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(54) **VOICE MESSAGING SYSTEM**

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(*) Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

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(57) **ABSTRACT**

A network-based voice messaging system is provided. A voice message is received at a network. The network converts the voice message into a text message by utilizing speech recognition software. The text message is transmitted to the intended recipient as an electronic mail (e-mail) message or facsimile document and is received by the intended recipient on conventional text receiving equipment.

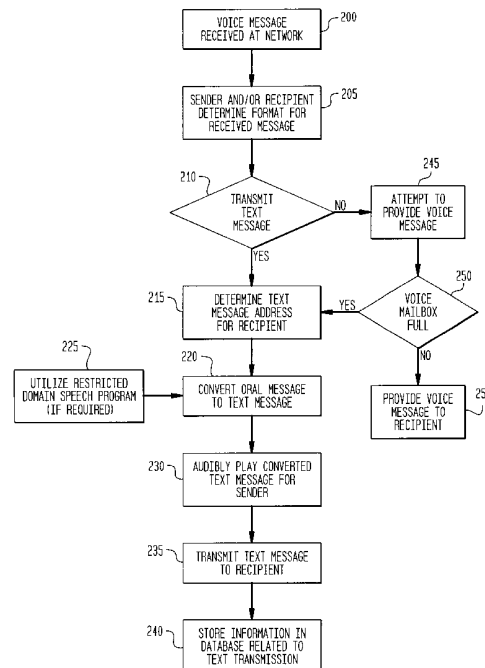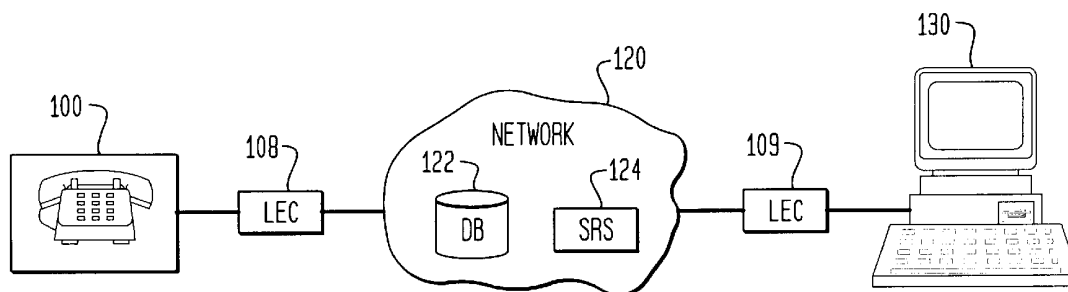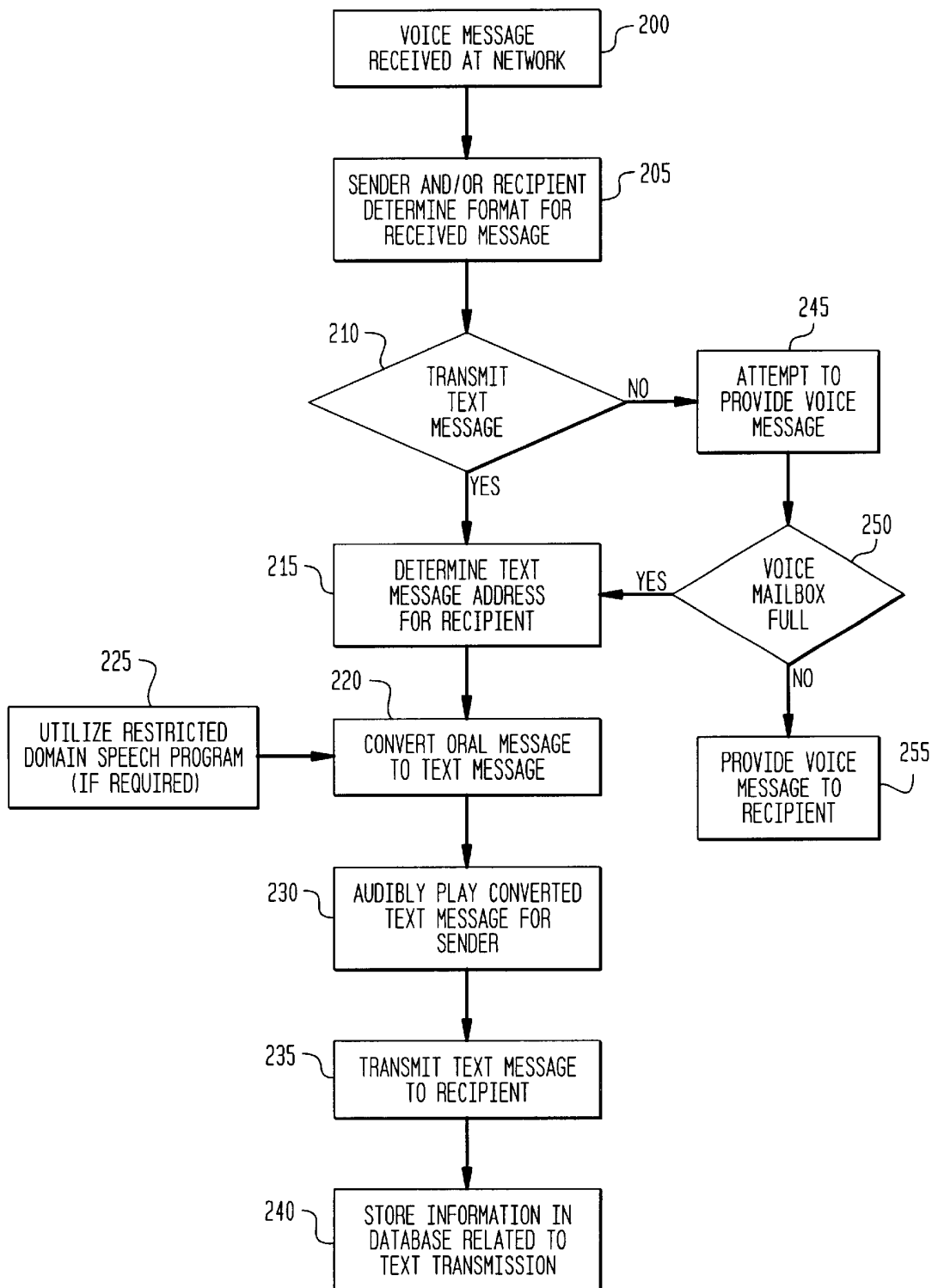**13 Claims, 2 Drawing Sheets**

