

United States Patent [19]

Will

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[54] PERSONAL PAGING, COMMUNICATIONS, AND LOCATING SYSTEM

[76] Inventor: **Craig A. Will**, 37675 Fremont Blvd.
No. 23, Fremont, Calif. 94536

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[51] Int. Cl.⁶ H04L 1/18

[52] U.S. Cl. 371/33

[58] Field of Search 371/32, 33; 455/54.1,
455/53.1, 89; 379/56, 57

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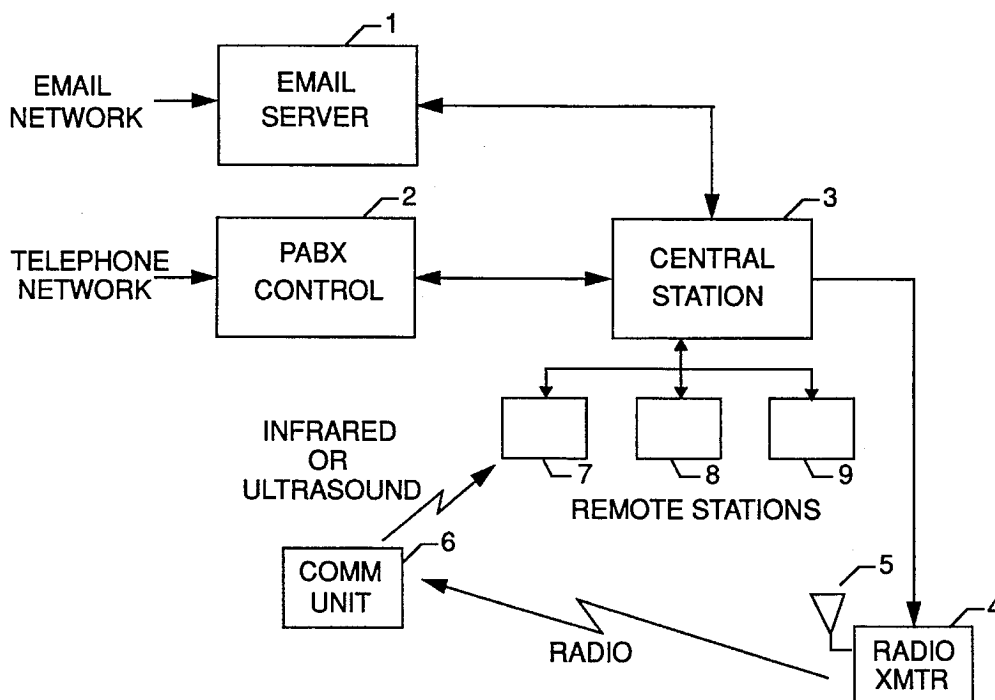
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Primary Examiner—Stephen M. Baker

[57] ABSTRACT

A method and apparatus for sending paging signals and messages to individuals within a building and accepting responses to the messages. Messages may be initiated by electronic mail, incoming telephone calls, incoming Fax messages, or other sources. Data is sent via radio to a communications unit carried by the individual and displayed visually together with possible responses. Each unit transmits its identity and responses or original messages when desired via coded infrared light (or, in an alternative embodiment, ultrasound) to one or more remote stations located in rooms or along corridors of the building. A remote station relays data to a central station via wire or optical fiber, which tracks the location of units and delivers messages. Communication units are clipped to the clothing of users and can be incorporated into a corporate employee identification badge. The hybrid radio-infrared light approach combines the broad, reliable characteristics of radio communication with the ability of infrared light to allow each unit to be located. This allows highly reliable delivery of messages via an acknowledgement and retransmission protocol, two-way communication with the individual, and capabilities (such as those for transferring incoming telephone calls) that require the location of the individual to be known.

