



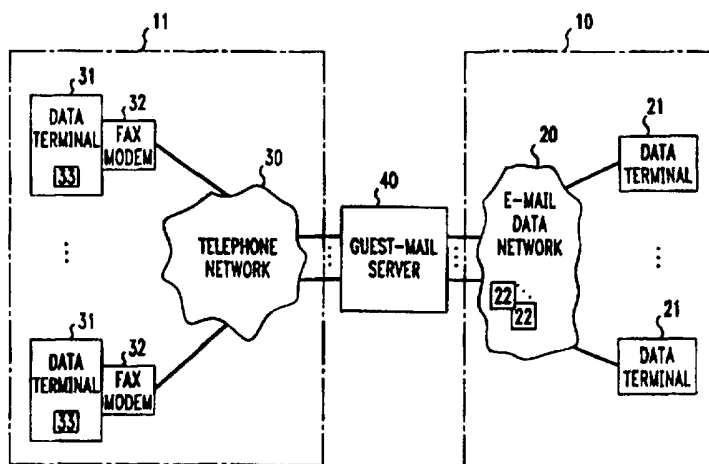
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(54) Title: GUEST MAIL: COMMUNICATING ELECTRONIC MESSAGES BETWEEN DISPARATE MESSAGING SYSTEMS

(57) Abstract

Messages between the telephone network (30) and the Internet network (20) are exchanged through a guest-mail server (40). The server receives a telephone call from a data terminal (31) in the telephone network and via the call receives a fax message containing a destination address in the Internet network. The server identifies, validates, and bills the fax message sender, converts the fax message into an e-mail message addressed to the destination in the Internet network, and transmits the e-mail message to the Internet network. Conversely, the server receives from a data terminal (21) on the Internet network an e-mail message addressed to the server and including a telephone number of a destination in the telephone network. The server validates and bills the destination telephone number, converts the e-mail message into a fax message, makes a telephone call in the telephone network to the destination telephone number, and sends the fax message via the call.



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GUEST MAIL: COMMUNICATING ELECTRONIC MESSAGES BETWEEN DISPARATE MESSAGING SYSTEMS

Technical Field

The invention relates generally to communications services and
5 products, and relates specifically to electronic mail.

Background of the Invention

A messaging system -- such as a voice-mail system or an e-mail system,
for example -- defines electronic mailboxes for subscribers and allows the
subscribers to send and receive messages to and from each other through the
10 mailboxes via their user terminals and the communications network on which the the
system is based. In a client-server messaging system, the mailboxes are centralized
at a messaging system server and operate under its control. Conversely, in a peer-
to-peer messaging system, the mailboxes are distributed such that each subscriber's
terminal has its own mailbox that operates under the terminal's control.

15 Various types of messaging systems are well known in the art. Client-
server messaging systems include electronic mail (e-mail) systems, wherein
subscribers communicate data messages to and from an e-mail server via data
terminals or personal computers (PCs) over a data network. The data terminals or
PCs may be connected to the data network either directly, or indirectly via modems
20 and the telephone network. Client-server messaging systems also include voice-mail
systems, wherein subscribers communicate voice messages to and from a voice-mail
server via telephones over the telephone network. Some voice-mail systems have
actually become multi-media systems, and allow subscribers to communicate fax
messages via fax machines or fax-enabled PCs over the telephone network and to
25 communicate data messages via PCs and modems over the telephone network.
Peer-to-peer messaging systems include e-mail systems wherein subscribers
communicate data messages directly between the message sender's and message
recipient's PCs via a data network or the telephone network. Peer-to-peer messaging
systems also include fax machines, or telephone answering machines and their
30 associated telephone sets, interconnected by the telephone network.

But what if the subscribers of different messaging systems want to send
messages to each other? Particularly, what if a subscriber of a client-server system
wants to send a message to a subscriber of a peer-to-peer system, or vice versa. For
example, what if a subscriber of the telephone network but not of the data network,
35 who is equipped with a fax machine or a PC and a modem for fax communications
through the telephone network, wants to send a message to a subscriber of the e-mail

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system. Or what if the subscriber of the data network wants to send a data message to the subscriber of the telephone network who is neither a subscriber of a multi-media voice-mail system nor a subscriber of the e-mail system? Messaging has generally not been possible in such situations.

5 Summary of the Invention

This invention is directed to solving these and other problems and disadvantages of the prior art. According to the invention, there is provided a service, referred to herein as "guest mail", and a gateway for providing the guest-mail service, that enables subscribers of disparate electronic messaging systems to

10 send messages to each other. In a telecommunications system that comprises a client-server messaging system and a peer-to-peer messaging system, the gateway interconnects the two messaging systems and includes at least one of (a) an arrangement for receiving a peer-to-peer message from a first sender for a first recipient via the peer-to-peer messaging system, converting the received peer-to-peer

15 message into a corresponding client-server message, and sending the corresponding client-server message to the first recipient via the client-server messaging system, and (b) an arrangement for receiving a client-server message from a second sender for a second recipient via the client-server messaging system, converting the message into a corresponding peer-to-peer message, and sending the corresponding

20 peer-to-peer message to the second recipient via the peer-to-peer messaging system. The first sender may be but need not be the second recipient, and the first recipient may be but need not be the second sender. In a telecommunication system that comprises a first electronic messaging system for messages having a first form -- such as a telephone network-based multi-media messaging system wherein messages

25 take the form of fax messages, for example -- and a second electronic messaging system for messages having a second form disparate from the first form -- such as a data network-based e-mail system wherein messages take the form of e-mail messages, for example -- the gateway interconnects the two messaging systems and has an address -- a telephone number or a data network address, for example -- in at

30 least one (e.g., the first) of the messaging systems. The gateway receives from the first messaging system a message having the first form and addressed to the gateway. This is effected, for example, by making a telephone call to the telephone number of the gateway in the telephone network and then transmitting a fax message to the gateway via the call. The message having the first form includes an address of its

35 destination in the second messaging system. The gateway preferably identifies the message sender or recipient, verifies that the sender or recipient is entitled to use the

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guest-mail service, and bills the sender or recipient for the service. The gateway converts the received message having the first form into a message having the second form and addressed to the destination in the second messaging system, and then transmits the converted message to its destination (i.e., its address) in the
5 second messaging system. Preferably, a corresponding transfer of messages in the other direction is also effected.

