

[54] **TELEPHONE SYSTEM WITH AUTOMATIC DIALING USING INFRARED TRANSMISSION FROM ELECTRONIC POCKET BOOK**

5,144,654	9/1992	Kelley et al. .
5,379,319	1/1995	Satoh et al. .
5,454,035	9/1995	Oba et al. .
5,504,805	4/1996	Lee .
5,526,424	6/1996	Karnowski .
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5,570,295	10/1996	Isenberg et al. .
5,659,299	8/1997	Williamson et al. 340/825.57
5,797,089	8/1998	Nguyen .

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FOREIGN PATENT DOCUMENTS

WO092010046 6/1992 WIPO .

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[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**⁷ **H04M 11/00**; H04M 1/00

[52] **U.S. Cl.** **379/56.3**; 379/102.01;
379/355

[58] **Field of Search** 379/355, 356,
379/357, 56.1, 56.2, 56.3, 110.1; 455/459,
387, 102.01, 101, 564; 359/172, 149, 147,
143, 144

[57] **ABSTRACT**

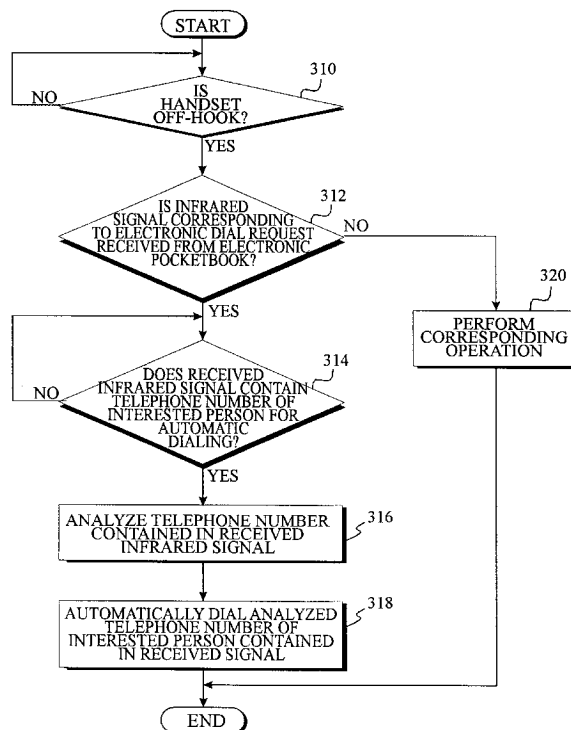
An automatic dialing method of a telephone system including an optical reception unit sensitive to infrared reception from an electronic pocketbook including an optical transmission unit for infrared transmission of a telephone number of an interested person registered in the electronic pocketbook. The dialing method includes receiving an infrared signal containing a telephone number of an interested person selected for an automatic dialing function, transmitted from the optical transmission unit of the electronic pocketbook, via the optical reception unit of the telephone system, when a telephone handset is in an off-hook state; analyzing data information representing the telephone number of the interested person contained in the infrared signal; and automatically dialing the telephone number of the interested person, via a dialer of the telephone system, corresponding to analyzed data information.

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,130,738	12/1978	Sandstedt .
4,456,925	6/1984	Skeros et al. .
4,553,267	11/1985	Crimmins .
4,847,760	7/1989	Yagi 364/400
4,910,767	3/1990	Brugliera et al. 379/355
4,978,948	12/1990	Andresen et al. .
5,054,051	10/1991	Hoff .
5,138,649	8/1992	Krisbergh et al. .