25 Claims, 26 Drawing Sheets



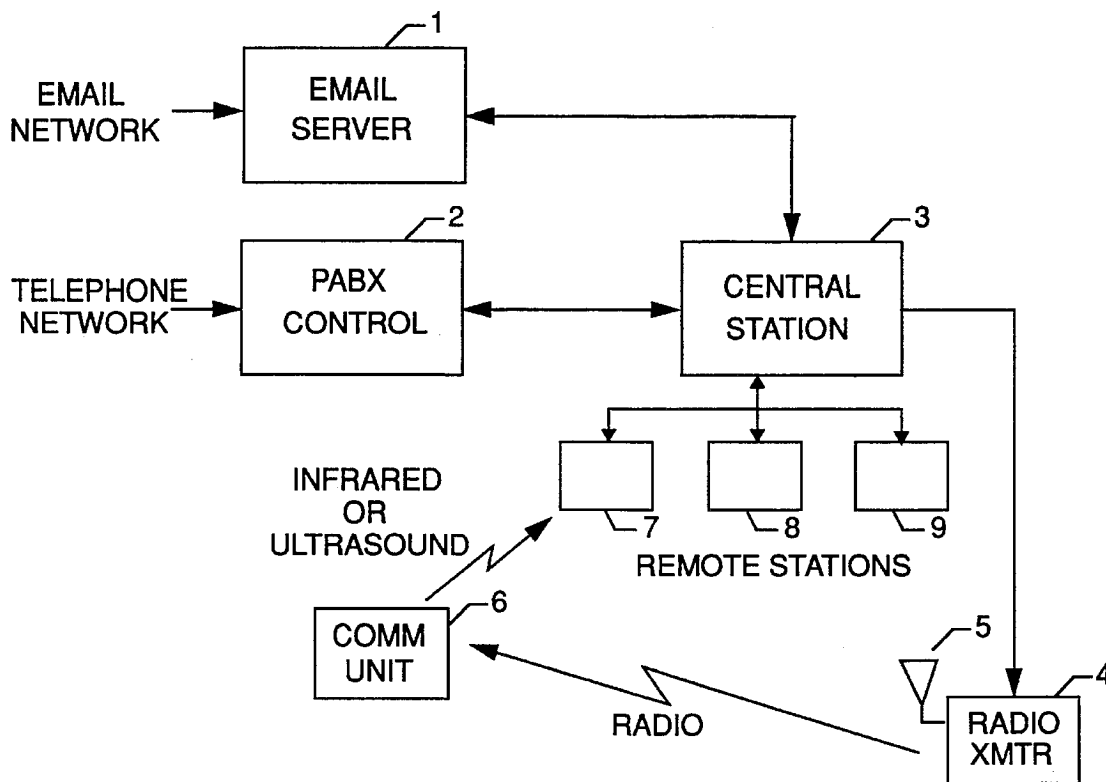


FIG. 1

