 D56X D66X
(71) Applicant(s) Hugh Malcolm Ian Bell 4 Reidon Hill, BISLEY, Surrey, GU21 2SQ, United Kingdom	(56) Documents Cited GB 2221113 A EP 0418181 A EP 0242099 A US 5021794 A US 4596988 A
(72) Inventor(s) Hugh Malcolm Ian Bell	(58) Field of Search INT CL ⁵ G01S ONLINE DATABASES: EDOC,WPI.
(74) Agent and/or Address for Service Hugh Malcolm Ian Bell 4 Reidon Hill, BISLEY, Surrey, GU21 2SQ, United Kingdom	

(54) Stolen property location system

(57) A stolen property location system which uses a network of transceivers or receivers 2 to receive signals from a transceiver 3 located on stolen property. The transceiver on the stolen property is activated by local or national radio stations or by the transceivers 2 using coded signals. The signal received by the network of transceivers or receivers is sent to a central computer for processing using public telephone systems provided by licensed carriers. The use of the network in conjunction with public telephone systems increases the area of detection of the transceivers located on the stolen property in relation to their signal power output, reducing their relative size, cost and power consumption. The receivers or transceivers 2 may be fixed or mobile, and may be capable of direction-finding or ranging to provide accurate location; alternatively, an approximate location is given by determining which receiver or transceiver 2 receives the signal from transceiver 3.

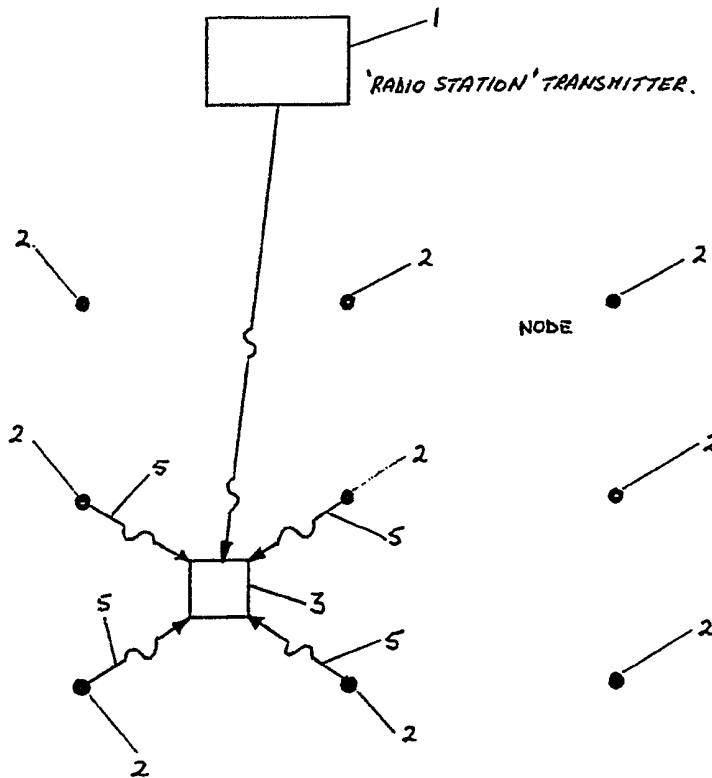


FIGURE 1.

