PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 :		(11) International Publication Number:
H04M 11/08, 11/00, H04N 1/32	A1	WO 90/10989
		(43) International Publication Date: 20 September 1990 (20.09.90)

(21) International Application Number: PCT/US90/01065

(22) International Filing Date: 2 March 1990 (02.03.90)

(30) Priority data:
321,715 10 March 1989 (10.03.89) US

(71) Applicant: SPECTRAFAX CORPORATION [US/US]; 209 South Airport Road, Naples, FL 33942 (US).

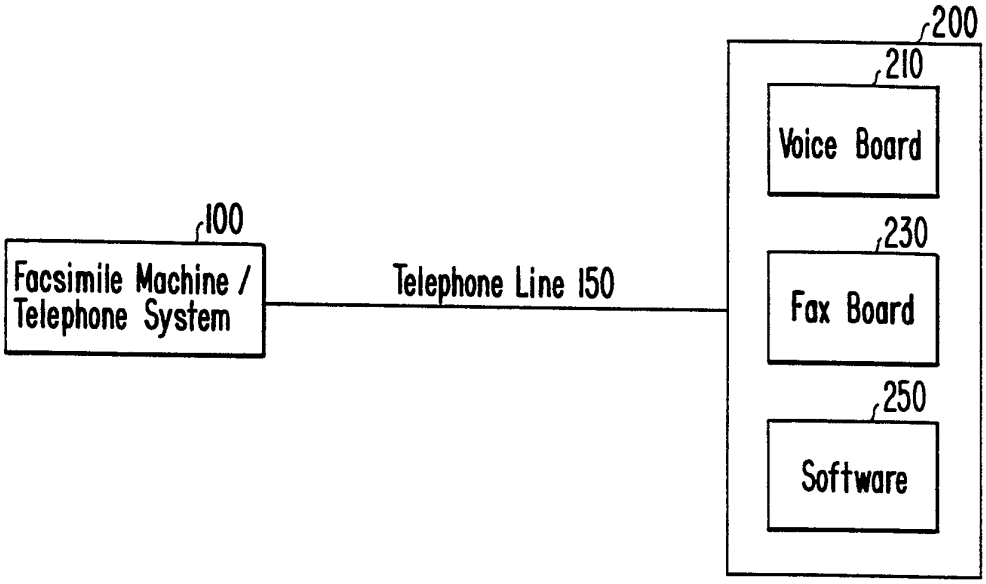
(72) Inventors: RAE, David, C. ; 5294 10th Avenue, S.W., Naples, FL 33999 (US). LECKRONE, Donald, G. ; 8503 Wheeler Road, Woodstock, GA 30188 (US).

(74) Agents: ROTHWELL, G., Franklin et al.; Bernard, Rothwell & Brown, 1700 K Street, N.W. ,800, Washington, DC 20006 (US).

(81) Designated States: AT (European patent), AU, BE (European patent), BG, BR, CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), HU, IT (European patent), JP, KR, LU (European patent), NL (European patent), NO, RO, SE (European patent), SU.

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: VOICE PROMPTED FACSIMILE RETRIEVAL SYSTEM



(57) Abstract

A method and appararus for transmitting specifically requested graphic and/or textual data from an unattended database storage location (200) to a requestor's facsimile machine (100) over a telephone line (150) includes a host computer (200) such as a PC modified with a facsimile transmission board (230) and a voice generation board (210). The host computer (200) receives incoming phone calls and prompts the caller using voice generation board (210) to select data files by using the DTMF keys of a standard telephone. The PC can be left unattended and can run automatically in the fascimile transmission mode. Callers can immediately access needed textual and image data with the use of just a standard telephone and facsimile machine (100).

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	ES	Spain	MG	Madagascar
AU	Australia	FI	Finland	ML	Mali
BB	Barbados	FR	France	MR	Mauritania
BE	Belgium	GA	Gabon	MW	Malawi
BF	Burkina Fasso	GB	United Kingdom	NL	Netherlands
BG	Bulgaria	HU	Hungary	NO	Norway
BJ	Benin	IT	Italy	RO	Romania
BR	Brazil	JP	Japan	SD	Sudan
CA	Canada	KP	Democratic People's Republic of Korea	SE	Sweden
CF	Central African Republic			SN	Senegal
CG	Congo	KR	Republic of Korea	SU	Soviet Union
CH	Switzerland	LI	Liechtenstein	TD	Chad
CM	Cameroon	LK	Sri Lanka	TG	Togo
DE	Germany, Federal Republic of	LU	Luxembourg	US	United States of America
DK	Denmark	MC	Monaco		

VOICE PROMPTED FACSIMILE RETRIEVAL SYSTEM

Field of the Invention

The present invention relates generally to database acquisition systems in which a user can access data stored in a storage medium via a telephone line.

Background of the Invention

Various data accessing systems are known in the art in which users can retrieve requested data from a central data storage location through telephone lines. Conventionally, subscribers to such systems are required to have either a personal computer (PC) or a so-called "smart terminal" in order to receive data from the central data location. A smart terminal usually consists of a keyboard and a display device containing a microprocessor for providing local control of the operation of the terminal.

Also generally known is the use of a conventional dual tone multi-frequency (DTMF) telephone to communicate with a remote database computer in which a user utilizes the alpha-numeric keys of the telephone to communicate a request to the database which then provides an audible response to the telephone receiver as voice information.

While currently available database accessing systems allow a restricted amount of information to be communicated to a user through a conventional telephone and allow subscribers with relatively sophisticated and

expensive equipment to gain access to larger databases at considerable cost, the prior art has failed to address the communication needs of individuals to acquire automatic and quick user selective forms of textual and/or graphic image data from an unattended database location, without the necessity of relatively expensive and sophisticated terminal equipment.

