



[54] NAVIGATION SYSTEM ALLOWING REAL-TIME COORDINATION OF THE DISPLACEMENT OF MOBILES TRAVELLING OUT OF DIRECT LINE OF SIGHT

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[51] Int. Cl.⁶ G01S 3/02

[52] U.S. Cl. 342/457

[58] Field of Search 342/357, 457

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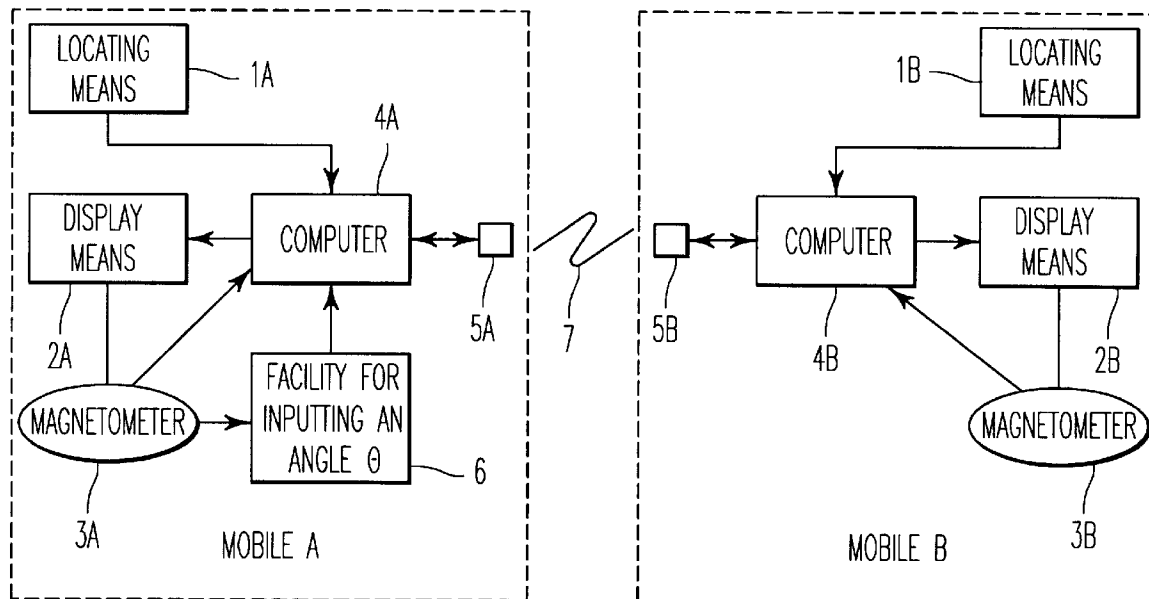
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[57] ABSTRACT

A navigation system having a terminal provided at each mobile station. Each terminal includes a locator for locating a mobile station, a display for displaying its travel relative to the reference direction, an indicator to indicate a common reference direction to both mobile stations with the indicator being coupled to the display, a travel data communicator and a processor to process data from the indicator, the locator and the communicator and display it on the display. At least one of the two mobile stations further includes a display for displaying the travel of the second mobile station relative to the first and an input unit for inputting a predetermined angle for defining how the direction of travel of the second mobile station should be corrected relative to the new direction of travel of the first mobile station. The correction is transmitted to the second mobile station by the travel data communicator of the first and second mobile stations.

