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Coon et al.

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(54) **VOICE-INTERACTIVE DOCKING STATION FOR A PORTABLE COMPUTING DEVICE**

5,949,776 A * 9/1999 Mahany et al. 455/435
6,202,008 B1 * 3/2001 Beckert et al. 455/552

(75) Inventors: **Bradley S. Coon**, Kokomo, IN (US);
Ronald K. Reger, Carmel, IN (US)

* cited by examiner

(73) Assignee: **Delphi Technologies, Inc.**, Troy, MI (US)

Primary Examiner—Richemond Dorvil
Assistant Examiner—Daniel A Nolan
(74) *Attorney, Agent, or Firm*—Jimmy L. Funke; Stefan V. Chmielewski

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(57) **ABSTRACT**

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A voice-interactive docking station is provided for use with a portable computing device. The portable computing device includes at least one information management application and a corresponding database for storing the data associated with the information management application. The docking station generally includes a speech input device for receiving speech input, a speech recognizer for translating the speech input into voice command data, and an interface application for interacting with the applications residing on the portable computing device. In particular, the interface application, in response to voice command data, accesses the data associated with the information management application residing on the portable computing device. The docking station may further include a text-to-speech synthesizer for converting output data from the interface application into speech output data, and an audio system for generating audio output from the speech output data.

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(52) **U.S. Cl.** **704/275**; 704/270; 704/251; 710/303

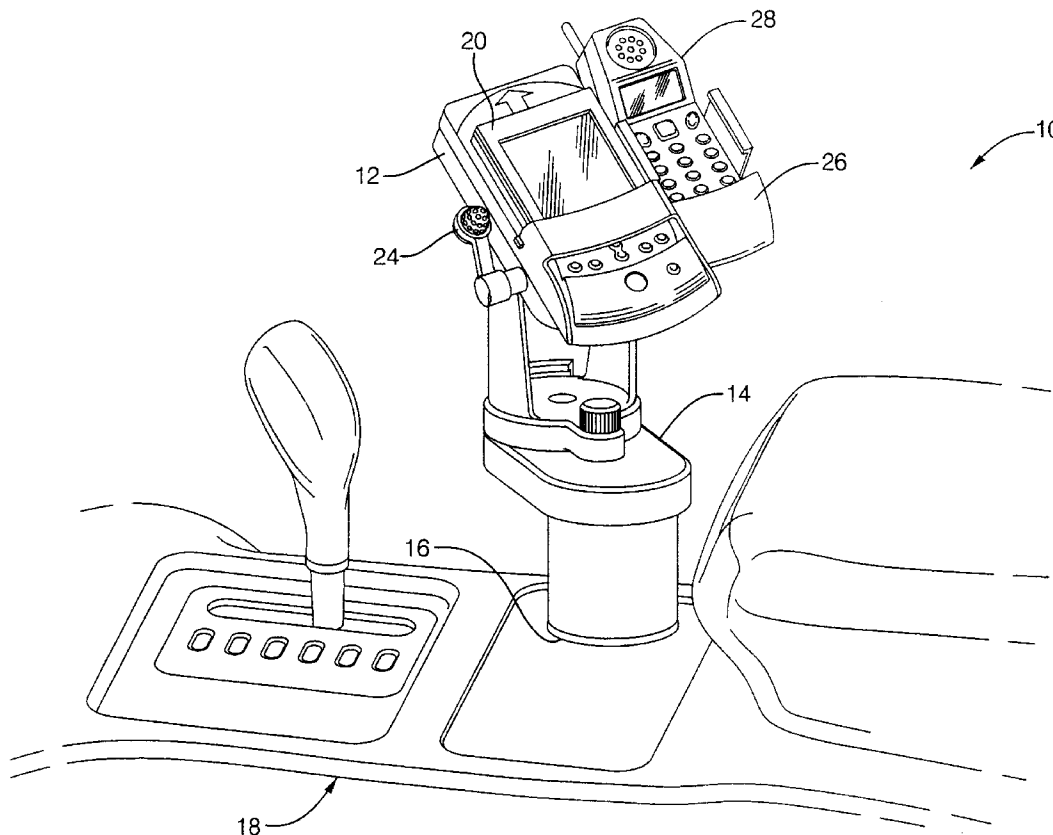
(58) **Field of Search** 704/258–269, 704/270–272, 251, 275; 455/552, 435; 709/219; 710/73, 303