SUMMARY OF THE INVENTION

This invention provides a method and apparatus for enabling a user to acquire specifically requested data from an unattended database storage location without the need for costly equipment.

This invention also enables a user to obtain graphic image data automatically from an unattended database location on a substantially real time basis.

This invention provides a method of transmitting graphic and/or textual data stored in a data storage medium to a requester's facsimile machine over a telephone line, comprising the steps of responding to an incoming call from a requester with a prerecorded voice message, receiving signals representing specific data in the data storage medium desired by the requester, retrieving the specific data from the data storage medium, instructing the requester to place his facsimile machine on-line, transmitting the specific data in facsimile format over the telephone line to the facsimile machine, and terminating the incoming call.

This invention further provides an apparatus for transmitting graphic and/or textual data requested by a user to a facsimile machine of the user over the telephone line, comprising a host computer including a memory means for storing the graphic and textual data means for receiving an incoming call from the user over

the telephone line, voice generation means for generating voice signals over the telephone line to the user, the voice signals representing instructions informing the user of individual items of data in the memory means which can be selected by the user for transmission, and instructions informing the user of specific code signals associated with each item of data, means for receiving code signals from the user over the telephone line representing selected items of data, means for decoding the received code signals to identify the selected items of data, means for retrieving the identified items of data from the memory means, means for transmitting the retrieved data in facsimile form to the facsimile machine, and means for terminating the incoming call after completion of the facsimile transmission.

The present invention thus enables a user to obtain graphic and/or textual data from a remote database using only a telephone and a standard facsimile machine.

Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific examples, while indicating preferred embodiments of the invention are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are

given by way of illustration only and thus are not limitative of the present invention, and wherein:

Figure 1 is a block diagram of one preferred embodiment of the present invention;

Figure 2 is a schematic block diagram for illustrating the configuration of one embodiment of a voice board 210 of Figure 1;

Figure 3 is a schematic block diagram of the configuration of one embodiment of the fax board 230 of Figure 1;

Figures 4A and 4B are flow charts illustrating a main processing routine of the computer 200 of Figure 1, according to the present invention;

Figure 5 is a flow chart illustrating a subroutine for obtaining a user's password;

Figure 6 is a flow chart illustrating a subroutine for obtaining a user's account number.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 illustrates the overall configuration of a system in conjunction with one preferred embodiment of the present invention in which a user's facsimile machine/telephone system 100 is interconnected to an unattended database storage location 200, which may be a computer or another type of data storage device, over a telephone line 150. The telephone line is preferably a portion of a public switched telephone network (PSTN) so that the facsimile machine/telephone system 100 may call the computer 200.

The computer 200 (which may be a minicomputer, personal computer or other suitable computer) is equipped with a voice board 210 and a fax board 230 and is loaded with specific software 250 to operate the system in the database acquisition mode described

hereinbelow. Alternatively, the voice and fax capabilities could be implemented with DSP (Digital Signal Processing) chips in the motherboard of the computer.

A schematic block diagram of voice board 210 is illustrated in Figure 2. The voice board is an integrated circuit module which is placed into a standard I/O slot of the PC to interconnect with the PC's data and control buses. Such voice board are commercially available devices, such as Model D-40 B from Dialogic Corporation, for example. However, other equivalent voice boards may be used for purposes of the present invention.

The typical layout of a four line voice board consists of a plurality of telephone interface lines 211 which connect with outside callers, analog processing circuits 212 connected to the telephone interface 211, A/D - D/A converter circuits 213 connected to the analog processing circuits 212, and compressor-decompressor circuitry 214 connected to the digital/analog converters 213. The compressor-decompressors 214 are connected to an internal bus 215 of the voice board which is connected to I/O controller 216 and a memory buffer 217. The I/P controller 216 and memory buffer 217 are further connected to the personal computer bus 300.

The operation of the voice board is as follows. A plurality of voice messages are stored in a memory as compressed digital voice data. The compressed voice data is obtained by having an announcer speak into a telephone device connected to a telephone interface line 211, processing the resultant analog waveform in the processing circuit 212, converting the processed analog signal into a digital signal in the analog to

digital part of the converter 213, compressing the digital data in the circuit 214, and storing the compressed data in memory via the input/output controller 216 and the internal bus 215. A voice message to be output is obtained from the memory, loaded into the memory buffer 217, and processed in the reverse order to output a voice analog signal at the telephone interface line 211 to be received by the speaker of a telephone handset.

Figure 3 is a block diagram of the structure of the fax board of 230 of Figure 1. The fax board may also be obtained as a commercially available unit, such as the "Connection Coprocessor" available from Intel Corporation, the "Personal Link" available from SpectraFax Corporation, or equivalent boards from other manufacturers.

The fax board 230 consists of a data access arrangement (DAA) device 231, a modem 232, an SDLC controller 233, a microprocessor 234, a low address latch 235, an EPROM 236, random access memory 237, an inbound latch 239, I/O address decoder 240, an outbound latch 241, and a direct memory access (DMA) controller 242. The various components of the board are interconnected via an internal bus 238, while the inbound and outbound latches, the DMA controller, and the I/O address decoder are connected to the host computer via the host computer bus 300.

The fax board is controlled by the host computer through a series of commands loaded into the inbound latch 239 from the host processor. The fax board receives DMA data from the host processor to send fax documents via the fax modem 232 to a telephone line connected to the DAA 231. Status and control data is

communicated to the host processor via the outbound latch 241.

A description of the operation of the present invention will now be described with reference to Figures 4A, 4B, 5 and 6.