FIG. 1

FIG. 2

VOICE MESSAGE
RECEIVED AT NETWORK — 200

SENDER AND/OR RECIPIENT
DETERMINE FORMAT FOR
RECEIVED MESSAGE — 205

210 — TRANSMIT
TEXT
MESSAGE

NO → ATTEMPT TO
PROVIDE VOICE
MESSAGE — 245

YES

215 — DETERMINE TEXT
MESSAGE ADDRESS
FOR RECIPIENT

YES ← VOICE
MAILBOX
FULL — 250

NO

225 — UTILIZE RESTRICTED
DOMAIN SPEECH PROGRAM
(IF REQUIRED)

220 — CONVERT ORAL MESSAGE
TO TEXT MESSAGE

PROVIDE VOICE
MESSAGE TO
RECIPIENT — 255

230 — AUDIBLY PLAY CONVERTED
TEXT MESSAGE FOR
SENDER

235 — TRANSMIT TEXT MESSAGE
TO RECIPIENT

240 — STORE INFORMATION IN
DATABASE RELATED TO
TEXT TRANSMISSION

VOICE MESSAGING SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to a method and apparatus for processing and transmitting a voice message. More specifically, the invention provides for converting a voice message to a text message and transmitting the text message to the intended recipient. A service provider network receives the voice message transmitted by the sender and converts the message into a text format. The network then transmits the text message to the intended recipient.

Currently, it is possible for a sender of a message to send text messages to an intended recipient. These messages can be electronic mail messages that are generated on the personal computer of the sender and transmitted over a network to the intended recipient's personal computer. Alternatively, these text messages can be documents that are transmitted to the intended recipient by utilizing a facsimile machine. However, with both of these known methods for sending a text message to an intended recipient, the sender of the message must have access to transmission equipment that is capable of sending the text message, e.g., a personal computer or a facsimile machine.