GB 2 279 840 A

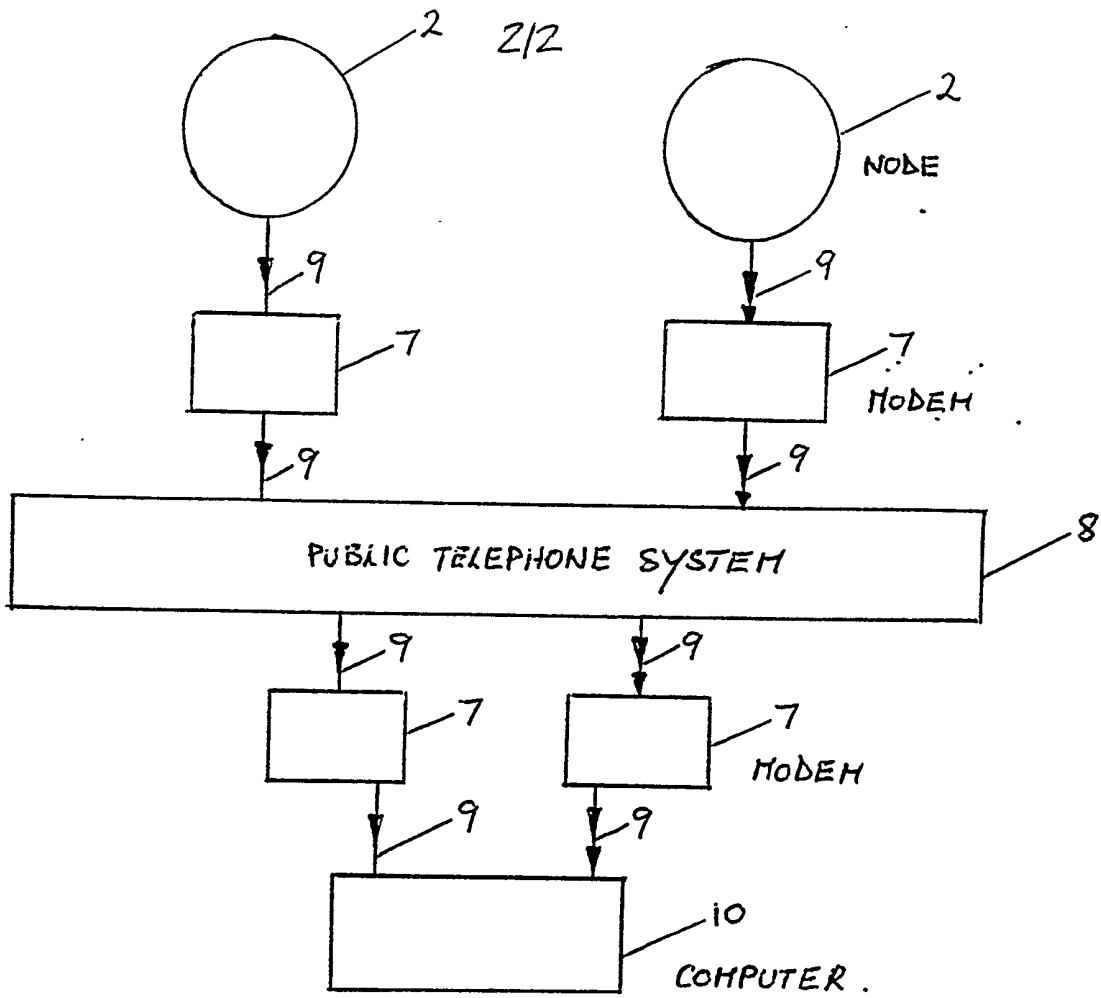


FIGURE 3.