The main processing routine is illustrated in Figs. 4A and 4B. At step 251, the main program is started by performing various initialization functions. At step 252, the host computer waits for an indication of an incoming call from the voice board. Upon the detection of the presence of an incoming call, the voice board is caused to output a welcome message at step 254. If an account number is required, processing advances to step 255, which initiates the account number subroutine as illustrated in Figure 6.

In this subroutine, the voice board outputs a request for an account number at step 501. At step 502, the system waits for the input of DTMF signals representing the caller's account number. After the caller has inputted his account number, the DTMF signals are decoded and compared with a list of valid account numbers at step 503. If the account number is valid, it is recorded at step 505 for billing purposes and processing returns to the main routine at step 506. If the account number is not determined to be valid, the voice board outputs an error message and asks the user to try again at step 504, upon which the subroutine returns to step 502 to await the input of a new account number. If a password is then required, the main routine proceeds to step 256 which calls up the password subroutine as illustrated in Figure 5.

In the password subroutine, the voice board is caused to output a message requesting the user to input a password at step 401. At step 402, the system waits

for the caller to complete the input of DTMF signals representing the password. After completion of password input, the DTMF signals are converted to password data at step 403, and the decoded password is checked for validity. If the password is valid, it is recorded at step 405 and the subroutine transfers processing to the main routine at step 406. If the password was judged to be invalid, the voice board is caused to output an error message at step 404 and the subroutine returns to step 402 to await the inputting of another password.

After the caller has input a valid account number and password, the main routine advances to step 257 at which the voice board is caused to output instructions informing the caller of the different types and items of data which are available for transmission as a facsimile along with DTMF codes corresponding to each of the listed items of data. After the product selection message is complete, the voice board outputs a prompt signal prompting the caller to input the codes corresponding to the item of data that has been selected for reception at the caller's facsimile machine. The program proceeds to step 258 as illustrated in Figure 4B.

At step 258, the system waits for the completion of code input from the caller. At step 259, the DTMF codes signals are converted to digital product codes and are checked for validity. Upon identification of a valid product code at step 259, the processing advances to step 261 in which the file containing the requested data is located for transfer to the fax board to be sent as a facsimile over the existing telephone connection. If the product code decoded at step 259 does not correspond to a valid data file, the program

proceeds to step 260 which causes the voice board to output an error message requesting the caller to input another code and returns to step 258. At step 262, the voice board outputs a message instructing the caller to press the start key on his facsimile machine to place the machine on line in a ready state to receive a facsimile transmission. The program then advances to step 263 in which the fax board is instructed to send the identified file as a facsimile transmission. In an alternative embodiment, at step 262 the caller can be given the option to input the telephone number of an alternate facsimile machine to which the transmission should be directed.

At step 264, the telephone connection is transferred to the fax board which then transmits the data in the identified file in a facsimile format, after handshaking with the fax machine to determine the correct operating parameters. The transmission is then checked to determine whether a satisfactory send has occurred. If an error has been detected, the program proceeds to step 266 in which the error is recorded. Otherwise, the call is terminated by releasing the phone line connection at step 265. The system then resets to await the next call at step 267.

WHAT IS CLAIMED IS:

1. A method of transmitting graphic and/or textual data stored in a data storage medium to a requester's facsimile machine over a telephone line, comprising the steps of:

a) responding to an incoming call from a requester with a prerecorded voice message;

b) receiving signals representing specific data stored in said data storage medium, other than voice message information, desired by said requester;

c) retrieving said specific data from said data storage medium;

d) instructing said requester to place said facsimile machine on line;

e) transmitting said specific data in facsimile format over said telephone line to said facsimile machine during said incoming call; and

f) terminating the incoming call.

2. The method of claim 1, wherein the step of receiving signals comprises the steps of receiving dual tone multi-frequency (DTMF) signals representing specific desired data, decoding the DTMF signals and determining the identity of the desired data from the decoded DTMF signals.

3. The method of claim 2, wherein the step of responding includes the steps of transmitting a prerecorded voice message indicating the file contents of the data storage medium which are available for transmission and the corresponding DTMF code for each separate data file, and generating a prompt signal

informing the requester to enter DTMf signals for the desired data.

4. The method of claim 3, wherein the step of responding further includes the steps of instructing the requester to input DTMF signals corresponding to the requester's account number and/or password.

5. The method of claim 1, wherein the step of transmitting includes the step of determining the operating parameters of said facsimile machine.

6. An apparatus for transmitting graphic and/or textual data requested by a user to a facsimile machine of the user over a telephone line, comprising:

a host computer including memory means for storing said graphic and/or textual data;

means for receiving an incoming call from said user over said telephone line;

voice generation means controlled by said host computer for generating voice signals over said telephone line to said user, said voice signals representing instructions informing said user of individual items of data in said memory means which can be selected by said user for transmission, and instructions informing said user of specific code signals associated with each of said individual items of data;

means for receiving code signals from said telphone line representing selected items of data;

means for decoding said received code signals to identify said selected items of data;

means for retrieving said identified items of data from said memory means;

means for transmitting said retrieved data in facsimile form to said facsimile machine; and

means for terminating said incoming call after completion of said facsimile transmission.

7. The apparatus of claim 6, wherein said code signals are dual tone mult-frequency (DTMF) signals.

8. The apparatus of claim 6, wherein said voice generation means includes storage means for storing digital voice data representing said voice signals.

9. The apparatus of claim 6, wherein said voice signals further include signals representing instructions to enter a password and/or account number of the user.

10. The apparatus of claim 6, wherein said voice signals include signals representing instructions prompting said user to input code signals corresponding to said selected items of data.