18 Claims, 2 Drawing Sheets



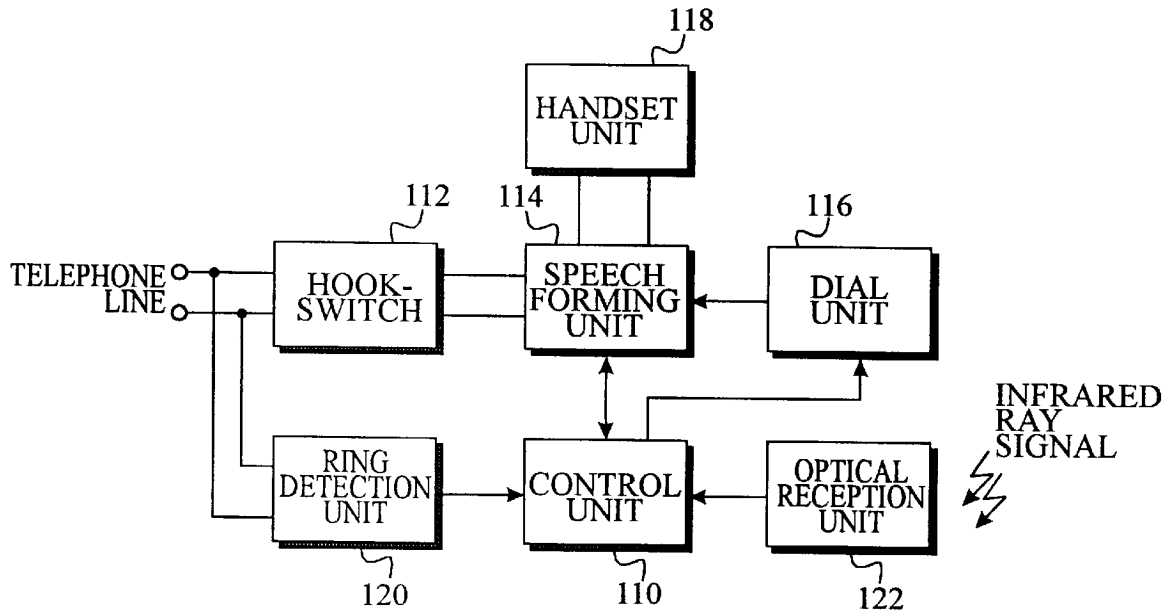


Fig. 1

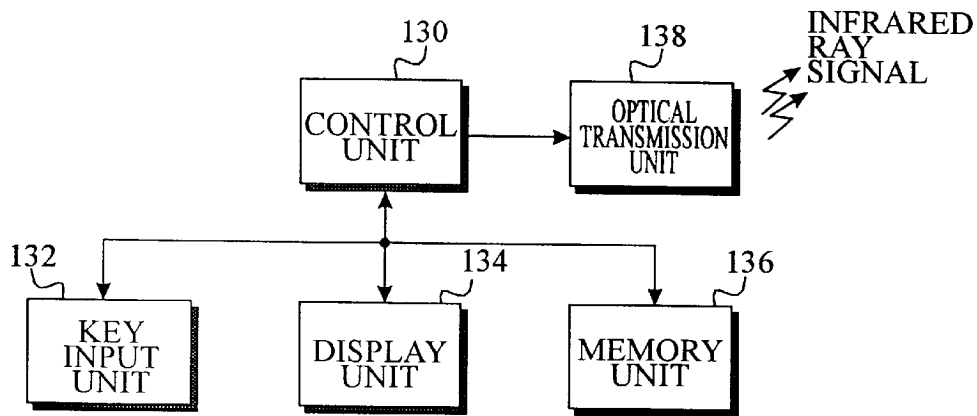


Fig. 2

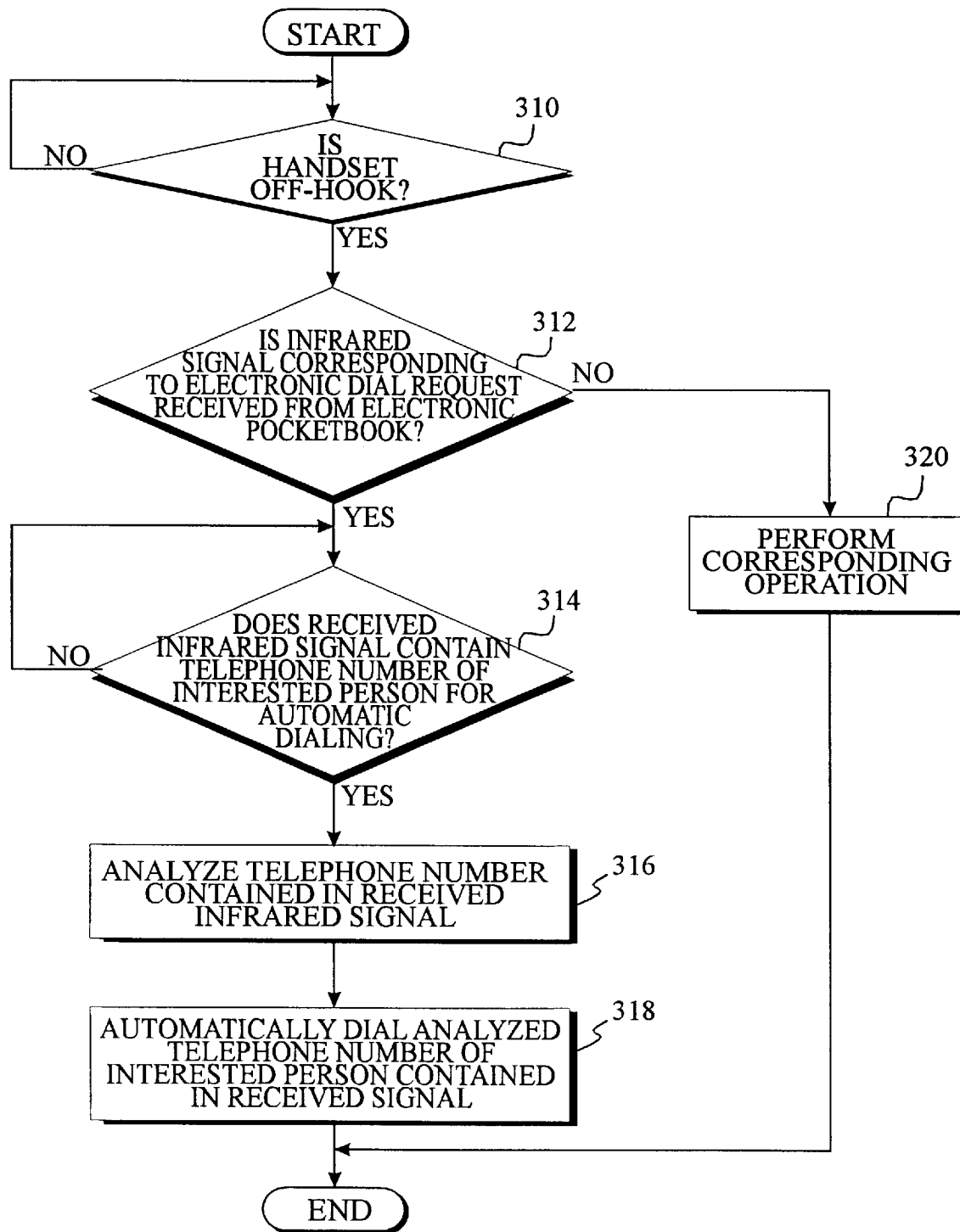


Fig. 3

**TELEPHONE SYSTEM WITH AUTOMATIC
DIALING USING INFRARED
TRANSMISSION FROM ELECTRONIC
POCKET BOOK**

CLAIM FOR PRIORITY

This application makes reference to, incorporates the same herein, and claims all benefits accruing under 35 U.S.C. §119 from an application for *DIALING DEVICE USING ELECTRONIC POCKETBOOK AND METHOD THEREOF* earlier filed in the Korean Industrial Property Office on Jun. 5, 1996, there duly assigned Ser. No. 20057/1996.

BACKGROUND OF THE INVENTION

1. Technical Field

The present invention relates to a telephone system, and more particularly, relates to a telephone system with automatic dialing using infrared transmission from an electronic pocketbook.

2. Related Art

Conventional electronic pocketbooks as disclosed, for example, in U.S. Pat. No. 4,117,542 for *Electronic Pocket Directory* issued to Klausner, U.S. Pat. No. 5,023,905 for *Pocket Data Receiver With Full Page Visual Display* issued to Wells, U.S. Pat. No. 5,150,293 for *Small Electronic Memo Data Storage, Display And Recall Apparatus* issued to Murata, and U.S. Pat. No. 5,526,424 for *Electronic Notepad* issued to Karnowski, are organized to feature a visual display, computer linking and a host of communication options and expandability, including touch screen display, word processor, calendar, scheduler, telephone directory and the like. Generally, telephone number registered in the electronic pocketbook must be manually retrieved by the user before the user can approach a telephone system and manually dial the telephone number of an interested person registered in the electronic pocketbook. Alternatively, the telephone number as registered in an electronic note disclosed, for example, in U.S. Pat. No. 5,454,035 for *Electronic Apparatus* issued to Oba et al, may be transmitted in a form of a dial tone signal to a telephone microphone in order to save the user the hassle of having to manually dial the telephone number registered in the electronic note at the telephone system. It is still inconvenient for the user to confirm the telephone number registered in the electronic pocketbook for automatic dialing purposes.