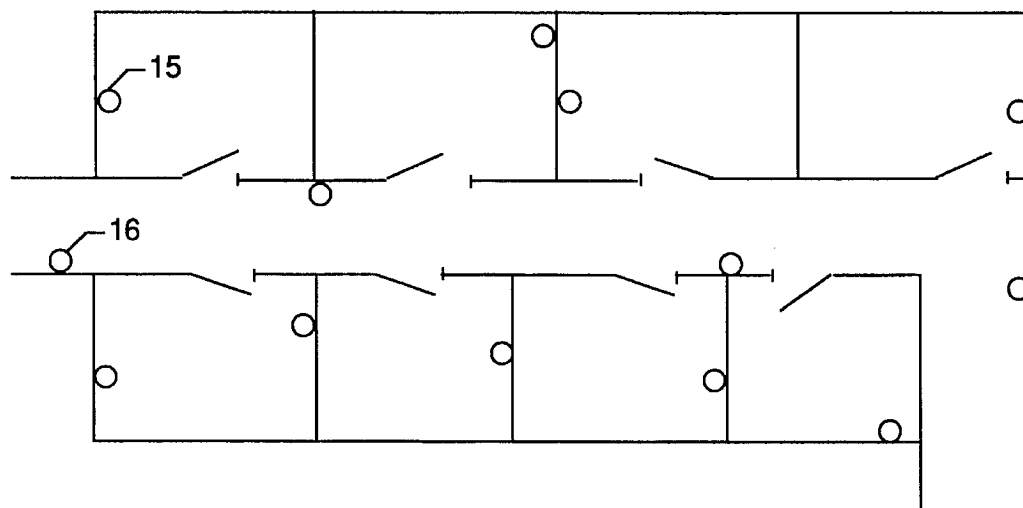


FIG. 2

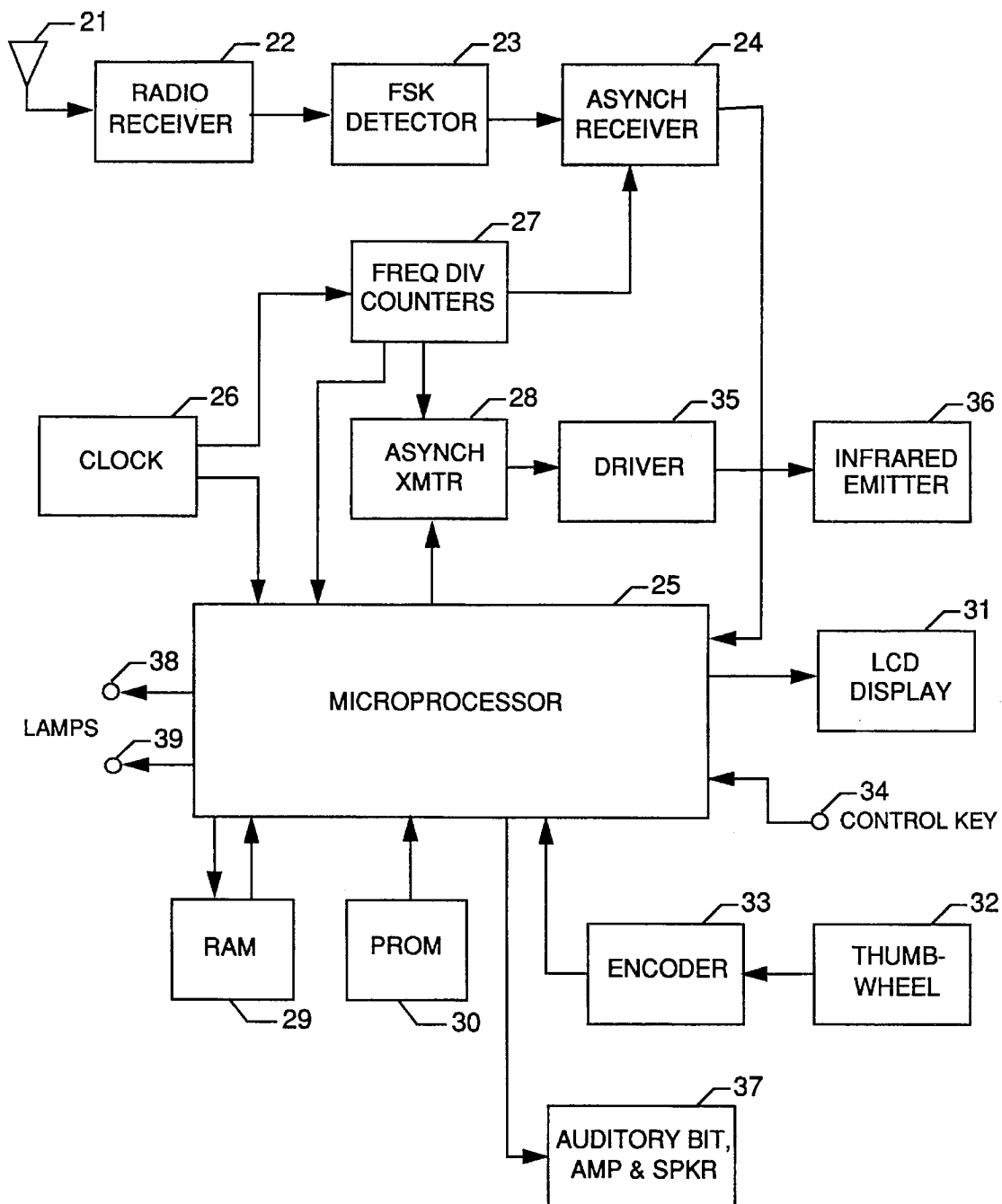


FIG. 3

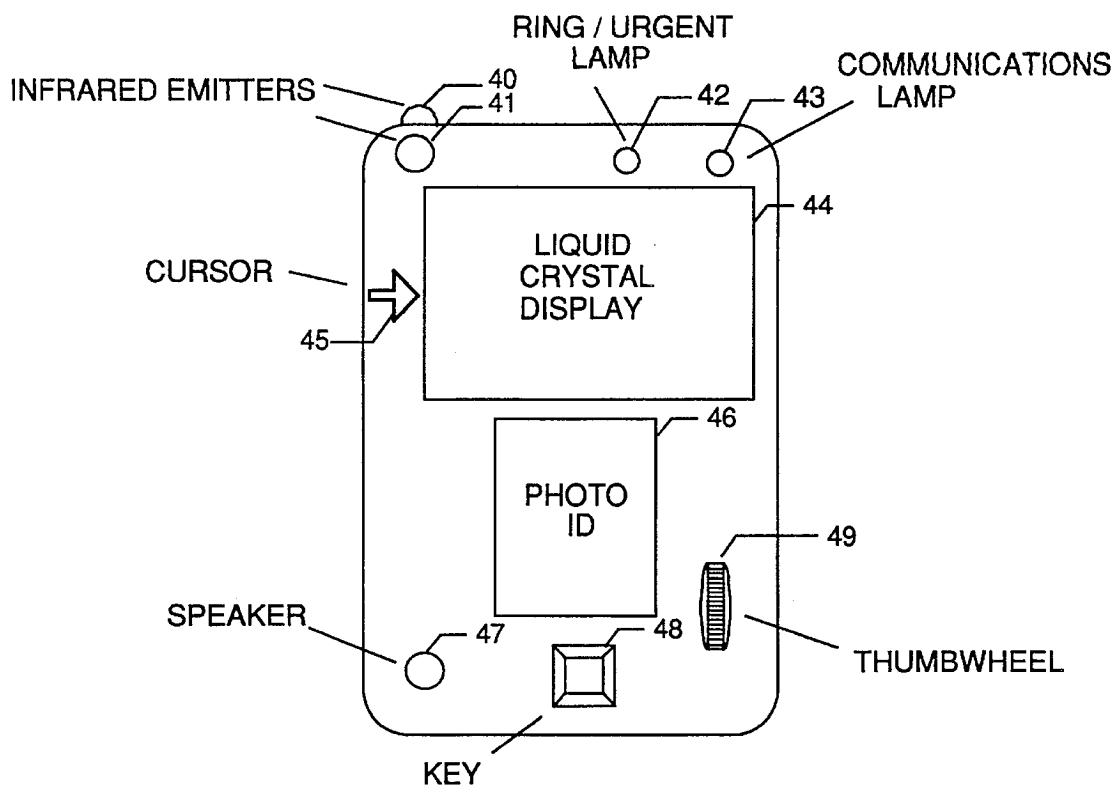