11. Apparatus for transmitting graphic and/or textual data stored in a memory of a host computer and requested by a user over a telephone line to a

facsimile machine of said user coupled to said telephone line, comprising:

means for receiving an incoming call from said user over said telephone line;

voice generation means for generating voice signals over said telephone line to said user, said voice signals representing instructions informing said user of individual items of data in said memory which can be selected by said user for transmission, and instructions informing said user of specific code signals associated with each of said individual items of data;

means for receiving code signals from said user over said telephone line representing selected items of data;

means for decoding said received code signals to identify said selected items of data;

means for retrieving said identified items of data from said memory;

means for transmitting said retrieved data in facsimile form to said facsimile machine; and

means for terminating said incoming call after completion of said facsimile transmission.

12. The apparatus of claim 11, wherein said code signals are dual tone multi-frequency (DTMF) signals.

13. The apparatus of claim 11, wherein said voice generation means includes storage means for storing digital voice data representing said voice signals.

14. The apparatus of claim 11, wherein said voice signals further include signals representing instructions to enter a password and/or account number.

15. The apparatus of claim 11, wherein said voice signals include signals representing instructions prompting said user to input code signals correspoinding to said selected items of data.

16. The apparatus of claim 6, wherein said means for receiving an incoming call includes means for simultaneously receiving a plurality of incoming calls over a plurality of telephone lines.

17. The apparatus of claim 11, wherein said means for receiving an incoming call includes means for simultaneously receiving a plurality of incoming calls over a plurality of telephone lines.

FIG. 1

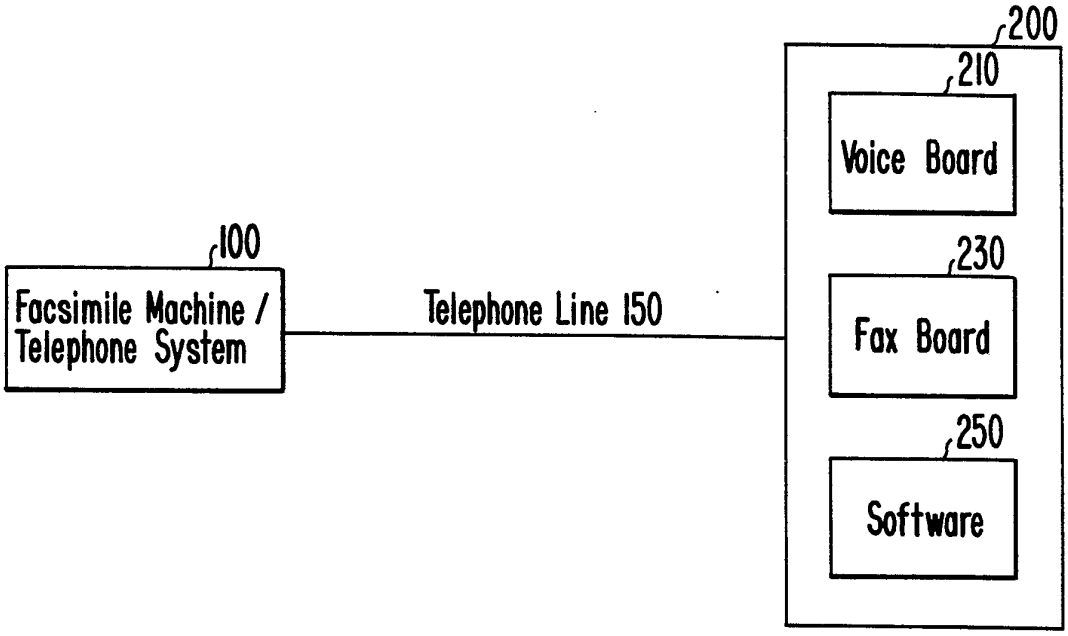

200
210
Voice Board
230
Fax Board
250
Software
100
Facsimile Machine / Telephone System
Telephone Line 150

