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# United States Patent [19]

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Norris

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- [54] **GPS RELATIVE POSITION DETECTION SYSTEM**
- [75] Inventor: **Elwood G. Norris, Poway, Calif.**
- [73] Assignee: **American Technology Corporation, Poway, Calif.**
- [21] Appl. No.: **542,799**
- [22] Filed: **Oct. 13, 1995**

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- A Sampling Of Global Positioning System Receivers by Don Herskovitz.
- How Mobile Computers Can Help You Find Yourself by Gerald Houston.
- This 'Remote' Shows Its Users Exactly Where Here Is by Liz Mullen.
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- United States Securities And Exchange Commission Form 10-K FRO Trimble Navigational Limited.

### Related U.S. Application Data

- [63] Continuation-in-part of Ser. No. 377,973, Jan. 25, 1995, Pat. No. 5,689,269.
- [51] Int. Cl.<sup>6</sup> ..... **H04B 7/185; G01S 5/02**
- [52] U.S. Cl. .... **342/357; 342/419**
- [58] Field of Search ..... **342/357, 419; 455/12.1**

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*Attorney, Agent, or Firm*—Thorpe, North & Western, LLP

### [57] ABSTRACT

A system of GPS devices which receive civilian GPS signals and provide an intuitive graphical interface for displaying the relative position of GPS devices in relation to each other, the relative position being accurate to several meters and defined as the distance to, direction of and height variance between GPS devices. A first GPS device with the person or object to be located transmits its GPS determined location to a second GPS device. This second GPS device includes a means for receiving the GPS determined position of the first GPS device, and also includes means for calculating the relative position of the first GPS device relative to the second GPS device based on a comparison of the received telemetry of the first GPS device and its own GPS determined position. The relative position of the first device is then graphically displayed on an interface of the second GPS device in a manner which eliminates the need for a map in order to travel to the location of the first GPS device. While providing an interface which displays a relative position of the first GPS device, this information remains accurate no matter how the orientation of the second GPS device changes with respect to a compass.

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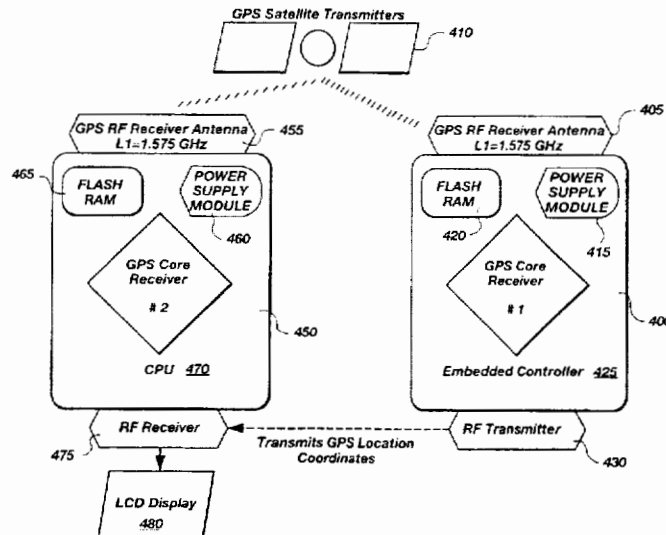
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**13 Claims, 8 Drawing Sheets**



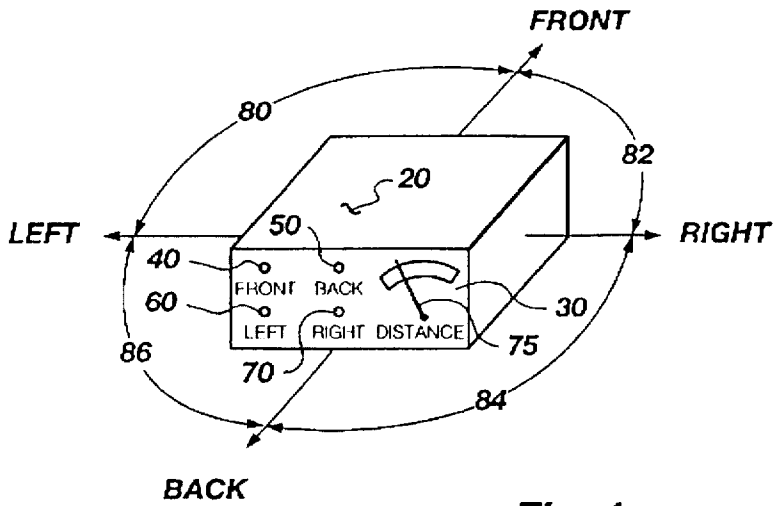


Fig. 1  
(PRIOR ART)