The guest-mail service and gateway advantageously allow subscribers of the telephone network who have fax messaging to communicate with subscribers of a data network, such as the Internet, who have e-mail messaging capability. Yet it
10 does so without requiring any modifications to either network and its messaging capabilities, and without requiring the subscribers of the telephone network to also be subscribers of the data network, or vice versa. Rather, the guest-mail service and gateway provide the subscribers of the telephone network with access to the data network, and vice versa, on an as-needed, on-demand, basis. Advantageously, only
15 one of the parties to a communication -- the telephone network subscriber, irrespective of whether the subscriber is the message sender or the message recipient -- need be entitled to use the guest-mail service in order for the service to be provided, and the entitled party is billed for the service irrespective of the direction of message transfer.

20 These and other advantages and features of the invention will become more apparent from the following description of an illustrative embodiment of the invention taken together with the drawing.

Brief Description of the Drawing

FIG. 1 is a block diagram of a telecommunication system that includes
25 an illustrative embodiment of the invention;

FIG. 2 is a block diagram of a guest-mail server of the system of FIG. 1;

FIG. 3 is a functional flow diagram of the operations of the guest-mail server of FIG. 2 in transferring a message from a telephone network-based messaging system of FIG. 1 to a data network-based messaging system of FIG. 1;
30 and

FIG. 4 is a functional flow diagram of the operations of the guest-mail server of FIG. 2 in transferring a message from the data network-based messaging system of FIG. 1 to the telephone network-based messaging system of FIG. 1.

Detailed Description

FIG. 1 shows an illustrative telecommunications system that comprises two disparate messaging systems: a data network-based system 10 and a telephone network-based system 11.

5 System 10 comprises a conventional data network 20 that provides a centralized store-and-forward e-mail messaging service to data subscribers. For this purpose, data network 20 defines a mailbox 22 for each data subscriber. Each data subscriber has a data terminal 21 connected to data network 20. The connections may be either direct, or via modems over telephone lines. Data network 20 is
10 illustratively the Internet, and data terminals 21 are illustratively PCs.

System 11 comprises a conventional telephone network 30 that provides communications connections between telephone subscriber's terminals. These terminals include not only telephones (not shown) but also data terminals 31, such as
15 PCs or fax machines. If telephone network 30 is an analog network, data terminals 31 are equipped with modems 32 to permit them to engage in data communications over network 30, as is conventional. Specifically, modems 32 may be fax modems that enable data terminals 33 to communicate through telephone network 30 in a fax format, just like conventional fax machines do. If telephone network 30 is a digital
20 network, such as the ISDN network, data terminals 31 can communicate digitally through network 30 and hence do not need to use modems 32. Preferably, each terminal 31 includes both a telephone device and a personal computer, and an arrangement that interfaces the two, such as the one described in U.S. patent application of J. L. Bentley et al. entitled "Arrangement for Interfacing a Telephone Device with a Personal Computer", serial no. 08/368678, filed on January 3, 1995,
25 and assigned to the same assignee as this application. System 11 provides a distributed messaging service to telephone subscribers. For this purpose, each data terminal 32 defines its own mailbox 33 and functions like an answering machine. As described so far, the telecommunications system of FIG. 1 is conventional.

According to the invention, disparate messaging systems 10 and 11 are
30 interconnected by a guest-mail server 40 that acts as a gateway between messaging systems 10 and 11 and allows data terminals 21 and data terminals 31 to send and receive e-mail messages to and from each other. Advantageously, neither the users of data terminals 21 nor the users of data terminals 31 need be subscribers of guest-mail services. Rather, they may use server 40 on an on-demand, as-needed, basis.
35 The structure of guest-mail server 40 is shown in FIG. 2.

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Guest-mail server 40 is preferably a stored-program-controlled machine -- a computer -- that includes a memory 200 which stores control programs and a processor 201 which executes the control programs from memory 200 to implement the functions of guest-mail server 40. Other hardware included in guest-mail server 40 is a fax interface 202 and a data interface 203. Fax interface 202 connects guest-mail server 40 to telephone network 30. It is the functional equivalent of a plurality of fax modems 32, but also includes a portion of memory 200 for storing users' messages. Data interface 203 connects guest-mail server 40 to data network 20. It is the functional equivalent of the interfaces of a plurality of data terminals 21 to data network 20, but also includes a portion of memory 200 for storing users' messages.

The control programs of guest-mail server 40 include a format conversion program 210 which converts the fax format of messages received by fax interface 202 into e-mail message format and forwards the converted messages to data interface 203 for transmission on data network 20, and which also converts the e-mail format of messages received by data interface 203 into fax message format and forwards the converted messages to fax interface 202 for transmission on telephone network 30. Illustratively, the conversion from e-mail to fax may be accomplished by representing the e-mail ASCII text characters in bit-map format. Illustratively, the conversion from fax to e-mail can use optical character recognition (OCR) to convert from the bit-map representation of characters into the ASCII representation of characters in the e-mail format. The control programs also include an address substitution program 211, which extracts e-mail addresses of recipients of messages received by fax interface 202, either from a database or from the messages themselves, and substitutes them for the telephone numbers of the received messages. Address substitution program 211 also extracts the telephone numbers of recipients of messages received by data interface 203 and substitutes them for the e-mail addresses of the received messages. The control programs further include a user validation program 212 which validates, through a database lookup, that the sender or the intended recipient of every user messages received by fax interface 202 or data interface 203 is an authorized user of the service provided by guest-mail server 40, and either permits guest-mail server 40 to transfer the message between systems 10 and 11 or causes guest-mail server 40 to block propagation of the message between systems 10 and 11. Finally, the control programs also include a billing program 213 which bills users who are validated by program 212 for services performed by guest-mail server 40 on their behalf.

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The operation of guest-mail server 40 in transferring a message from system 11 to system 10 is diagramed in FIG. 3. When a user of a data terminal 31 wishes to send an e-mail message to a user of a data terminal 21, the user of data terminal 31 composes the message on data terminal 31 and addresses it with the data network 20 address of the intended recipient. The user of data terminal 31 then dials the telephone number of guest-mail server 40. Telephone network 30 connects the call to fax interface 202, at step 300, and fax interface 202 answers the call, at step 302, and identifies the caller, at step 304. Fax interface 202 can identify the caller from the ANI (calling number) information that is provided by telephone network 30, or by prompting the sending data terminal 31 to provide identifying information such as the calling telephone number, an identifying code, an account number, or a credit card number. Fax interface 202 passes this information to user validation 212. Data terminal 31 then transmits the message, including its destination address on network 20, through telephone network 30 in fax format, illustratively by using the FAX-BFT protocol.

