PATENTS ACT 1977

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"A location tracking system"

THIS INVENTION relates to a location tracking system and more particularly to a location tracking system for identifying and locating the position of a transmitter within a telecommunications infrastructure.

Popular methods of tracking articles include using the global positioning satellite system (GPS) and using transmitters on objects to be tracked which transmit a beacon signal. Such systems require a dedicated and hence expensive system to communicate the location information back to a monitoring facility.

The present invention seeks to overcome the above mentioned problem.

Accordingly, the invention provides a location tracking system comprising: a location transmitter for transmitting an identification signal; a plurality of cells defining a network of communication cells; a reference unit for receiving information from the cells including the identity of the or each cell and the identity of the or each location transmitter from which the or each cell has received an identification signal; and a location monitor to identify which cell is receiving or has received an identification signal from a location transmitter to establish the physical location of that location transmitter in that network.

In order that the present invention may be more readily understood, an embodiment thereof will now be described, by way of example, with reference to the

accompanying figure which is a schematic representation of a location tracking system embodying the present invention.

A location tracking system embodying the invention comprises the following main components: a location transmitter; a cell base station; and a reference unit.

The cell base station includes a receiver for receiving signals transmitted by location transmitters within a cell. A plurality of such cells form a network and preferably comprise the cells and network of an existing cellular wireless telecommunication infrastructure. Thus, as well as receiving information transmitted by the location transmitters, the cell base stations are also capable of receiving from and transmitting to cellular telephones within that cell.

Each location transmitter transmits registration or identification information to the cell base station of the cell in which the location transmitter is physically located.

The cellular telecommunication infrastructure also includes the reference unit which receives information from all the cell base stations in the network. Each cell base station provides the reference unit with information regarding the identification information being received by that cell base station from location transmitters. This information is stored in the reference unit and is used to identify the location transmitters and identify in which cell each location transmitter is physically located.

A location monitor is also provided to interrogate the reference unit in order to monitor the location of a particular location transmitter. The location monitor

allows a user to identify in which cell of a cellular telecommunication infrastructure a particular location transmitter is located at any one time. The physical location of the location transmitter can be derived from a look-up table/library or the like which provides a corresponding physical location to the identity of a cell base station.

Once the location of the location transmitter has been established, this information can be sent to the location transmitter so that the mobile user is informed of his location. This is achieved by capturing the identity of the cell base station to which the location transmitter is transmitting and transmitting this information back to the location transmitter.

The location tracking system enables the use of an existing cellular wireless telecommunication infrastructure to locate a user to within the accuracy of the size of a cell and to provide the location information to a monitoring facility and/or back to the location transmitter.

The location transmitter may be fixed to a mobile object to be tracked and preferably sends identification information periodically to the respective cell base station. The reference unit is regularly updated with information from the cell base stations.

The location transmitter is preferably a portable or mobile terminal of an existing cellular telecommunication system. At a minimum, the location transmitter will comprise those components of a portable or mobile telephone which allow a user to register with a cell

base station. Preferably, the location transmitter is carried about the person of mobile user.

The location transmitter is envisaged to include means for transmitting status information to the reference unit and location monitor. The status information would include, for example, messages such as notifying the reference unit of any vehicle breakdown or other user activated signals such as "mission accomplished".

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CLAIMS:

1. A location tracking system comprising: a location transmitter for transmitting an identification signal; a plurality of cells defining a network of communication cells; a reference unit for receiving information from the cells including the identity of the or each cell and the identity of the or each location transmitter from which the or each cell has received an identification signal; and a location monitor to identify which cell is receiving or has received an identification signal from a location transmitter to establish the physical location of that location transmitter in that network.

2. A location tracking system according to Claim 1, wherein the location monitor is provided with a look-up table having information concerning the physical location of the cells in the network.

3. A location tracking system according to any preceding claim, wherein the location transmitter transmits the identification signal periodically.

4. A location tracking system according to any preceding claim, wherein information concerning the physical location of that location transmitter is transmitted back to that location transmitter.

5. A location tracking system according to any preceding claim, wherein the location transmitter is operable to transmit status information to the or each cell.

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6. A location tracking system substantially as hereinbefore described with reference to and as shown in the accompanying Figure.