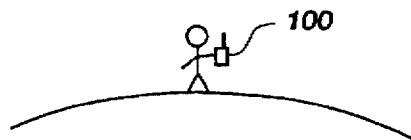
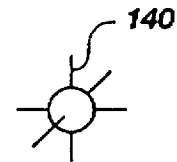
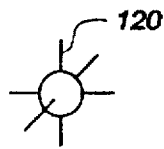
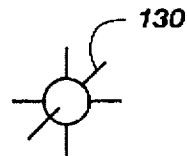
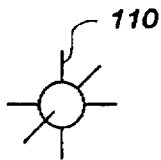
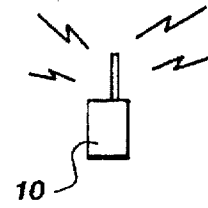


Fig. 2A

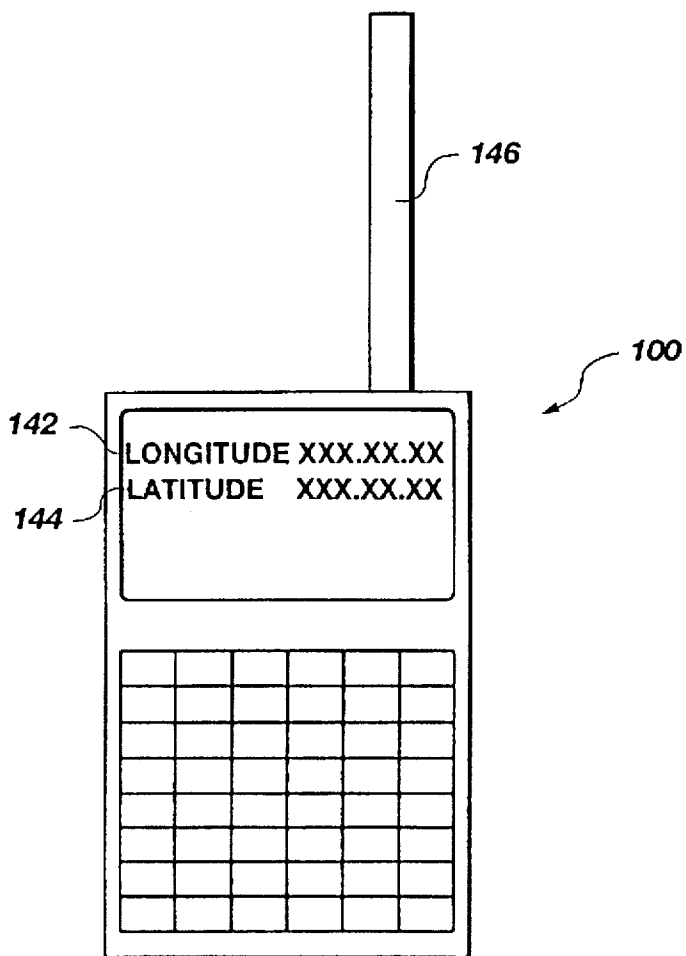


Fig. 2B

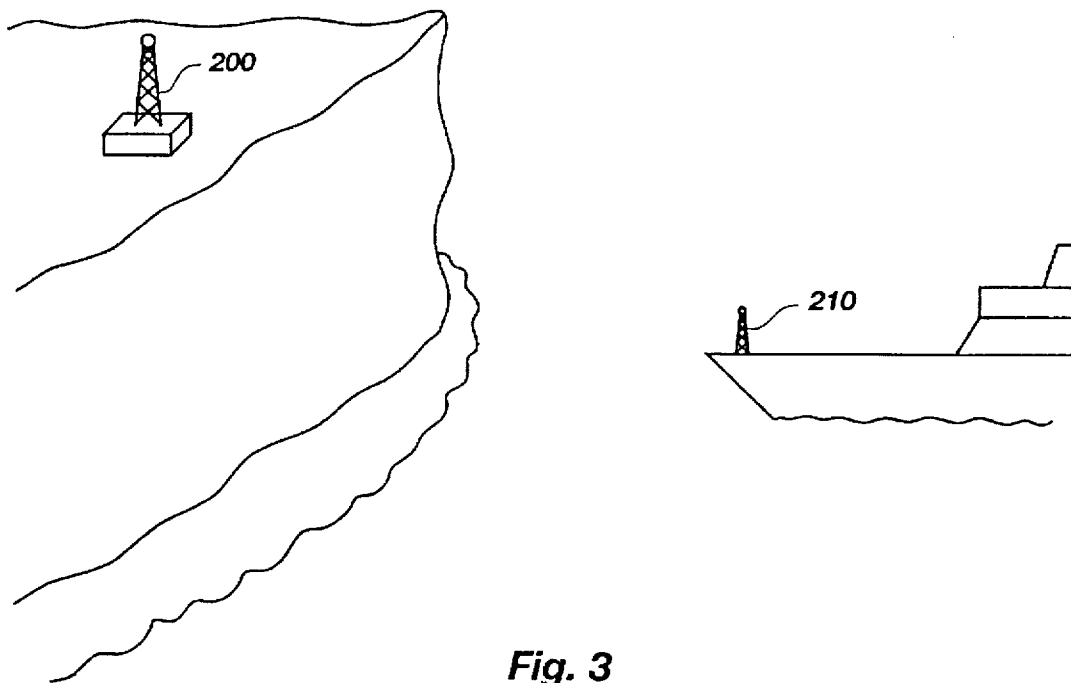