Fax interfaces 202 receives the message, at step 306, and stores it in memory 200, at step 308. In the meantime, user validation 212 examines the user identification that was provided by fax interface 202 to determine if it is a credit card number, at step 310. If not, user validation 212 compares the user identification against contents of an internal valid-user database to determine if the calling telephone number, identifying code, or account number matches a database entry and hence identifies the sender as a valid user, at step 312. If the identifying information is a credit card number, user validation 212 makes a data call (e.g., through fax interface 202) to a credit bureau (not shown), at step 314, to obtain the name and address of the owner of the number and confirm his or her sound credit, at step 316.

If the identifying information does not produce a database match or if the credit of the caller does not check out, the caller is considered to be an invalid user, at step 318. User validation 212 therefore causes fax interface 202 to send an indication to the caller that the fax message was rejected, at step 320, and to hang up the call, at step 322. User validation 212 also deletes the message from memory 200, at step 324, and handling of the message comes to an end, at step 326.

If the identifying information does produce a database match or if the credit of the caller checks out, the caller is considered to be a valid user, at step 318. User validation 212 therefore causes fax interface 202 to send an indication to the caller that the fax message was accepted, at step 330, and to hang up the call, at step 332. User validation 212 then sends the information obtained from the user database

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or the credit bureau to billing 213, which responds by creating a billing record for the caller, at step 334. At this point, format conversion 210 and data substitution 211 are invoked. Format conversion 210 retrieves the fax message from memory 200 and converts it from the fax format into e-mail format (which is illustratively the RFC-822 format, if data network 20 is the Internet), at step 336. Address substitution 211 retrieves the data network address from the fax message in memory 200 and appends it to the e-mail format message, at step 338. At this point, data interface 203 is notified of the message, and it retrieves the converted message from memory 200, at step 340, and transmits it to e-mail data network 20, at step 342, where it will be stored by data network 20 in mailbox 22 of the intended recipient. Handling of the message at guest-mail server 40 thus comes to an end, at step 344.

The operation of guest-mail server 40 in transferring a message from system 10 to system 11 is diagramed in FIG. 4. When a user of a data terminal 21 wishes to send an e-mail message to a user of a data terminal 31, the user of data terminal 21 composes the message on data terminal 21 and addresses it with a data network 20 address of guest-mail server 40. The user appends the telephone number of the intended message recipient to the data network address. The user then transmits the e-mail message from data terminal 21 to data network 20, and data network 20 routes the message to guest-mail server 40. Data interface 203 receives the e-mail message, at step 402, and stores it in memory 200, at step 404. Data interface 203 also sends the appended telephone number to user validation 212. User-validation 212 compares the telephone number against contents of its valid-user database to determine if the number matches a database entry and hence identifies the recipient as a valid user, at step 406. If the intended recipient is deemed to be an invalid user of services provided by guest-mail server 40, as determined at step 408, user validation 212 causes data interface 203 to return to the sender of the message a notification via data network 20 that the message was refused, at step 410, and deletes the message from memory 200, at step 412. Handling of the message thus comes to an end, at step 414.

If the user is deemed to be valid, as determined at step 408, user validation causes data interface 203 to return to the sender of the message a notification that the message was accepted, at step 420. User validation 212 then sends the information obtained from the user database to billing 213, which responds by creating a billing record for the recipient, at step 422. At this point, format conversion 210 and data substitution 211 are invoked. Format conversion 210 retrieves the mail message from memory 200 and converts it from the e-mail format

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of network 20 into a fax format, at step 424. Address substitution 211 retrieves the appended telephone number from the e-mail message's address, at step 426, and provides it to fax interface 202, which is invoked at this point. Fax interface 202 uses the telephone number to place a call to the intended recipient of the e-mail message, at step 428. When the intended recipient's data terminal 31 answers the call, fax interface 202 retrieves the converted message from memory 200, at step 430 and sends it to data terminal 31 as a fax message, illustratively using the FAX-BFT protocol, at step 432. Fax modem 32 of data terminal 31 re-converts the fax message back into digital form. Handling of the message by guest-mail server 40 thus comes to an end, at step 434.

Of course, various changes and modifications to the illustrative embodiment described above will be apparent to those skilled in the art. For example, the messages may be conveyed in a format other than fax format through the telephone network, the data network need not be the Internet but may be any data network, either message recipients or message senders or both parties may be billed by the gateway in each instance, the e-mail messages may be multimedia messages, or the gateway may perform medium conversion between text messages in the data network and voice messages in the telephone network. Also, all messages originating from terminals in the telephone network may always be sent to the gateway, whereupon the gateway determines if the intended recipient is a subscriber of the messaging service in the telephone network and sends the message to the recipient through the telephone network if the recipient is a subscriber of the messaging service in the telephone network, and sends the message to the recipient through the data network only if the recipient is not a subscriber of the messaging service in the telephone network. Such changes and modifications can be made without departing from the spirit and the scope of the invention and without diminishing its attendant advantages. It is therefore intended that such changes and modifications be covered by the following claims.

The invention claimed is:

1. A telecommunications system comprising:
 - a client-server messaging system;
 - a peer-to-peer messaging system;
 - 5 a gateway interconnecting the client-server messaging system and the peer-to-peer messaging system and including at least one of (a) peer-to-peer receiving means for receiving a peer-to-peer message from a first sender for a first recipient via the peer-to-peer messaging system, peer-to-peer converting means for converting the received peer-to-peer message into a corresponding client-server
 - 10 message, and client-server sending means for sending the corresponding client-server message to the first recipient via the client-server messaging system, and (b) client-server receiving means for receiving a client-server message from a second sender for a second recipient via the client-server messaging system, client-server converting means for converting the received client-server message into a
 - 15 corresponding peer-to-peer message, and peer-to-peer sending means for sending the corresponding peer-to-peer message to the second recipient via the peer-to-peer messaging system.