FIG. 2

Block Diagram-4 Line Voice Board

Complete Diagram = 210

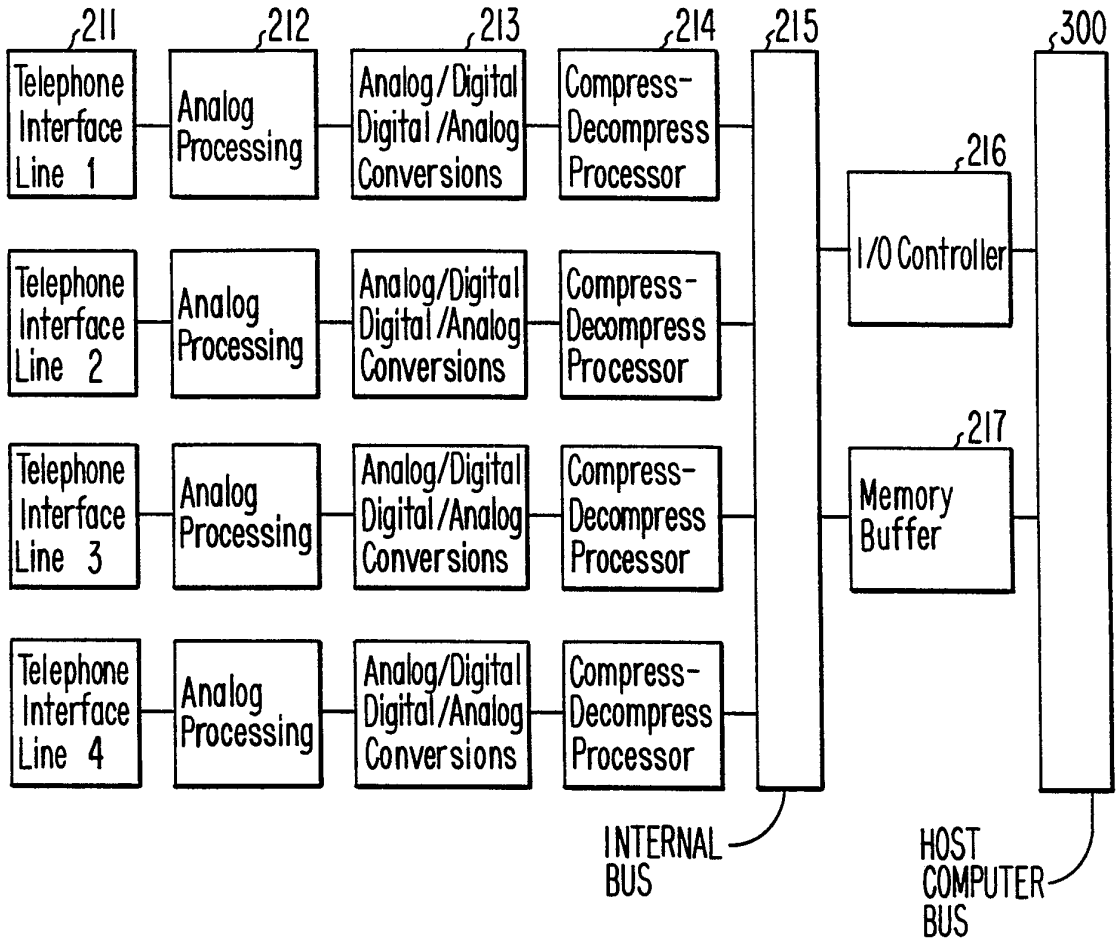


FIG. 3

Block Diagram — FAX Board

Complete Diagram = 230

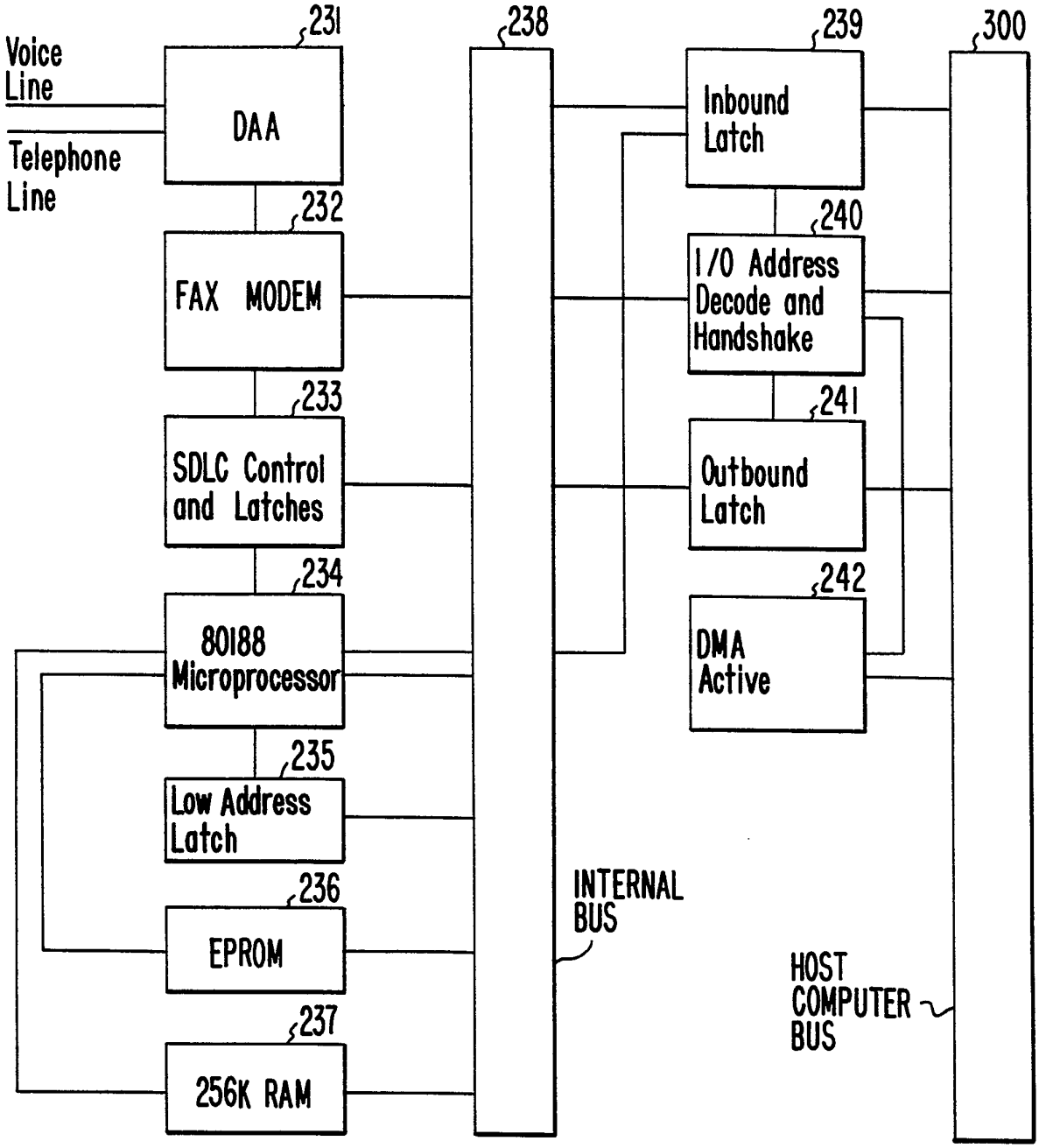


FIG. 4A
Main Processing Routine

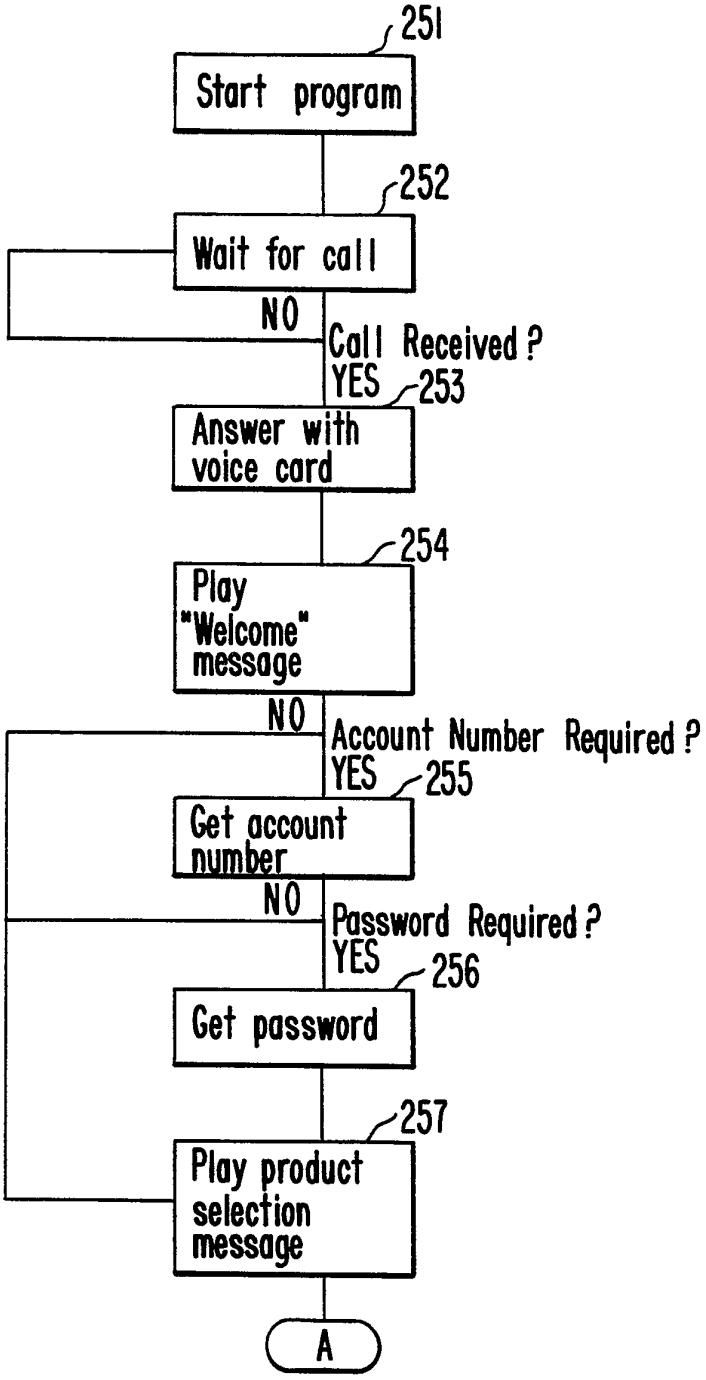


FIG. 4B