The sender of a message who wants to send a text message to an intended recipient may not always have access to conventional text transmission equipment. For example, a sending party that wants to send an e-mail message to an intended recipient could be at an airport and thus not have access to conventional e-mail transmission equipment. Therefore, it would be desirable to provide a capability where a person who desires to transmit a text message to an intended recipient could send the text message to the intended recipient without requiring the sender to have access to conventional transmission equipment for sending text messages.

Currently, it is also possible for an intended recipient of a voice mail message to receive the voice mail message from the sending party. However, as with the situation above where the sender of a text message must have access to conventional transmission equipment, the intended recipient of a voice mail message must have access to a conventional telephone in order to receive the voice mail message. As such, it may not always be possible for the intended recipient of a voice mail message to receive the message at a time when desired. Therefore, it would also be desirable to provide a capability to receive a voice mail message where the person who desires to receive the voice mail message does not have access to a conventional telephone.

SUMMARY OF THE INVENTION

The present invention overcomes the drawbacks in the above-described communication scenarios. In accordance with the present invention, a network-based voice messaging system is provided. The system provides the capability to convert a voice mail message to a text message.

A voice message is received at a network. The network converts the voice message into a text message by utilizing known speech recognition software. The text message is transmitted to the intended recipient as an electronic mail (e-mail) message or facsimile document and is received by the intended recipient on conventional text receiving equipment. Thus, a sending party that desires to send a text message but who does not have access to conventional text transmission equipment could utilize a telephone connected to a network to provide a voice message for an intended

recipient. The network would convert the voice message into a text message and transmit the text message to the intended recipient. In the second situation where an intended recipient of a voice message desires to receive the message but does not have access to a conventional telephone, the intended recipient could have the network convert the voice message to a text message and transmit the text message to the personal computer or facsimile machine of the intended recipient.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates an embodiment for the voice messaging system of the present invention.

FIG. **2** illustrates a process flow chart for the method steps in practicing an embodiment of the present invention.

DETAILED DESCRIPTION

FIG. **1** illustrates a functional block diagram for one embodiment of the network-based voice messaging system of the present invention. A voice message, or oral message, is input into network **120** by utilizing telephone **100**. Telephone **100** is connected to network **120** through local exchange carrier switch **108**. Upon receipt of the voice message at network **120**, network **120** will convert the voice message into a text message by utilizing known speech recognition software **124**, which is stored in network **120**. After network **120** converts the voice message to a text message, network **120** transmits the text message to the intended recipient's receiving apparatus **130**, such as by connection through LEC switch **109**, where the message is received by the intended recipient.

Network **120** may be an integrated services provider network or a telephone network. As such, network **120** provides interconnection between the sender's telephone **100** and the intended recipient's receiving apparatus **130**. Network **120** is capable of converting the voice message into a variety of different types of text messages by utilizing speech recognition software **124** and standardized text formatting software. For example, network **120** is capable of converting the input voice message into either an electronic mail (e-mail) message or a text document to be transmitted as a facsimile document. Network **120** contains transmission equipment to transmit the converted text message to the intended recipient's receiving apparatus **130**.

The intended recipient's receiving apparatus **130** may be a variety of different types of equipment, e.g., a personal computer or a facsimile machine. All that is required is that the apparatus be capable of receiving the particular type of text-formatted message that is transmitted by network **120**, for example, a personal computer for receiving electronic mail (e-mail) messages or a facsimile machine for receiving fax documents. For purposes of illustration, the present invention will be described in an embodiment where the voice message is converted into an electronic mail message and transmitted to the intended recipient's personal computer **130**.

In continuing with the description of an embodiment of the present invention, the invention has utility for a person who desires to send an electronic mail message to an intended recipient but who does not have access to an electronic mail transmission device. In order to send an electronic mail message to an intended recipient in this circumstance, the sending party, who is a subscriber to network **120**, dials into network **120** by utilizing telephone **100**. After dialing into network **120**, network **120** will ask the calling party if they would like to place a voice phone

call or would like to send an electronic mail message. If the calling party desires to place a voice phone call, the calling party will be prompted to dial the phone number of the desired party and network **120** will attempt to establish the phone connection. If the calling party desires to send an electronic mail message, the network will prompt the calling party for information in order to compose and transmit the e-mail message.