2. The telecommunications system of claim 1 wherein:
 - the first sender is not a subscriber of the client-server messaging system,
 - 20 and the second sender is not a user of the peer-to-peer messaging system.

3. The telecommunications system of claim 2 wherein:
 - the first recipient is not a user of the peer-to-peer messaging system, and
 - the second recipient is not a subscriber of the client-server messaging system.

4. The telecommunications system of claim 1 further comprising:
 - 25 means for billing for services provided by the gateway.

5. The telecommunications system of claim 1 further comprising:
 - means for billing one of (a) the first sender and (b) the second recipient,
 - for services provided by the gateway.

6. The telecommunications system of claim 1 wherein:

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the peer-to-peer receiving means comprise

means for receiving a peer-to-peer message addressed by the first sender to a peer-to-peer messaging system address of the gateway in the peer-to-peer messaging system, the peer-to-peer message including a client-server messaging system address corresponding to the first recipient, and

5 the client-server sending means send the corresponding client-server message to the client-server messaging system address corresponding to the first recipient; and

the client-server receiving means comprise

10 means for receiving a client-server message addressed by the second sender to a client-server messaging system address corresponding to the gateway in the client-server messaging system, the client-server message including a peer-to-peer messaging system address of the second recipient, and

15 the peer-to-peer sending means send the corresponding peer-to-peer message to the peer-to-peer messaging system address of the second recipient.

7. A telecommunications system comprising:

a first electronic messaging system for messages having a first form;

a second electronic messaging system for messages having a second form disparate from the first form; and

20 a gateway interconnecting the first messaging system with the second messaging system, the gateway having an address in at least the first messaging system and comprising

25 means for receiving from the first messaging system a message having the first form and addressed to the gateway, the message having the first form and including an address of a destination in the second messaging system,

means responsive to receipt of the message having the first form, for converting the message having the first form into a message having the second form and addressed to the destination in the second messaging system, and

30 means responsive to the conversion, for transmitting to the second messaging system the message having the second form and addressed to the destination in the second messaging system.

8. The telecommunications system of claim 7 wherein:

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the gateway also comprises
means for receiving from the second messaging system a message
having the second form and addressed to the gateway, the message having the
second form and addressed to the gateway including an address of a destination in
5 the first messaging system,
means responsive to receipt of the message having the second form and
addressed to the gateway, for converting the message having the second form and
addressed to the gateway into a message having the first form and addressed to the
destination in the first messaging system, and
10 means responsive to the conversion of the message having the second
form and addressed to the gateway, for transmitting to the first messaging system the
message having the first form and addressed to the destination in the first messaging
system.

9. The telecommunications system of claim 8 wherein:
15 the first messaging system comprises a telephony network and the first
form comprises a fax format; and
the second messaging system comprises a data network and the second
form comprises an e-mail format.

10. The telecommunications system of claim 9 wherein:
20 the data network comprises Internet network.

11. The telecommunications system of claim 7 wherein:
the first messaging system comprises a telephony network and the first
form comprises a fax format;
the second messaging system comprises a data network and the second
25 form comprises an e-mail format;
the means for receiving from the first messaging system a message
having the first form and addressed to the gateway comprise
means for answering a call from a call originator, which call was made
to a telephone number of the gateway, and
30 means for receiving a fax message via the answered call, the fax
message including an address of a destination in the data network;

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the means for converting the message having the first form into a message having the second form comprise

means for converting the fax message into an e-mail message addressed to the destination in the data network; and

5 the means for transmitting the message having the second form and addressed to the destination in the second messaging system comprise

means for transmitting on the data network the e-mail message addressed to the destination in the data network.

12. The telecommunications system of claim 7 wherein:

10 the first messaging system comprises a data network and the first form comprises an e-mail format;

the second messaging system comprises a telephone network and the second form comprises a fax format;

15 the means for receiving from the first messaging system a message having a first form and addressed to the gateway comprise

means for receiving on the data network an e-mail message addressed to the gateway, the e-mail message containing a telephone number of a destination in the telephone network;

20 the means for converting the message having the first form into a message having the second form comprise

means for converting the e-mail message into a fax message; and

the means for transmitting the message having the second form and addressed to the destination in the second messaging system comprise

25 means for making a telephone call to the telephone number of the destination in the telephone network, and

means for transmitting the fax message via the telephone call.

13. The telecommunications system of claim 12 wherein:

30 the e-mail message addressed to the gateway has a destination address in the data network that contains both an address of the gateway in the data network and the telephone number of the destination in the telephone network.

14. A telecommunications system comprising:

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- a telephone network;
a first user terminal connected to the telephone network and having a telephone number in the telephone network, for transmitting e-mail messages in fax format to the telephone network and for receiving e-mail messages in fax format
5 from the telephone network;
a data network;
a second user terminal connected to the data network and having an address in the data network, for receiving e-mail messages addressed to the second user terminal from the data network and for transmitting e-mail messages addressed
10 to destinations on the data network to the data network; and
a gateway interconnecting the telephone network with the data network and having both a telephone number in the telephone network and an address in the data network, and comprising
means for answering a first telephone call made from the first user
15 terminal to the telephone number of the gateway,
means for receiving a first e-mail message in fax format from the first user terminal via the first telephone call, the first e-mail message in fax format including the address of the second user terminal,
means for converting the first e-mail message in fax format into a first
20 e-mail message in e-mail format and addressed to the second user terminal,
means for transmitting the first e-mail message in e-mail format and addressed to the second user terminal on the data network,
means for receiving on the data network from the second user terminal a second e-mail message in e-mail format addressed to the gateway and including the
25 telephone number of the first user terminal,
means for converting the second e-mail message in e-mail format into a second e-mail message in fax format,
means for making a second telephone call to the telephone number of the first user terminal, and
30 means for transmitting the second e-mail message in fax format to the first user terminal via the second telephone call.

15. The telecommunications network of claim 14 wherein:
the gateway further comprises

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means responsive to receipt of the first telephone call, for determining an originator of the first telephone call;

means for verifying that the originator is allowed to use the gateway;

and

5 means responsive to the verification for allowing the gateway to transmit the first e-mail message in the e-mail format, and responsive to a lack of the verification for preventing the gateway from transmitting the first e-mail message in the e-mail format.

16. The telecommunications network of claim 15 wherein:

10 the gateway further comprises

means for billing the originator for service provided by the gateway in converting the first e-mail message in the fax format and transmitting the first e-mail message in the e-mail format on the data network.