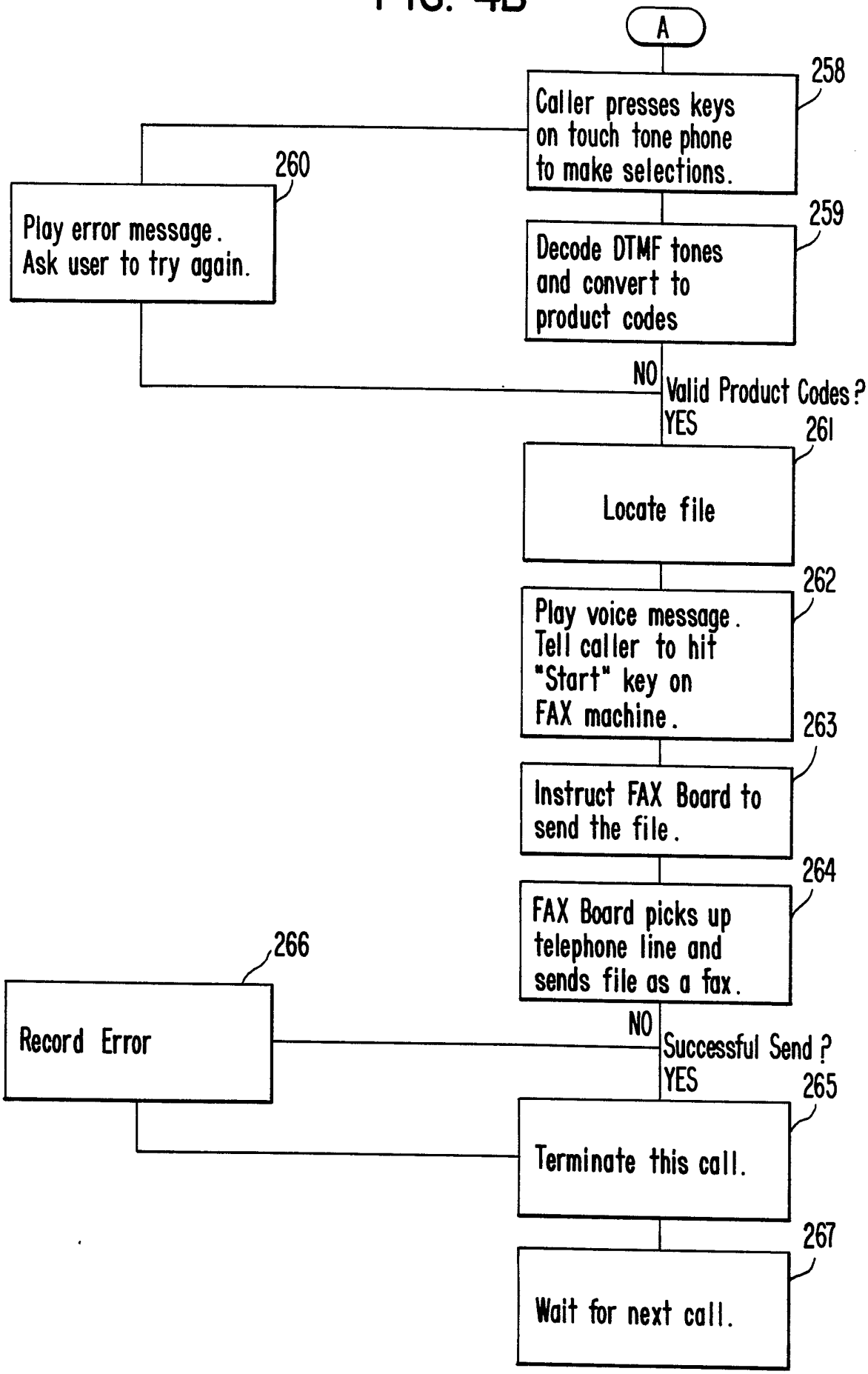

A
258
Caller presses keys on touch tone phone to make selections.
259
Decode DTMF tones and convert to product codes
NO
Valid Product Codes?
YES
260
Play error message. Ask user to try again.
261
Locate file
262
Play voice message. Tell caller to hit "Start" key on FAX machine.
263