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,522,089 A * 5/1996 Kikinis et al. 710/73
5,914,941 A * 6/1999 Janky 709/219

20 Claims, 3 Drawing Sheets



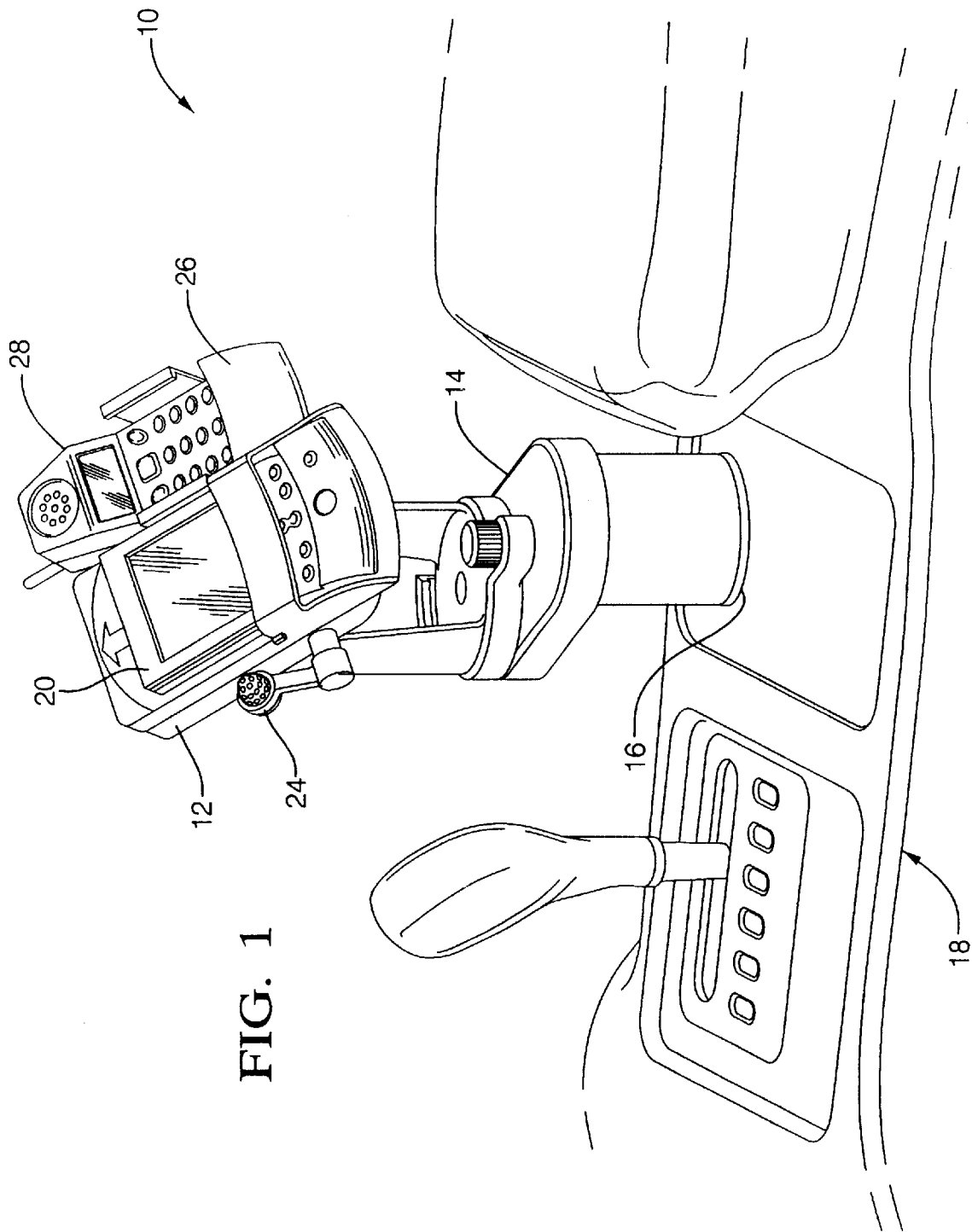