17. The telecommunications network of claim 14 wherein:

15 the gateway further comprises

means responsive to receipt of the second e-mail message in the e-mail format, for verifying that the telephone number included in the second e-mail message in the e-mail format belongs to a destination that is allowed to use the gateway; and

20 means responsive to the verification for allowing the gateway to transmit the second e-mail message in the fax format, and responsive to a lack of the verification for preventing the gateway from transmitting the second e-mail message in the fax format.

18. The telecommunications network of claim 17 wherein:

25 the gateway further comprises

means for billing the destination for service provided by the gateway in converting the second e-mail message in the e-mail format and transmitting the second e-mail message in the fax format.

19. A gateway for interconnecting a client-server messaging system with
30 a peer-to-peer messaging system, the gateway including at least one of:

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(a) peer-to-peer receiving means for receiving a peer-to-peer message from a first sender for a first recipient via the peer-to-peer messaging system, peer-to-peer converting means for converting the received peer-to-peer message into a corresponding client-server message, and client-server sending means for sending
5 the corresponding client-server message to the first recipient via the client-server messaging system, and

(b) client-server receiving means for receiving a client-server message from a second sender for a second recipient via the client-server messaging system, client-server converting means for converting the received client-server message into
10 a corresponding peer-to-peer message, and peer-to-peer sending means for sending the corresponding peer-to-peer message to the second recipient via the peer-to-peer messaging system.

20. The gateway of claim 19 wherein:

the first sender is not a subscriber of the client-server messaging system,
15 and the second sender is not a user of the peer-to-peer messaging system.

21. The gateway of claim 20 wherein:

the first recipient is not a user of the peer-to-peer messaging system, and
the second recipient is not a subscriber of the client-server messaging system.

22. The gateway of claim 19 further comprising:

20 means for billing for services provided by the gateway.

23. The gateway of claim 19 further comprising:

means for billing one of (a) the first sender and (b) the second recipient,
for services provided by the gateway.

24. The gateway of claim 19 wherein:

25 the peer-to-peer receiving means comprise
means for receiving a peer-to-peer message addressed by the first sender to a peer-to-peer messaging system address of the gateway in the peer-to-peer messaging system, the peer-to-peer message including a client-server messaging system address corresponding to the first recipient, and

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the client-server sending means send the corresponding client-server message to the client-server messaging system address corresponding to the first recipient; and

the client-server receiving means comprise

5 means for receiving a client-server message addressed by the second sender to a client-server messaging system address corresponding to the gateway in the client-server messaging system, the client-server message including a peer-to-peer messaging system address of the second recipient, and

10 the peer-to-peer sending means send the corresponding peer-to-peer message to the peer-to-peer messaging system address of the second recipient.

25. A gateway for interconnecting a first messaging system for messages having a first form with a second messaging system for messages having a second form disparate from the first form, the gateway having an address in at least the first messaging system and comprising:

15 means for receiving from the first messaging system a message having the first form and addressed to the gateway, the message having the first form and including an address of a destination in the second messaging system;

means responsive to receipt of the message having the first form, for converting the message having the first form into a message having the second form and addressed to the destination in the second messaging system; and

20 means responsive to the conversion, for transmitting to the second messaging system the message having the second form and addressed to the destination in the second messaging system.

26. The gateway of claim 25 also comprising:

25 means for receiving from the second messaging system a message having the second form and addressed to the gateway, the message having the second form and addressed to the gateway including an address of a destination in the first messaging system;

30 means responsive to receipt of the message having the second form and addressed to the gateway, for converting the message having the second form and addressed to the gateway into a message having the first form and addressed to the destination in the first messaging system; and

means responsive to the conversion of the message having the second form and addressed to the gateway, for transmitting to the first messaging system the message having the first form and addressed to the destination in the first messaging system.

5 **27.** The gateway of claim 26 for interconnecting the first messaging system which comprises a telephony network and wherein the first form comprises a fax format, with the second messaging system which comprises a data network and wherein the second form comprises an e-mail format.

10 **28.** The gateway of claim 26 for interconnecting the first messaging system which comprises a telephone network and wherein the first form comprises a fax format, with the second messaging system which comprises Internet network and wherein the second form comprises an e-mail format.

15 **29.** The gateway of claim 25 for interconnecting the first messaging system which comprises a telephony network and wherein the first form comprises a fax format, with the second messaging system which comprises a data network and wherein the second form comprises an e-mail format, wherein:

 the means for receiving from the first messaging system a message having the first form and addressed to the gateway comprise

20 means for answering a call from a call originator, which call was made to a telephone number of the gateway, and

 means for receiving a fax message via the answered call, the fax message including an address of a destination in the data network;

 the means for converting the message having the first form into a message having the second form comprise

25 means for converting the fax message into an e-mail message addressed to the destination in the data network; and

 the means for transmitting the message having the second form and addressed to the destination in the second messaging system comprise

30 means for transmitting on the data network the e-mail message addressed to the destination in the data network.

30. The gateway of claim 25 for interconnecting the first messaging system which comprises a data network and wherein the first form comprises an e-

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mail format, with the second messaging system which comprises a telephone network and wherein the second form comprises a fax format, wherein:

the means for receiving from the first messaging system a message having a first form and addressed to the gateway comprise

5 means for receiving on the data network an e-mail message addressed to the gateway, the e-mail message containing a telephone number of a destination in the telephone network;

the means for converting the message having the first form into a message having the second form comprise

10 means for converting the e-mail message into a fax message; and the means for transmitting the message having the second form and addressed to the destination in the second messaging system comprise

means for making a telephone call to the telephone number of the destination in the telephone network, and

15 means for transmitting the fax message via the telephone call.

31. The gateway of claim 30 wherein:

the e-mail message addressed to the gateway has a destination address in the data network that contains both an address of the gateway in the data network and the telephone number of the destination in the telephone network.