FIG. 4

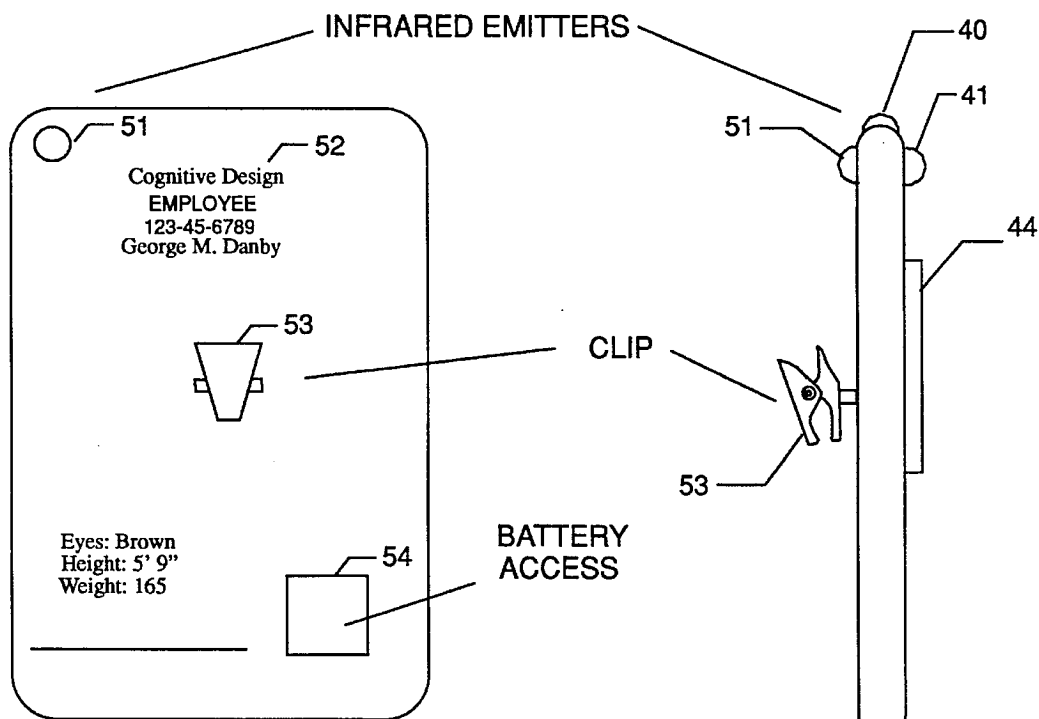
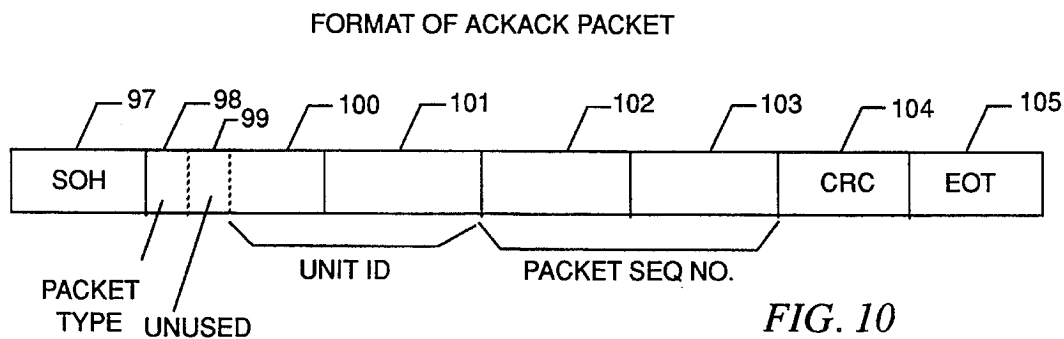