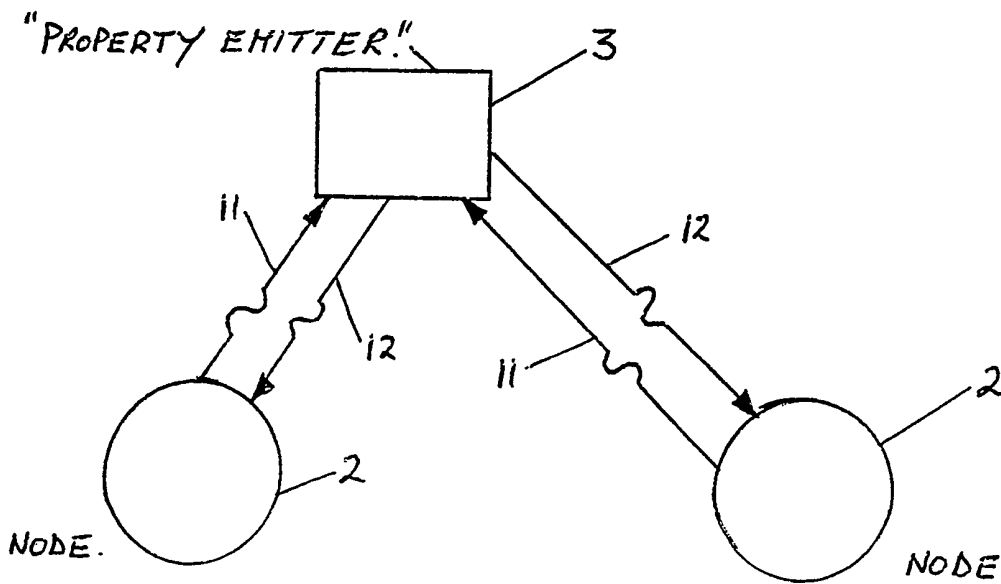


FIGURE 4

DESCRIPTION

STOLEN PROPERTY LOCATION SYSTEM

This invention relates to a system for the location of property using radio, telephony and computer technologies.

The location of lost or stolen property is of major concern to the authorities, insurance companies and commerce.

Although devices, radio transceivers and transmitters are fitted to property to aid location and recovery, there are a number of inherent difficulties that prevent widespread general use. The output signal power of these devices dictates the area over which they are effective. The greater the area of required effectiveness the greater the signal power output must be and in consequence the larger and more expensive the devices become. Problems of concealment and compliance with statutory regulations also cause difficulties the larger and more powerful the devices become. National and International location of property in general becomes commercially and technically impractical.

According to the present invention the distances over which radio transmission is necessary to aid the location of property over a wide area can be reduced. This is achieved by using a network of individual radio devices hereafter called 'nodes' that receive radio signal information emanating from a radio signalling device connected to the property to be located, and sending location information to a central computer for processing by telephonic means, including the use of licensed public carriers systems.

The nodes which are not necessarily symmetrically located throughout an area may be receivers to collect information or transceivers to enable the radio signalling device connected to "the property to be located", to be activated and or interrogated remotely. Nodes may incorporate a feature to enable the distance and direction from them and the signalling device connected to "the property to be located", to be determined. The signalling device connected to "the property to be located", hereafter referred to as the 'property emitter', is a transceiver and activated to transmit by means of either a transmitter external to the network of nodes or by one or more nodes, or both.

The nodes may be mobile and the information obtained by them conveyed by any licensed public carriers system to the central computer. The location of each fixed node is known on installation by satellite navigation or grid reference as is that of the mobile nodes.

The central computer contains node location information and when any node receives a signal from a 'property emitter' it 'dials' the computer via a public telephone system and provides the node identity code and any information it has received by interrogating the 'property emitter'.

An approximate location of the 'property emitter' is then given by the computer and if necessary the exact location is determined by a proximity search using directional radio receivers tuned to a 'property emitter'.

Regional computers may be used for intermediate collection and processing of node data prior to it being conveyed to the central computer.

The 'property emitter' for each property may or may not be identical in terms of design and transmission characteristics or some may have identifying characteristics and some may not.

'Property emitters' may or may not be capable of being de-activated via the nodes or internal transmitter or self de-activating and in accordance re-activating with a time schedule.

Each 'property emitter' will have its own radio activation code and they may or may not have individual de-activation codes.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying block diagrams. (Figures 1, 2, 3 and 4).

Figure 1 shows the following:-

- i) A transceiver 3 which is with the property to be located, the 'property emitter' situation within a network of transceivers or receivers 2, the 'nodes'.

- ii) Two alternative methods of activating 3 and enabling it to transmit a signal.

Firstly by transmitting a signal 4 from an external transmitter 1 and secondly by transmitting a signal 5 from one or more of the network of transceivers 2 if transceivers are used instead of receivers.