20 **32.** A gateway for interconnecting a telephone network with a data network, wherein a first user terminal is connected to the telephone network and has a telephone number in the telephone network, the first user terminal for transmitting e-mail messages in fax format to the telephone network and for receiving e-mail messages in fax format from the telephone network, and wherein a second user
25 terminal is connected to the data network and has an address in the data network, the second user terminal for receiving e-mail messages addressed to the second user terminal from the data network and for transmitting e-mail messages addressed to destinations on the data network to the data network, the gateway having both a telephone number in the telephone network and an address in the data network, and
30 comprising:

means for answering a first telephone call made from the first user terminal to the telephone number of the gateway;

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means for receiving a first e-mail message in fax format from the first user terminal via the first telephone call, the first e-mail messages in fax format including the address of the second user terminal;

5 means for converting the first e-mail message in fax format into a first e-mail message in e-mail format and addressed to the second user terminal;

means for transmitting the first e-mail message in e-mail format and addressed to the second user terminal on the data network;

10 means for receiving on the data network from the second user terminal a second e-mail message in e-mail format addressed to the gateway and including the telephone number of the first user terminal;

means for converting the second e-mail message in e-mail format into a second e-mail message in fax format;

means for making a second telephone call to the telephone number of the first user terminal; and

15 means for transmitting the second e-mail message in fax format to the first user terminal via the second telephone call.

33. The gateway of claim 32 further comprising:

means responsive to receipt of the first telephone call, for determining an originator of the first telephone call;

20 means for verifying that the originator is allowed to use the gateway;
and

25 means responsive to the verification for allowing the gateway to transmit the first e-mail message in the e-mail format, and responsive to a lack of the verification for preventing the gateway from transmitting the first e-mail message in the e-mail format.

34. The gateway of claim 33 further comprising:

means for billing the originator for service provided by the gateway in converting the first e-mail message in the fax format and transmitting the first e-mail message in the e-mail format on the data network.

30 **35. The gateway of claim 32 further comprising:**

means responsive to receipt of the second e-mail message in the e-mail format, for verifying that the telephone number included in the second e-mail message in the e-mail format belongs to a destination that is allowed to use the

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gateway; and

means responsive to the verification for allowing the gateway to transmit the second e-mail message in the fax format, and responsive to a lack of the verification for preventing the gateway from transmitting the second e-mail message
5 in the fax format.

36. The gateway of claim 35 further comprising:

means for billing the destination for service provided by the gateway in converting the second e-mail message in the e-mail format and transmitting the second e-mail message in the fax format.

10 **37. A method of communicating messages between a client-server messaging system and a peer-to-peer messaging system, comprising at least one of the series (a) and (b) of the steps of:**

(a) receiving, at a gateway interconnecting the client-server messaging system and the peer-to-peer messaging system, a peer-to-peer message from a first
15 sender for a first recipient via the peer-to-peer messaging system,

converting the received peer-to-peer message into a corresponding client-server message, and

sending the corresponding client-server message from the gateway to the first recipient via the client-server messaging system; and

20 (b) receiving, at the gateway, a client-server message from a second sender for a second recipient via the client-server messaging system,

converting the received client-server message into a corresponding peer-to-peer message, and

25 sending the corresponding peer-to-peer message from the gateway to the second recipient via the peer-to-peer messaging system.

38. The method of claim 37 wherein:

the first sender is not a subscriber of the client-server messaging system, and the second sender is not a user of the peer-to-peer messaging system.

39. The method of claim 38 wherein:

30 the first recipient is not a user of the peer-to-peer messaging system, and the second recipient is not a subscriber of the client-server messaging system.

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40. The method of claim 37 further comprising the step of:
billing for services provided by the gateway.

41. The method of claim 37 wherein:
the series (a) of steps further comprises the step of
5 billing the first sender for services provided by the gateway; and
the series (b) of steps further comprises the step of
billing the second recipient for services provided by the gateway.

42. The method of claim 37 wherein:
the step of receiving a peer-to-peer message comprises the step of
10 receiving a peer-to-peer message addressed by the first sender to a peer-
to-peer messaging system address of the gateway in the peer-to-peer messaging
system, the peer-to-peer message including a client-server messaging system address
corresponding to the first recipient, and
the step of sending the corresponding client-server message comprises
15 the step of
sending the corresponding client-server message to the client-server
messaging system address corresponding to the first recipient; and
the step of receiving a client-server message comprises the step of
receiving a client-server message addressed by the second sender to a
20 client-server messaging system address corresponding to the gateway in the client-
server messaging system, the client-server message including a peer-to-peer
messaging system address of the second recipient, and
the step of sending the corresponding peer-to-peer message comprises
the step of
25 sending the corresponding peer-to-peer message to the peer-to-peer
messaging system address of the second recipient.

43. A method of communicating messages between a first electronic
messaging system for messages having a first form and a second electronic
messaging system for messages having a second form disparate from the first form
30 via a gateway interconnecting the first messaging system with the second messaging
system and having an address in at least the first messaging system, the method
comprising the steps of:

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receiving at the gateway from the first messaging system a message having the first form and addressed to the gateway, the message having the first form including an address of a destination in the second messaging system;

5 in response to receipt of the message having the first form, converting the message having the first form into a message having the second form and addressed to the destination in the second messaging system; and

in response to the conversion, transmitting from the gateway to the second messaging system the message having the second form and addressed to the destination in the second messaging system.

10 **44.** The method of claim 43 further comprising the steps of:

receiving at the gateway from the second messaging system a message having the second form and addressed to the gateway, the message having the second form and addressed to the gateway including an address of a destination in the first messaging system;

15 in response to receipt of the message having the second form and addressed to the gateway, converting the message having the second form and addressed to the gateway into a message having the first form and addressed to the destination in the first messaging system; and

20 in response to the conversion of the message having the second form and addressed to the gateway, transmitting from the gateway to the first messaging system the message having the first form and addressed to the destination in the first messaging system.

45. The method of claim 44 for communicating messages between the first messaging system which comprises a telephony network and wherein the first
25 form comprises a fax format, and the second messaging system which comprises a data network and wherein the second form comprises an e-mail format.

46. The method of claim 44 for communicating messages between the first messaging system which comprises a telephony network and wherein the first
30 form comprises a fax format, and the second messaging system which comprises an Internet network and wherein the second form comprises an e-mail format.