20 Claims, 3 Drawing Sheets



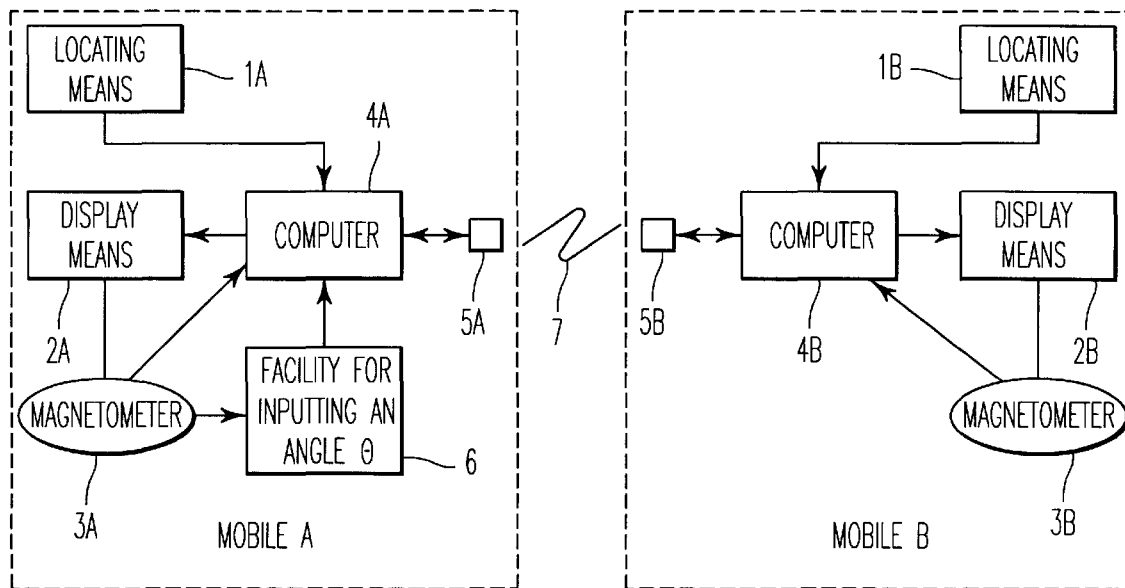


FIG. 1

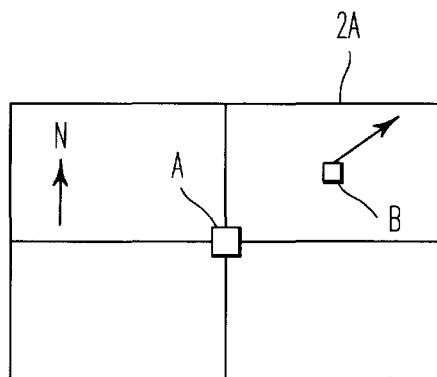


FIG. 2

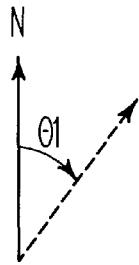


FIG. 3

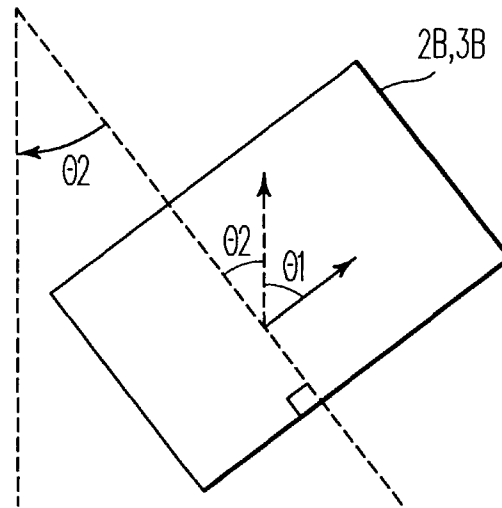


FIG. 4

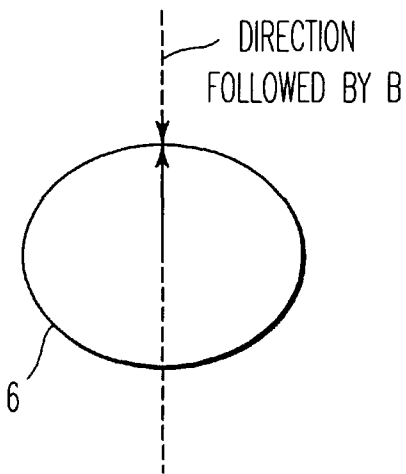


FIG. 5a

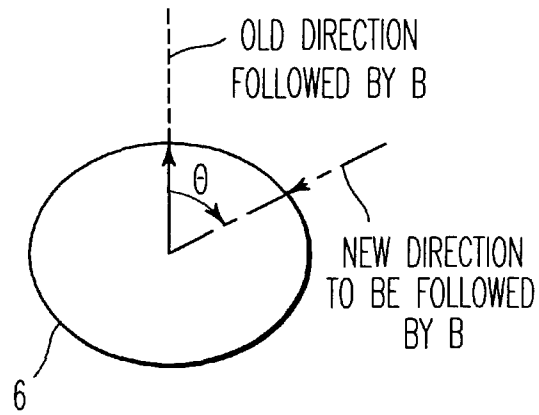


FIG. 5b

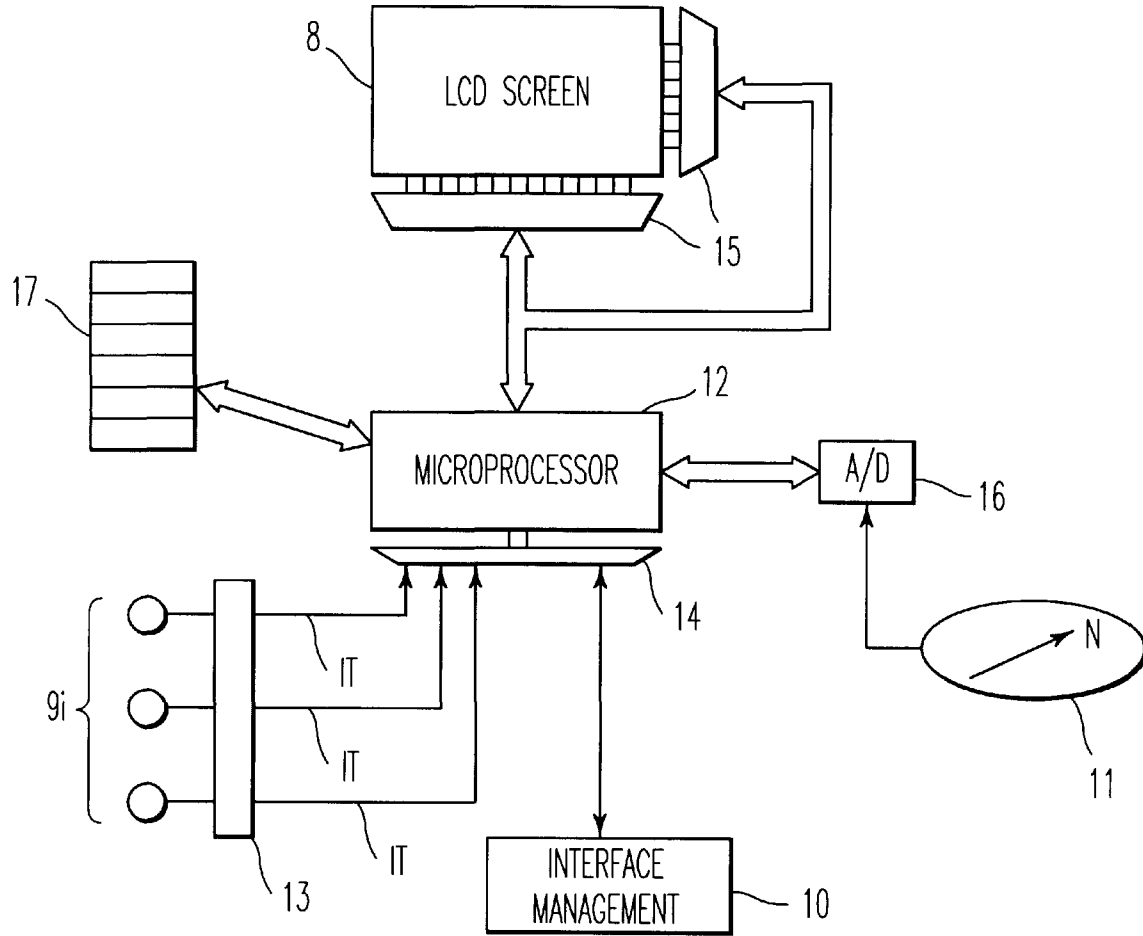


FIG. 6

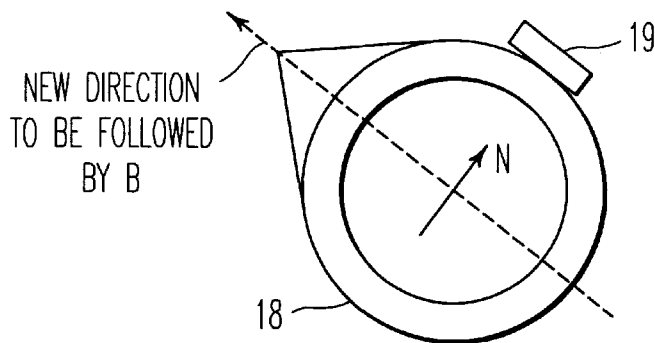


FIG. 7

NAVIGATION SYSTEM ALLOWING REAL-TIME COORDINATION OF THE DISPLACEMENT OF MOBILES TRAVELLING OUT OF DIRECT LINE OF SIGHT

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a navigation system allowing real-time coordination of the displacement of at least two mobiles travelling out of direct line of sight. A first mobile regularly indicates to a second distant mobile the new direction of progress to be followed, and does so without using any visible or audible transmission system.