While conventional telephone systems such as disclosed in U.S. Pat. No. 5,506,895 for *Telephone Apparatus With Automatic Dialing Function* issued to Hirai et al., are widely organized to perform an automatic dialing function by way of, for example, optical scanning of telephone numbers from printed materials such as disclosed in U.S. Pat. No. 4,975,948 for *Rapid Dialing Method For Telecommunications* issued to Andresen et al., U.S. Pat. No. 5,144,654 for *Automatic Telephone Dialer System With Printed Storage* issued to Kelley et al., or by way of voice recognition as disclosed in U.S. Pat. No. 5,504,805 for *Calling Number Identification Using Speech Recognition* issued to Lee, or by way of body heat or infrared rays irradiated from a person as disclosed in U.S. Pat. No. 5,379,319 for *Telephone Apparatus* issued to Satoh et al., there is no convenient and effective way to link the electronic pocketbook with the telephone system which allows the user to automatically dial a telephone number at the telephone system under control of operation from the electronic pocketbook.

SUMMARY OF THE INVENTION

Accordingly, it is therefore an object of the present invention to provide a telephone system with automatic dialing using infrared transmission from an electronic pocketbook.

It is also an object to provide an electronic pocketbook with a telephone directory containing a plurality of telephone numbers of interested persons and an infrared transmitter for transmitting an infrared signal containing a telephone number selected for calling to the telephone system for automatic dialing purposes.

It is another object to provide a telephone system with an automatic dialer and an infrared receiver for receiving an infrared signal containing a telephone number selected for calling from the electronic pocketbook in order to perform an automatic dialing function.

These and other objects of the present invention can be achieved by an automatic dialing method of a telephone system including an infrared receiver sensitive to infrared reception from an electronic pocketbook including an infrared transmitter for infrared transmission of a telephone number of an interested person registered in the electronic pocketbook. The automatic dialing method includes receiving an infrared signal containing a telephone number of an interested person selected for an automatic dialing function, transmitted from the infrared transmitter of the electronic pocketbook, via the infrared receiver of the telephone system, when a telephone handset is in an off-hook state; analyzing data information representing the telephone number of the interested person contained in the infrared signal; and automatically dialing the telephone number of the interested person, via a dialer of the telephone system, corresponding to analyzed data information.

In accordance with one aspect of the present invention, an electronic pocketbook that uses infrared link to enable a telephone system to automatically dial a telephone number of an interested person includes a memory storing a directory of pre-registered telephone numbers of interested persons; a key input unit for allowing an operator to input telephone numbers, and to initiate transmission of an infrared signal containing a telephone number of an interested person selected for an automatic dialing function; a display unit for providing a visual display of telephone numbers input by the operator and the telephone number of the interested person selected by the operator for the automatic dialing function; an infrared transmitter for transmitting the telephone number of the interested person selected for the automatic dialing function in a form of an infrared signal; and a controller for controlling said infrared transmission of the infrared signal containing the telephone number of the interested person selected for the automatic dialing function.

In accordance with another aspect of the present invention, a telephone system linked to the electronic pocketbook includes a handset; an infrared receiver for receiving the infrared signal transmitted from the infrared transmitter of said electronic pocketbook; a controller for analyzing the telephone number contained in a received infrared signal; and a dialer for automatically dialing the telephone number contained in the received infrared signal analyzed from the controller.

The present invention is more specifically described in the following paragraphs by reference to the drawings attached only by way of example.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the present invention, and many of the attendant advantages thereof, will become readily apparent as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

FIG. 1 is a block diagram of a telephone system constructed according to the principles of the present invention;

FIG. 2 is a block diagram of an electronic pocketbook constructed according to the principles of the present invention; and

FIG. 3 is a control flow chart of an automatic dialing process according to the principles of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings and particularly to FIG. 1, which illustrates a telephone system constructed according to the principles of the present invention. As shown in FIG. 1, the telephone system includes a control unit 110, a hook-switch 112, a speech forming unit 114, a dial unit 116, a handset unit 118, a ring detection unit 120 and an optical reception unit 122.

Control unit 110 may be constructed by a one-chip microprocessor for controlling the overall operation of the telephone system. The controller 110 includes a read-only-memory (ROM) for storing an application program and a random-access-memory (RAM) for temporarily storing data generated while executing the application program. The RAM has a key buffer for storing telephone numbers received from the optical receiving unit 122 for enabling performance of an automatic dialing function.