47. The method of claim 43 for communicating messages between the first messaging system which comprises a telephony network and wherein the first

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form comprises a fax format, and the second messaging system which comprises a data network and wherein the second form comprises an e-mail format, wherein:

- the step of receiving from the first messaging system a message having the first form and addressed to the gateway comprises the steps of
- 5 answering a call from a call originator, which call was made to a telephone number of the gateway, and
- receiving a fax message via the answered call, the fax message including an address of a destination in the data network;
- the step of converting the message having the first form into a message
- 10 having the second form comprises the step of
- converting the fax message into an e-mail message addressed to the destination in the data network; and
- the step of transmitting the message having the second form and addressed to the destination in the second messaging system comprises the step of
- 15 transmitting on the data network the e-mail message addressed to the destination in the data network.

- 48.** The method of claim 43 for communicating messages between the first messaging system which comprises a data network and wherein the first form comprises an e-mail format, and the second messaging system which comprises a
- 20 telephone network and wherein the second form comprises a fax format, wherein:
- the step of receiving from the first messaging system a message having a first form and addressed to the gateway comprises the step of
- receiving on the data network an e-mail message addressed to the gateway, the e-mail message containing a telephone number of a destination in the
- 25 telephone network;
- the step of converting the message having the first form into a message having the second form comprises the step of
- converting the e-mail message into a fax message; and
- the step of transmitting the message having the second form and
- 30 addressed to the destination in the second messaging system comprises the steps of
- making a telephone call to the telephone number of the destination in the telephone network, and
- transmitting the fax message via the telephone call.

- 49.** The method of claim 48 wherein:

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the e-mail message addressed to the gateway has a destination address in the data network that contains both an address of the gateway in the data network and the telephone number of the destination in the telephone network.

50. A method of communicating messages between a telephone network
5 and a data network via a gateway interconnecting the telephone network with the
data network and having both a telephone number in the telephone network and an
address in the data network, wherein a first user terminal is connected to the
telephone network and has a telephone number in the telephone network, the first
user terminal for transmitting e-mail messages in fax format to the telephone
10 network and for receiving e-mail messages in fax format from the telephone
network, and wherein a second user terminal is connected to the data network and
has an address in the data network, the second user terminal for receiving e-mail
messages addressed to the second user terminal from the data network and for
transmitting e-mail messages addressed to destinations on the data network to the
15 data network, the method comprising the steps of:

answering at the gateway a first telephone call made from the first user
terminal to the telephone number of the gateway;

receiving at the gateway a first e-mail message in fax format from the
first user terminal via the first telephone call, the first e-mail messages in fax format
20 including the address of the second user terminal;

converting the first e-mail message in fax format into a first e-mail
message in e-mail format and addressed to the second user terminal;

transmitting the first e-mail message in e-mail format and addressed to
the second user terminal from the gateway on the data network;

25 receiving at the gateway on the data network from the second user
terminal a second e-mail message in e-mail format addressed to the gateway and
including the telephone number of the first user terminal;

converting the second e-mail message in e-mail format into a second e-
mail message in fax format;

30 making a second telephone call from the gateway to the telephone
number of the first user terminal; and

transmitting the second e-mail message in fax format from the gateway
to the first user terminal via the second telephone call.

51. The method of claim 50 further comprising the steps of:

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in response to receipt of the first telephone call, determining an originator of the first telephone call;
verifying that the originator is allowed to use the gateway;
in response to the verification, allowing the gateway to transmit the first
5 e-mail message in the e-mail format; and
in response to a lack of the verification, preventing the gateway from transmitting the first e-mail message in the e-mail format.

52. The method of claim 51 further comprising the step of:
billing the originator for service provided by the gateway in converting
10 the first e-mail message in the fax format and transmitting the first e-mail message in the e-mail format on the data network.

53. The method of claim 50 further comprising the steps of:
in response to receipt of the second e-mail message in the e-mail format,
verifying that the telephone number included in the second e-mail message in the e-
15 mail format belongs to a destination that is allowed to use the gateway;
in response to the verification, allowing the gateway to transmit the second e-mail message in the fax format; and
in response to a lack of the verification, preventing the gateway from transmitting the second e-mail message in the fax format.

20 54. The method of claim 53 further comprising the step of:
billing the destination for service provided by the gateway in converting the second e-mail message in the e-mail format and transmitting the second e-mail message in the fax format.