Figure 2 Shows the transceiver 3, 'property emitter' transmitting a signal 6.

The figure 2 also shows the signal 6 in this case being received by two of the network transceivers or receivers 2, nodes, although one or more of 2 may receive the signal and the information collated.

Figure 3 Shows two of the network of transceivers or receivers 2 sending information by means of cable and modems via a licensed public exchange carrier 8 to the central computer 10 for processing.

Figure 4 Shows two of the network transceivers 2 sending signals 11 to a transceiver 3 and receiving signals 12 from that transceiver 3.

From the transmission time of the signals 11 and 12 and knowing the time to process each signal by 3 and 2 the distance of 3 from each transceiver 2 is determined. This distance information together with the relative and absolute location of both transceivers 2 allows the location of 3 to be calculated.

A quantity of goods is stolen. One of the items of property was previously fitted with a 'property emitter' ref Figure 1 number 3. The stolen property is conveyed a substantial distance from the theft location.

The activation code of the 'property emitter' 3 is previously recorded and transmitted along with those of other 'property emitters' connected to stolen property, by an external transmitter 1 possibly operated by a radio station with national or local coverage.

The 'property emitter' will transmit 6 at known periodic times and intervals and if it passes within the reception range of any node 2, they will pass information to the central computer 10. This information will be sent to the central computer 10 using modems 7, cables and the telephonic transmission system 8 of a licensed public carrier.

If the 'property emitter' is mobile and its direction of travel is known from information received from the nodes 2 interrogation and instructions to modify its transmission schedule may be done using the nodes within its range.

CLAIMS

- 1 A stolen property location system comprising a transceiver connected to the property and a network of individual transceivers or receivers that collect information and send it using public telephone systems to a computer for processing.
- 2 A stolen property location system as claimed in Claim 1 wherein transceivers connected to the property to be located are activated using a national or local radio station transmitter, or a network of transceivers.
- 3 A stolen property location system as claimed in Claim 1 or Claim 2 that uses public telephone systems to reduce the transmission range of radio devices attached to property for the purpose of determining the location of that property.
- 4 A stolen property location system that uses a network of individual transceivers or receivers connected to a public telephone system for the transmission or collection of information or data.
- 5 A stolen property location system as claimed in Claim 1 that uses a computer to process information in order to establish the location of property.
- 6 A stolen property location system as claimed in Claim 1 that uses two or more individual transceivers or receivers in a network of transceivers or receivers to collect information from those transceivers or receivers which allows the combined information collected to more accurately determine the location of the transceiver connected to the property to be located.
- 7 A stolen property location system as claimed in Claim 1 that uses mobile transceivers or receivers to come within the transmission range of a radio emitting device connected to an item of property in order to aid the determination of its location.
- 8 A stolen property location system substantially as described herein with reference to Figures 1 - 4 of the accompanying block diagrams.

Patents Act 1977
 Examiner's report to the Comptroller under
 Section 17 (The Search Report)

Application number

GB 9313811.3

-6-

Relevant Technical fields

- (i) UK CI (Edition)
- (ii) Int CI (Edition 5) G01S

Search Examiner

DR E P PLUMMER

Databases (see over)

- (i) UK Patent Office
- (ii) ONLINE DATABASES: EDOC, WPI

Date of Search

10 SEPTEMBER 1993

Documents considered relevant following a search in respect of claims

ALL

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X Y	GB 2221113 A (BROWN) whole document	1-6, 7
X Y	EP 0418181 A (TELECOM SYSTEMES MOBILES) whole document	1, 3-6, 7
X Y	EP 0242099 A (ADVANCED STRATEGICS) whole document	1-6, 7
Y	US 5021794 (LAWRENCE) for example column 3 lines 11-57	7
X Y	US 4596988 (WANKA) for example Figure 1, abstract, column 2 lines 36-68	1, 3-6, 7



Category	Identity of document and relevant passages -7-	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).