Hook-switch 112 is connected to a telephone line from a central telephone network, when the handset unit 118 is off-hook. Then, the speech forming unit 114 processes a voice signal for performing a call under control of the control unit 110. A dial unit 116 dials a telephone number under control of the control unit 110. The handset unit 118 converts a voice signal into an electric signal or the electric signal into the voice signal. The ring detection unit 120 detects a ring signal received through the telephone line and then provides the received signal to the control unit 110. The optical reception unit 122 receives an infrared ray signal containing a telephone number of an interested person transmitted from the electronic pocketbook and provides the same to the control unit 110 for enabling the dial unit 116 to perform an automatic dialing function.

FIG. 2 is a block diagram of an electronic pocketbook constructed according to the principles of the present invention. As shown in FIG. 2, the electronic pocketbook includes a control unit 130, a key input unit 132, a display unit 134, a memory unit 136 and an optical transmission unit 138.

Control unit 130 controls overall functions of the electronic pocketbook including, for example, a calendar display mode, a schedule storage/display mode, a phone mode for an electronic phone book or the like. The key input unit 132 corresponds to a key matrix which includes mode selection keys for selecting any one of the foregoing modes, a dial key for initiating transmission of an infrared ray signal containing a telephone number selected by the user to the telephone system as shown in FIG. 1, via the optical transmission unit 122. Key matrix also contains template keys for permitting the user to input digits such as telephone numbers, character input keys for permitting the user to input characters and the like for memo, and a symbol telephone key for inputting a symbol for setting the digits input through the template keys as a telephone number.

The key input unit 132 provides key input data to the control unit 130. The display unit 134 in a form of liquid crystal display (LCD) provides a visual display of data information input from the key input unit 132 under control of the control unit 130. The memory unit 136 contains a

read-only-memory (ROM) for storing programs for the control unit 130 to process data information in each mode of operation. In particular, the ROM stores a program for automatically transmitting a telephone number registered at the memo mode contained in a form of an infrared ray signal at the optical transmission unit 138, and a display control program for enabling the control unit 130 to control the visual display of data information in response to the user's key input. The memory unit 136 also contains a random-access-memory (RAM) for temporarily storing data information input through the key input unit 132. The optical transmission unit 138 converts data information provided from the control unit 130 into an infrared ray signal containing an electronic dial request and telephone number of an interested person selected for an automatic dialing function. After the conversion, the optical transmission unit 138 transmits the infrared ray signal containing the telephone number of the interested person to the telephone system as shown in FIG. 1 for performing an automatic dialing function.

Turning now to FIG. 3 which illustrates a control flow chart of an automatic dialing process between the telephone system of FIG. 1 and the electronic pocketbook of FIG. 2 according to the principles of the present invention. The process of dialing a telephone number of an interested person using the electronic pocketbook includes initially analyzing the telephone number contained in the infrared ray signal received from the electronic pocketbook after receipt of an electronic dial request in an off-hook state, and automatically dialing the analyzed telephone number contained in the infrared ray signal.

The automatic dialing operation using an electronic pocketbook according to the principles of the present invention will now be described in detail with reference to FIG. 3 hereinbelow.

First, the control unit 110 of the telephone system determines whether or not a handset unit 118 is off-hook in order to make a phone call at step 310. Here, when it is determined that the handset unit 118 is not off-hook, the control unit 110 returns to step 310 until the handset unit 118 is off-hook. When it is determined that the handset unit 118 is off-hook, however, the control unit 110 monitors whether an infrared ray signal corresponding to an electronic dial request is received from the electronic pocketbook via the optical reception unit 122. Herein, the infrared ray signal corresponding to the electronic dial request is transmitted from the electronic pocketbook through its optical transmission unit 138 under control of its control unit 130 in accordance with specific key input from the key input unit 132 included in the electronic pocketbook. At this time, if the infrared ray signal corresponding to the electronic dial request is not received from the electronic pocketbook, the control unit 110 proceeds to step 320, thereby performing the corresponding operation. However, if the infrared ray signal corresponding to the electronic dial request from the electronic pocketbook is received at step 312, the control unit 110 determines whether the infrared ray signal contains a telephone number of an interested person for an automatic dialing function at step 314.

It is noted that, prior to the transmission of infrared ray signal containing a telephone number of an interested person from an electronic pocketbook, data information stored in the memory 136 of the electronic pocketbook is first retrieved for a visual display on the display unit 134 in response to the user's specific key input via key input unit 132. Data information displayed on the display unit 134 is then confirmed by the user and is subsequently transmitted

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