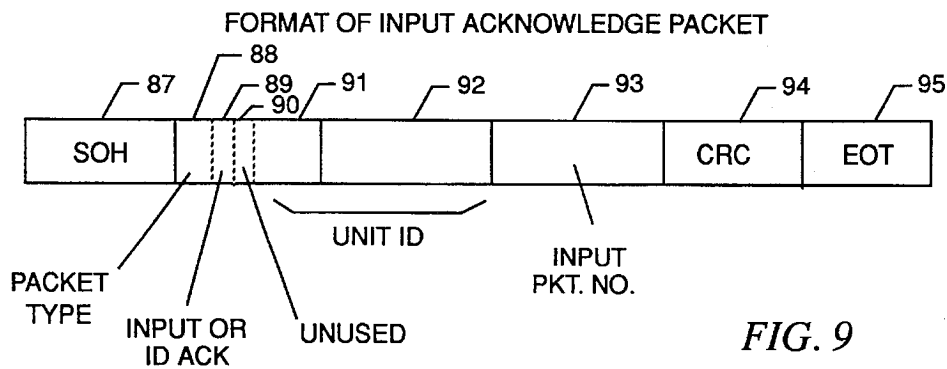
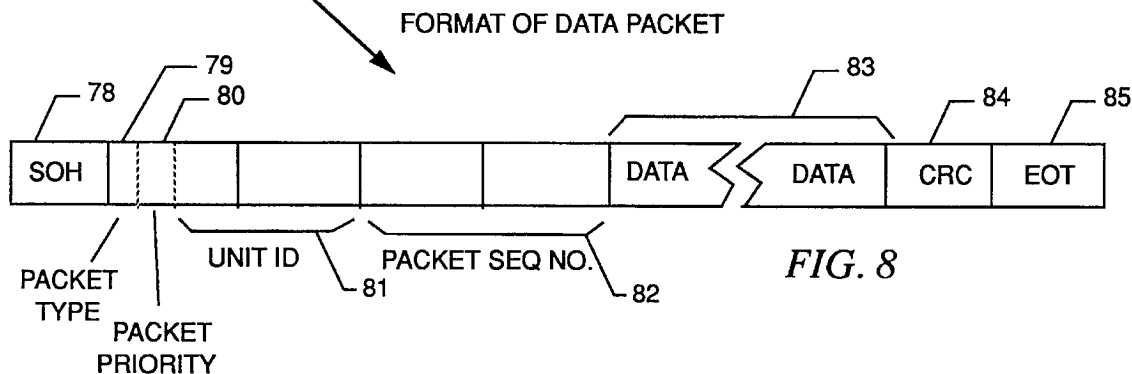