FIG. 1

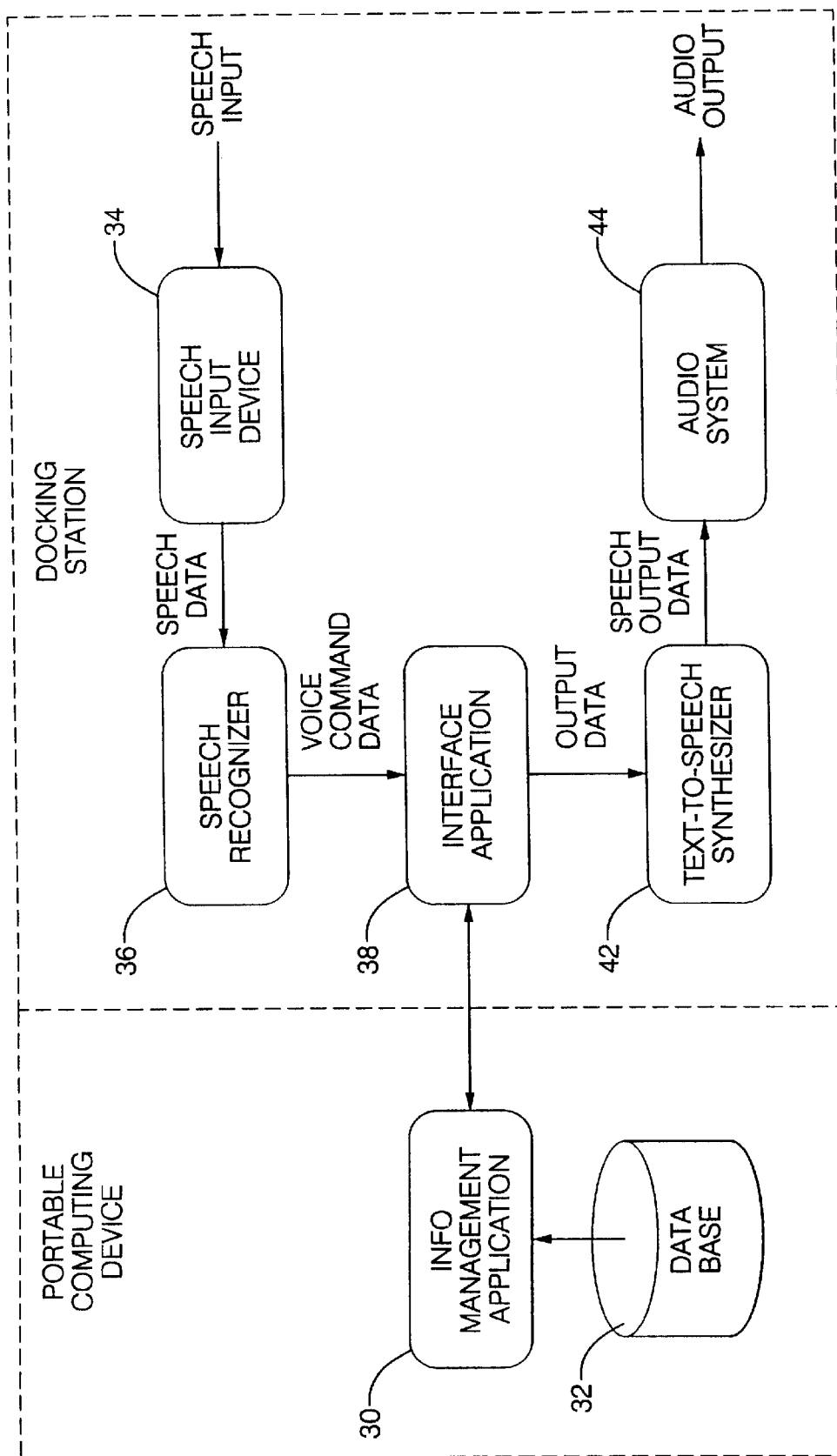


FIG. 2

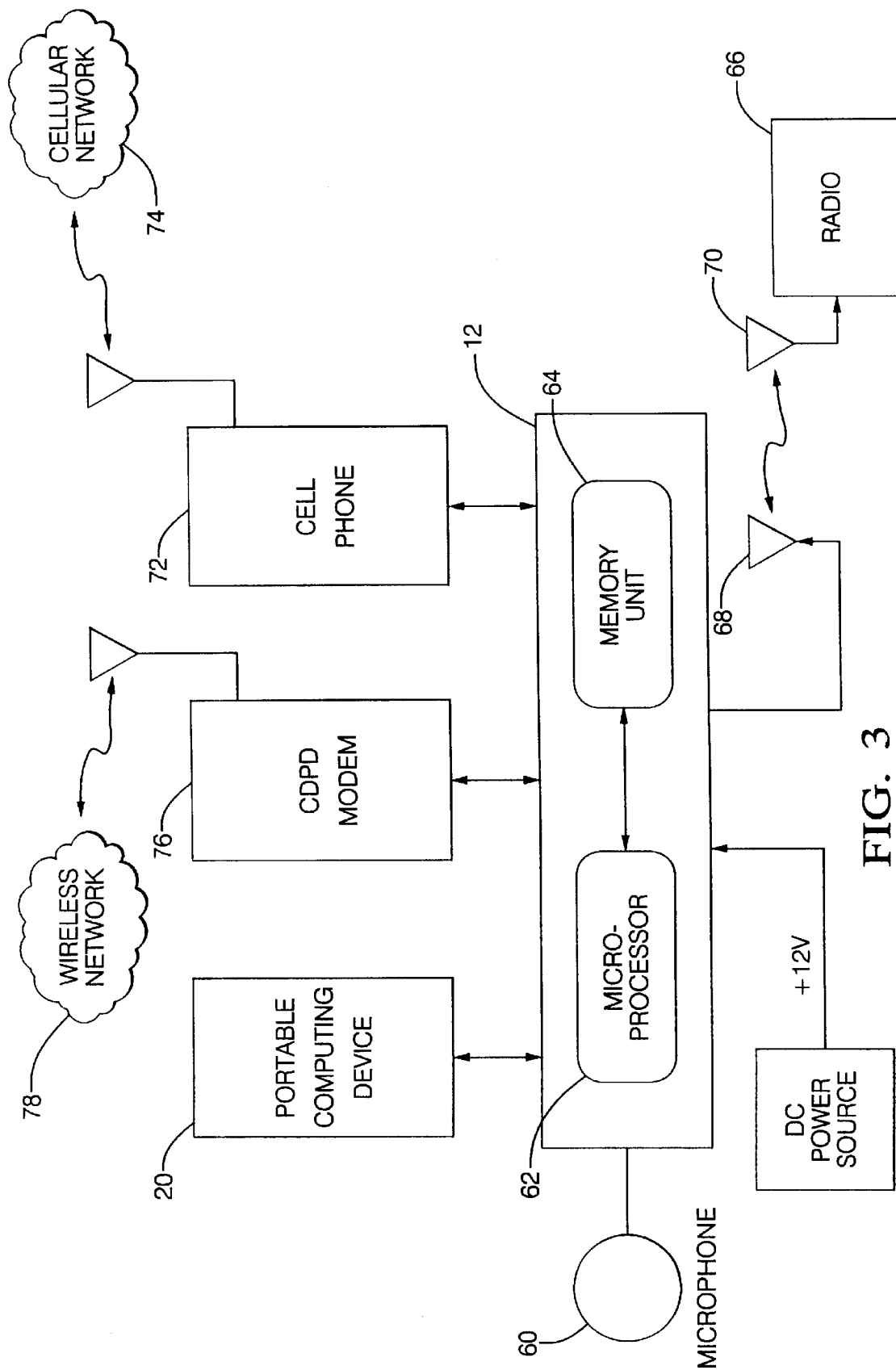


FIG. 3

VOICE-INTERACTIVE DOCKING STATION FOR A PORTABLE COMPUTING DEVICE

TECHNICAL FIELD

The present invention relates generally to a docking station for a portable computing device and, more particularly, to a voice-interactive docking system for use in a motor vehicle.