When sending an electronic mail message to an intended recipient, the sending party must identify the intended recipient for the e-mail message so that the intended recipient's e-mail address can be determined. There are many possible ways for identifying who the intended recipient is. All that is required is that an electronic mail address for the recipient be ultimately determined. The easiest method for determining this information is for the sender to directly input the e-mail address for the recipient into the network when recording the voice message. Network **120** can prompt the calling party to input the intended recipient's e-mail address. The calling party can input the e-mail address by speaking the e-mail address into network **120** and having speech recognition software **124** interpret the spoken e-mail address, or the sending party could enter the recipient's e-mail address by utilizing the telephone's keypad.

Alternative methods for determining the e-mail address for the recipient could be for the sender to input other information identifying the recipient into the network. For example, the sender could speak the recipient's name into the network. If this methodology was utilized, the network would utilize this information to access database **122** to correlate the name of the recipient to an e-mail address for the recipient.

Database **122** contains identification information for potential recipients. This identification information could be, as previously mentioned, the name of the recipient. As such, the sender can enter any identification information for the intended recipient into the network and the network would utilize this information to obtain the correct e-mail address for the recipient by accessing database **122**. The only requirement is that the identification information entered by the sender must also be stored in database **122** so that correlation of the identification information to an e-mail address can be accomplished.

Information can be input to database **122** by either the calling party or by the network itself. The network can provide for entering information into database **122** by utilizing, for example, subscriber information provided to the network if the intended recipient is also a subscriber to the network or by having the network service provider enter information that is obtained from personal data lists that are commercially available. Additionally, information is also input to network database **122** through normal use of the present invention. For example, when a sender sends an e-mail document to an intended recipient, all information entered by the sender into network **120** when sending the message is automatically entered into the database. In this manner, information is input to database **122** through normal use of the system by the subscriber, and thus does not necessarily have to be input by a separate data input step that is specifically intended for inputting information into the database.

In the situation where there is either no information contained in database **122** for an intended recipient or where there is information contained in the database for a particular intended recipient, e.g., the name of the intended recipient, but there is no e-mail address available for the intended

recipient, the sending party will be provided with the recognized name of the intended recipient, as recognized by speech recognition software **124**, and will be prompted to provide an e-mail address for the intended recipient.

In order to compose an e-mail message for transmission to an intended recipient, the sender will orally speak the message to be delivered into network **120**. As mentioned previously, network **120** contains speech recognition software **124**. Speech recognition software **124** will convert the oral message into a text format by utilizing known speech-to-text conversion software. Once the oral message is converted into a text format, network **120** will format the text-formatted document into an e-mail message and transmit the e-mail message to the intended recipient by utilizing the intended recipient's e-mail address, which has been determined through the process as described previously.

Currently known speech recognition software has limitations with respect to the library of words that can be recognized. For example, not all voice recognition software programs will be able to recognize words that relate solely to a particular segment of the population. For example, words that are commonly used by medical personnel are not usually words that are commonly used in the general population. Therefore, most general purpose voice recognition systems will not contain these words in their database. However, there are voice recognition systems that are specifically designed to be utilized with speech that is specific to a particular segment of the population. These voice recognition systems are generally known as restricted domain systems.

Because a particular sending party may desire to send a message that contains words that may not be contained in a general purpose speech recognition software program, but that may only be contained in a "restricted domain" speech recognition program, network **120** contains restricted domain speech recognition programs. Network **120** will query the sending party as to whether they desire to utilize a restricted domain speech recognition program. If the sending party realizes that their message contains words that are not commonly used, the sending party would select from a menu of restricted domains that would be provided to the sending party by network **120**. The sending party would then select the restricted domain appropriate to their message and network **120** would utilize this restricted domain voice recognition program to recognize the speech of the sending party.

If the sending party does not select a restricted domain software program upon call initiation and the network is not able to recognize the spoken message of the sending party because it contains words that are not contained in the general purpose speech recognition software, the network will inform the sender that the speech cannot be recognized and will prompt the user to select a restricted domain for speech interpretation that may possibly contain the spoken words.

After the network composes the electronic mail message by interpreting and converting the voice message, and before transmitting the e-mail message, network **120** will audibly provide the sending party with the name, e-mail address, and message content of the e-mail message as converted from the voice message of the sender. The name that network **120** provides to the sender for verification is the name that is recognized and interpreted by the speech recognition software as input by the sender. The e-mail address is that address either accessed from database **122** or input by the sender. The message content of the e-mail

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