Fig. 3

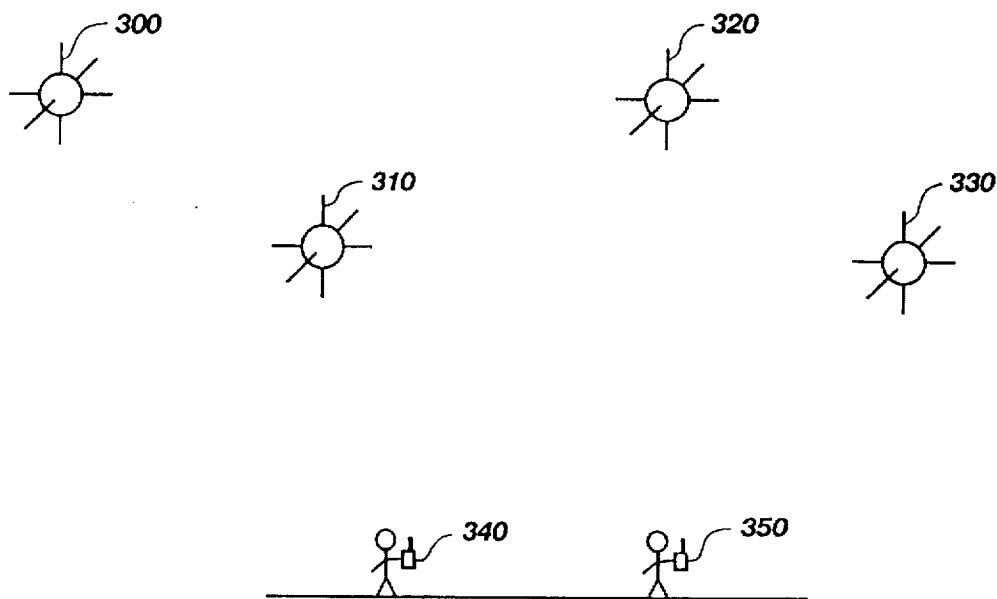


Fig. 4

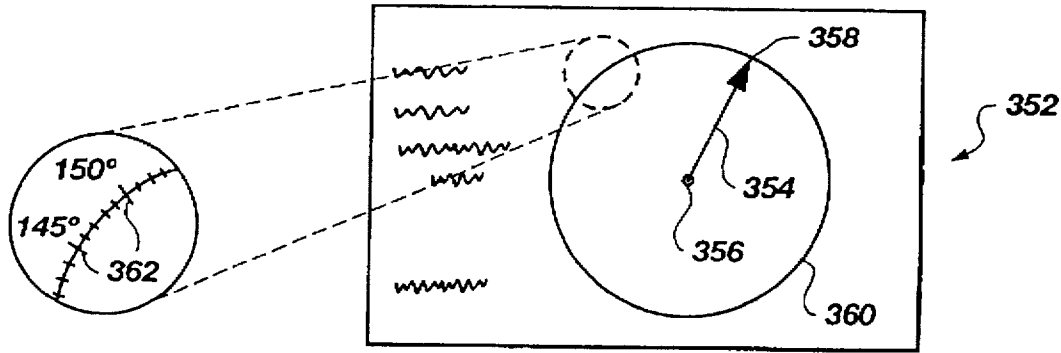


Fig. 5B

Fig. 5A

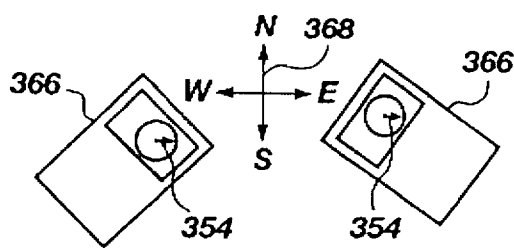


Fig. 5C

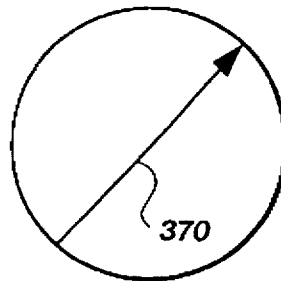


Fig. 5D

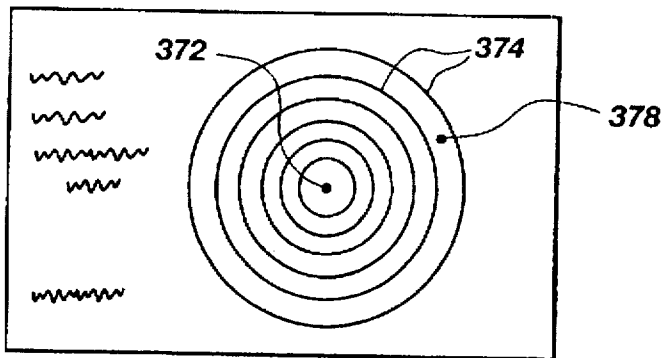


Fig. 6

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