BACKGROUND OF THE INVENTION

Portable computing devices, such as a Palm™ personal digital assistant handheld computing device, are not designed to be safely used by the driver of a motor vehicle. Accessing information on a portable computing device typically involves viewing a display screen that presents information to the user and/or entering information using a stylus by writing on the display screen. Each of these access methods require the driver of a motor vehicle to at least momentarily take their eyes off the road, thereby causing safety concerns.

Although portable computing devices offer ideal opportunities to exploit speech technology, they also present a challenge in that processing power and memory is often limited within the device. To limit memory usage, a typical embedded speech recognition system will have a very limited, static vocabulary. In this case, condition-specific words, such as the names found in an address book, may not be recognized by the system. Therefore, it is desirable to provide a voice-interactive docking station for a portable computing device that is being used in a motor vehicle.

To complement the portable computing device, the docking station provides the additional processing power and memory needed to support robust speech recognition and/or speech synthesis features. In this way, the voice-interactive docking station provides hands-free information access to the portable computing device for the driver of a motor vehicle. Additionally, the docking station serves as an interface between the portable computing device and other vehicle systems.

SUMMARY OF THE INVENTION

In accordance with the present invention, a voice-interactive docking station is provided for a portable computing device. The portable computing device includes at least one information management application and a corresponding database for storing the data associated with the information management application. The docking station generally includes a speech input device for receiving speech input, a speech recognizer for translating the speech input into voice command data, and an interface application for interacting with the applications residing on the portable computing device. In particular, the interface application, in response to voice command data, accesses the data associated with the information management application residing on the portable computing device. The docking station may further include a text-to-speech synthesizer for converting output data from the interface application into speech output data, and an audio system for generating audio output from the speech output data.

For a more complete understanding of the invention, its objects and advantages, refer to the following specification and to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram of a voice-interactive docking station embodying features of the present invention in the context of a motor vehicle;

FIG. 2 is a block diagram illustrating the software-implemented components of the voice-interactive docking system in accordance with the present invention; and

FIG. 3 is a block diagram illustrating the hardware components of the voice-interactive docking system in a preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A voice-interactive docking system **10** for use in a motor vehicle is shown in FIG. 1. In this presently preferred embodiment, a docking station **12** couples to a mounting device **14** that securely attaches the docking station **12** to the interior of the motor vehicle. The mounting device **14** pivotally attaches to the docking station and securely couples into a cup holder **16** in the center console **18** of a motor vehicle. The mounting device **14** may have other configurations as well as couple to other interior components of the motor vehicle. It is envisioned that the docking station **14** is accessible to at least one of the passengers within the motor vehicle. While the following description is provided with reference to a docking station for use in a motor vehicle, it is readily understood that the broader aspects of the present invention are applicable to a docking station configured for other types of applications.

The docking station **12** is adapted to receive a portable computing device **20**. An exemplary portable computing device **20** may be any one of the commercially available Palm handheld computing devices. However, other types of handheld computing devices and/or personal digital assistants may be used with the docking station **12**. To facilitate the electrical connection with different portable computing devices, the docking station **12** may provide a modular interface connector **22**. The modular interface connector **22** is an interchangeable component that provides a serial data interface for data transmission between the portable computing device **20** and the docking station **12**. A push button **23** positioned on the front of the docking station **12** may be used activate the system. The docking station **12** further includes a microphone **24** for receiving speech input, and, optionally, a secondary docking station **26** for a cellular telephone **28**.

Referring to FIG. 2, the portable computing device **20** includes at least one information management application **30** and a corresponding database **32** for storing the data associated with the information management application **30**. An exemplary information management application **30** may be any one of an address book application, an e-mail application, a calendar application, a memo pad application, a personal finance application, a Web-browsing application, a word processor application, or other similar information management applications.

In accordance with the present invention, the speech-enabled docking station **12** generally includes a speech input device **34** (e.g., a microphone) for receiving speech input, a speech recognizer **36** for translating the speech input into voice command data, and an interface application **38** for interacting with the applications residing on the portable computing device **20**. In response to voice command data from the speech recognizer **36**, the interface application **38** is operable to access the database **32** residing on the portable computing device **20**. In this way, the interface application **38** can retrieve and/or update data associated with the information management application.

Alternatively, the interface application **38** may extract data from the database **32** prior to receiving voice command

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