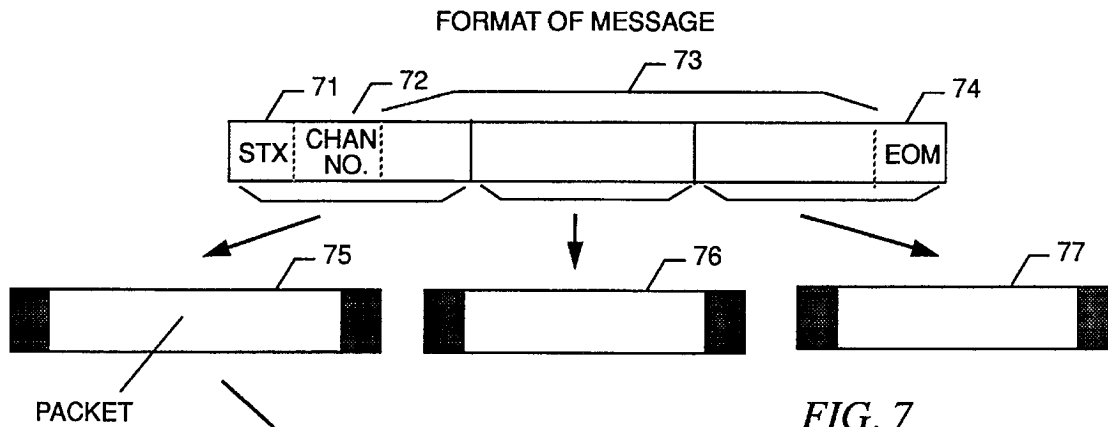


FIG. 5

FIG. 6



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