Instruct FAX Board to send the file.
264
FAX Board picks up telephone line and sends file as a fax.
NO
Successful Send?
YES
266
Record Error
265
Terminate this call.
267
Wait for next call.

FIG. 5
"Get Password" Subroutine

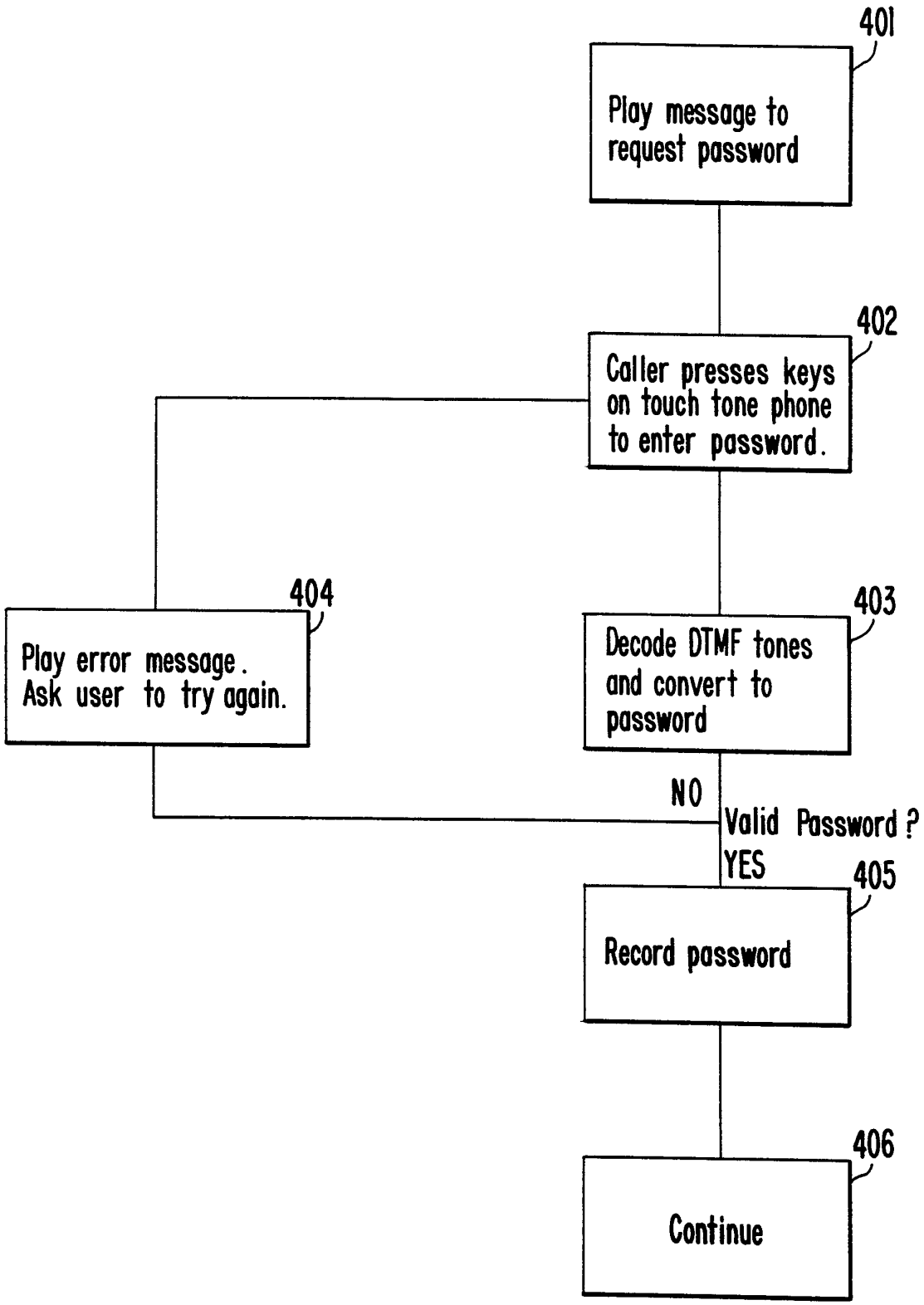
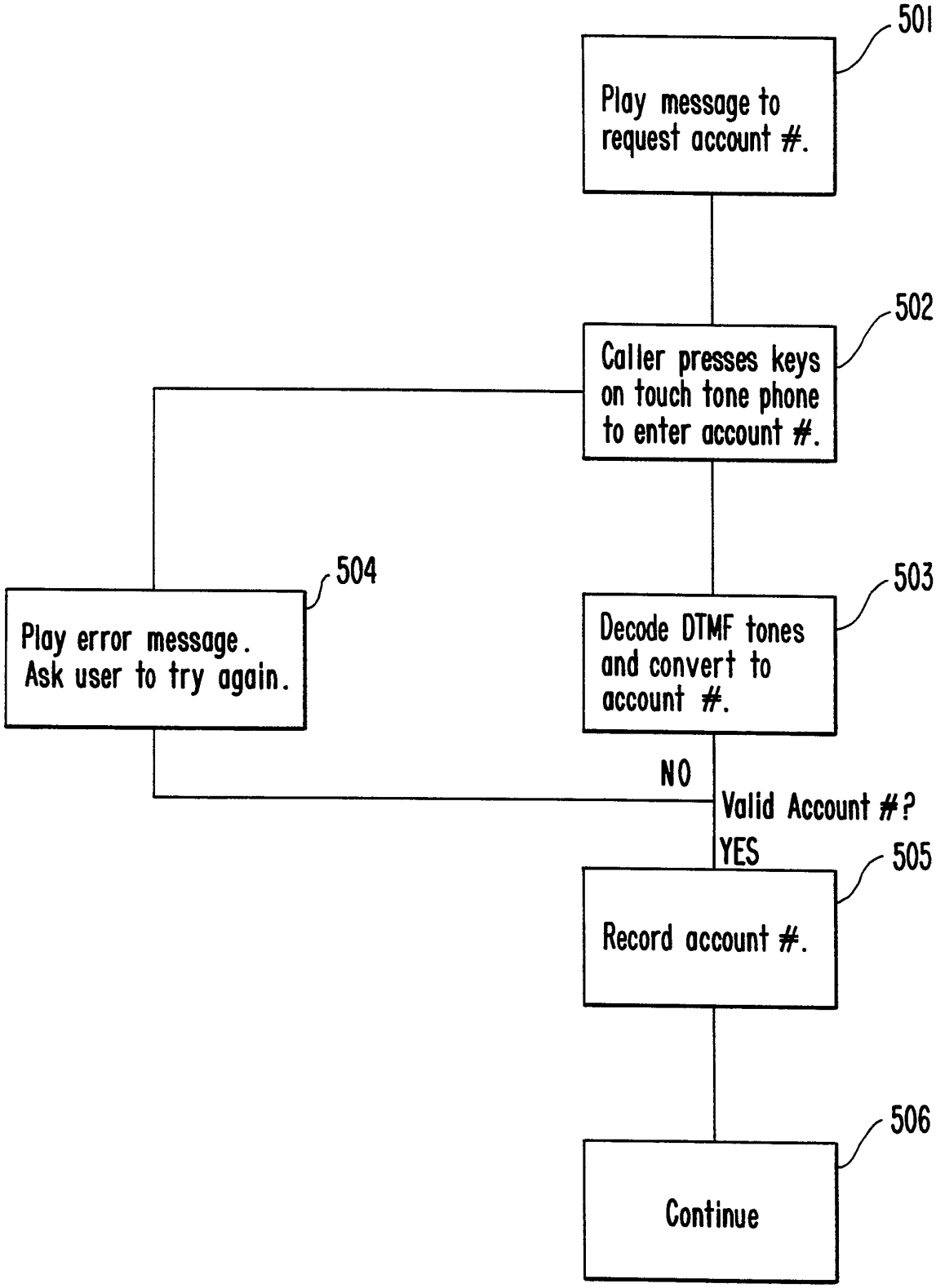