The present invention applies more particularly to the context of an infantry combatant on the battle field. It enables, for example, a group leader, continuously aware of the position of the members of the combat group, to coordinate their displacement as a function of his own displacement.

2. Discussion of the Background

Known systems currently use either means of direct voice transmission, radio means for example, or visual means, via gestures, sets of lights, smoke signals, flags, etc.

These various means are not, on the one hand, completely stealthy, and on the other hand, may quickly run into difficulty on account of the relief of the terrain and/or the meteorological conditions.

SUMMARY OF THE INVENTION

The objective of the present invention is to alleviate the aforesaid drawbacks.

To this end, the subject of the invention is a navigation system allowing real-time coordination of the displacement of at least two distant mobiles travelling out of direct line of sight, characterized in that it includes a terminal arranged on each mobile respectively, each terminal including:

- a means of location of the mobile,
 - a means of display of its progress with respect to a common reference direction,
 - a means which indicates to the two mobiles a common reference direction and is coupled to the display means,
 - a means of communication of progress data, and
 - a means of processing the information delivered by the means which indicates to the two mobiles the common reference direction, the locating means and the communication means so as to display them on the display means, and in that at least one of the two mobiles furthermore includes:
 - a means of display of the progress of the second mobile with respect thereto, and
 - a facility for inputting a specified angle defining the correction to be made to the direction of progress of the second mobile with respect to the new progress of the first mobile, this correction being transmitted to the second mobile by way of the communication means respective to the first and second mobiles.
- The system according to the invention has the advantage of combining easily implemented means of location, communication and display, and furnishes a navigation system whose man/machine interface is ergonomic and user-friendly, and especially well suited to the context in which the mobiles are pedestrians.

BRIEF DESCRIPTION OF THE DRAWINGS

Other advantages and characteristics of the present invention will emerge more clearly on reading the description which follows and the appended figures which represent:

FIG. 1, a functional diagram of the navigation system according to the invention,

FIG. 2, an example of display, by the mobile A, of its means of display of the system according to the invention,

FIG. 3, an example of display, by the mobile B, of its means of display of the system according to the invention,

FIG. 4, an example of orientation of the means of display of the mobile A with respect to North and to the new direction of progress of the mobile B.

FIGS. 5a and 5b, the illustration of the method used by the mobile A to input the new direction to be followed by the mobile B,

FIG. 6, an architecture of a wrist terminal according to the invention, borne by the mobile A, and

FIG. 7, an illustration of the input of a new angle of orientation on the wrist terminal of the mobile A.

DISCUSSION OF THE PREFERRED EMBODIMENTS

A functional diagram of a system according to the invention is illustrated diagrammatically in FIG. 1.

The system according to the invention includes, arranged on the mobile A and the mobile B respectively:

- a means of location, 1A, 1B,
- a means of display 2A, 2B,
- a means, for example a magnetometer, 3A, 3B indicating to the two mobiles A and B a common reference direction, for example North, and which is coupled to the means of display 2A, 2B,
- a computer 4A, 4B receiving the information output by the means of location 1A, 1B and by the magnetometer 3A, 3B, and
- a means of communication 5A, 5B of the data exchanged between mobiles A and B, which is coupled to the computer 4A, 4B.

One of the two mobiles, for example A, regarded as the leader of the combat group in respect of a combatant application, furthermore includes a facility 6 for inputting an angle θ , receiving the information output by the magnetometer 3A. The angle θ defines the correction to be made to the direction of progress of the mobile B so as to align with that imposed by A.

The system according to the invention can use various transmission media 7 for exchanging mobiles position and progress information such as for example hertzian, infrared, ultrasound transmission, etc.

FIG. 2 illustrates an example of what the mobile A displays on the screen of its display means 2A. This screen is in this example of rectangular shape and quadrilled to form four identical rectangles. The centre of the screen displays the position of the mobile A, the upper right rectangle displays the position of the mobile B with respect to A as well as its progress depicted by an arrow, obtained on the basis of the last position received, of the speed or of the last progress indication received by B at the time of its confirmation by B. The upper left rectangle displays the direction of North.

As illustrated by FIG. 3, the mobile B displays on its display means 2B an arrow shown dashed in the figure,

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