FIG. 6

"Get Account Number" Subroutine



INTERNATIONAL SEARCH REPORT

International Application No. PCT/US90/01065

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC (5): H04M 11/08, 11/00; Ho4N 1/32
US CL.: 379/88,96,100

II FIELDS SEARCHED

Minimum Documentation Searched 7

Classification System	Classification Symbols
U.S.	379/67,88,96-98,100

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8

III DOCUMENTS CONSIDERED TO BE RELEVANT 9

Category *	Citation of Document, 11 with indication, where appropriate, of the relevant passages 12	Relevant to Claim No. 13
Y	GB, A, 2,052,122,(Sugiyama et al), 21 January 1981, See abstract; all figure; page 1 lines 3-9,43-46,61-64,119-125; page 2 lines 8-10, 36-48,54-59,121-page 3 line 36, page 3 lines 121-130; page 4 lines 1-16, 24-30,64,65.	1-17
Y	JP,A, 57-152072, (Katou), 20 September 1982, See Abstract; figure 3; page 1 lines 15-18, page 4 line 8 to page 6 line 25 of the translation.	1-17
Y	R.J. Perdue et al, "Conversant 1 Voice System: Architecture and Applications", AT&T Technical Journal, Sept. /Oct. 1986, Vol. 65, Issue 5, See Figure 1,4,5; page 35 left hand column lines 1-7, pages 40,43.	3,4,9,10, 14-17
Y	Anonumous, "Document Distribution System", International Technology Disclosures, 25 May 1988, Page 2, right hand column, last full paragraph.	1,2,5,6-8 11-13

* Special categories of cited documents: 10

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
27 MARCH 1990	09 JUL 1990
International Searching Authority	**Signature of Authorized Officer**
ISA/US	Wing Fu Chan

Form PCT/ISA/210 (second sheet) (Rev.11-87)