FIG. 1

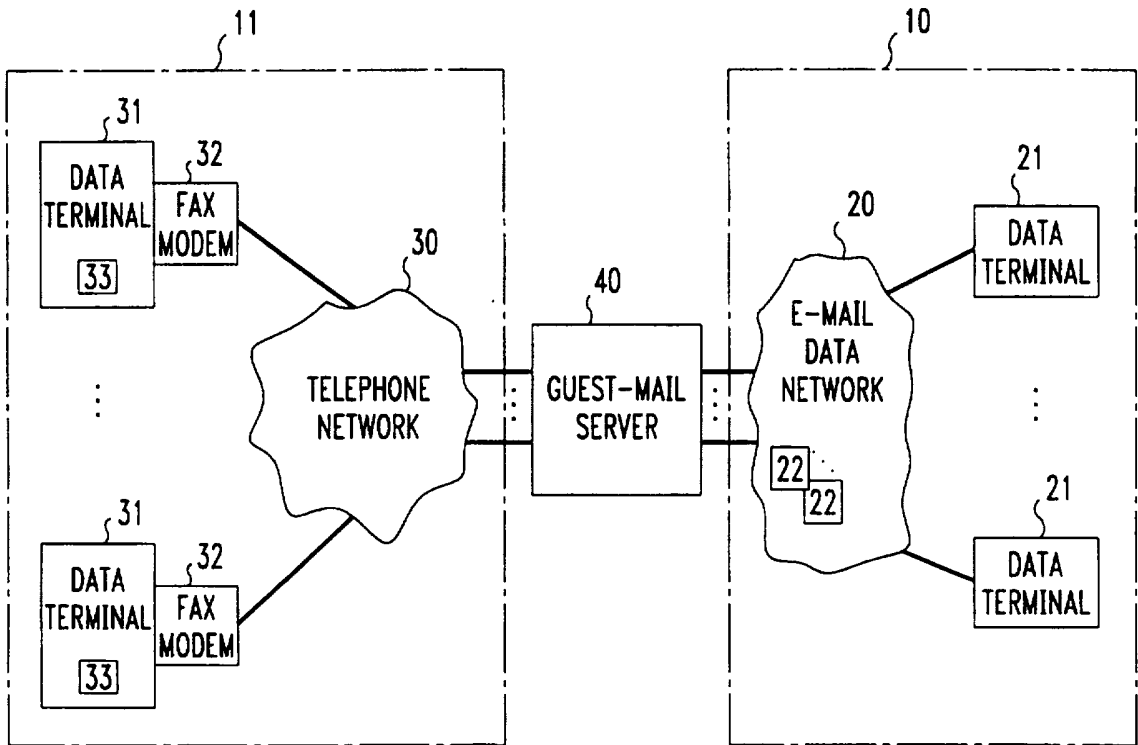


FIG. 2

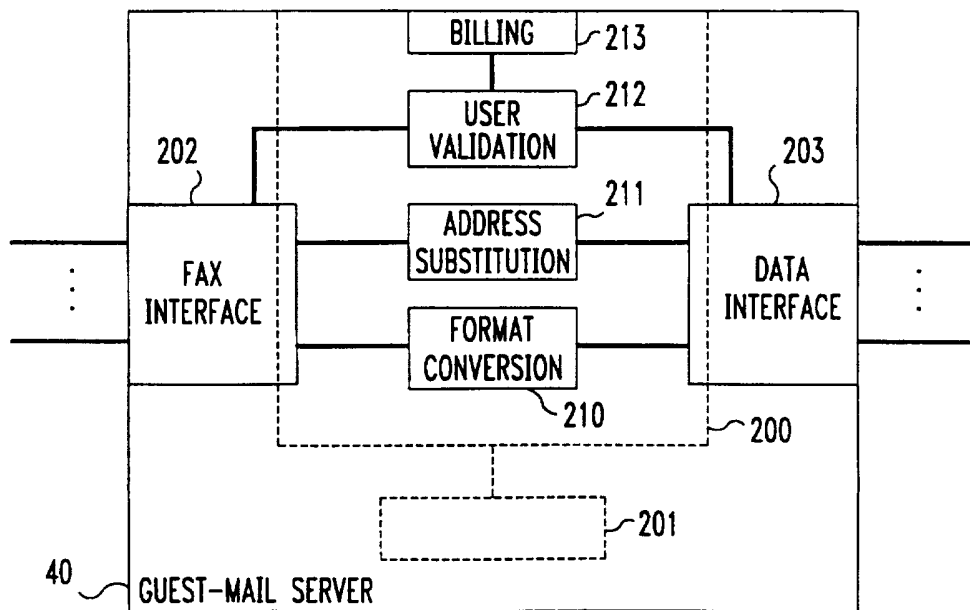


FIG. 3

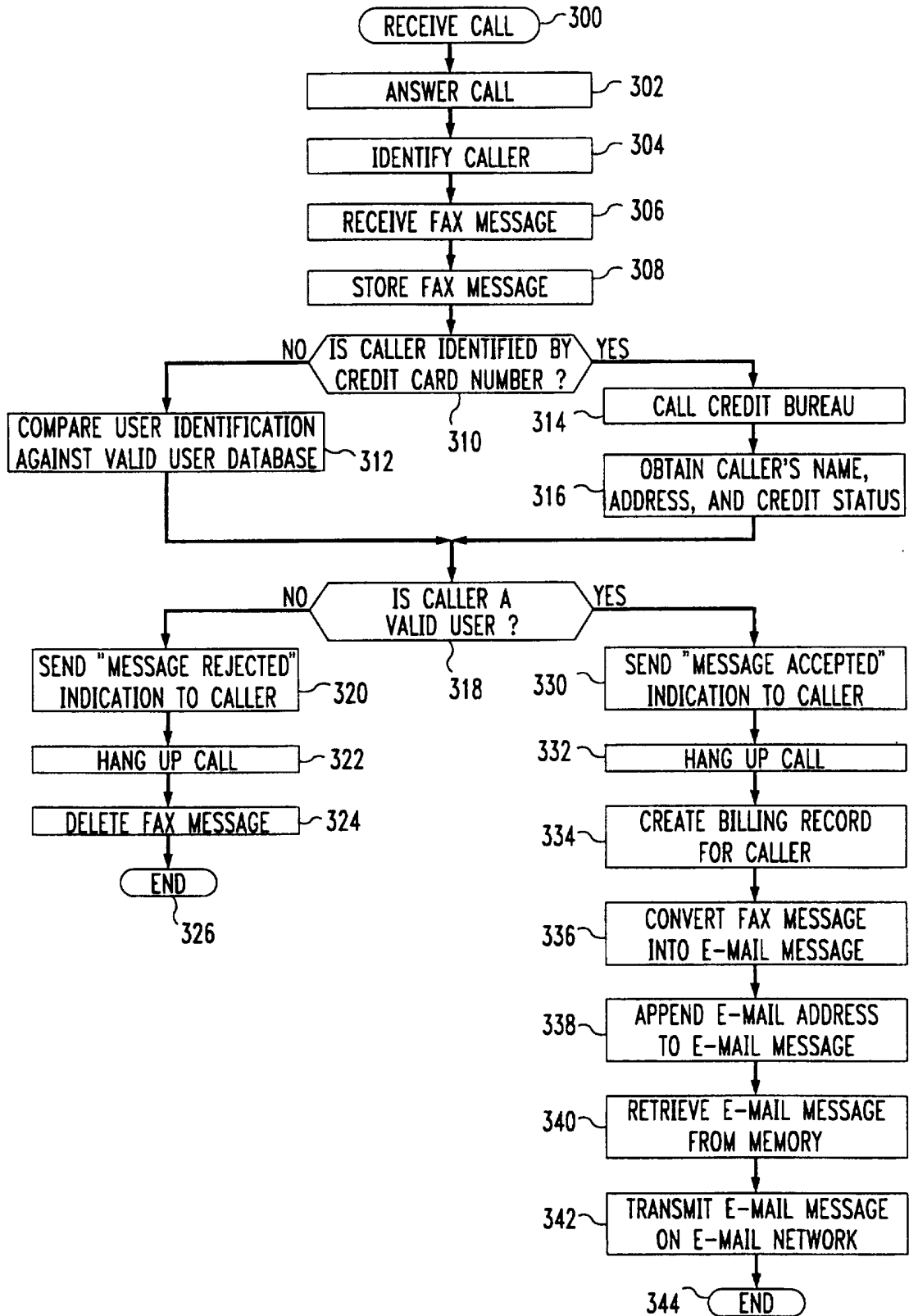
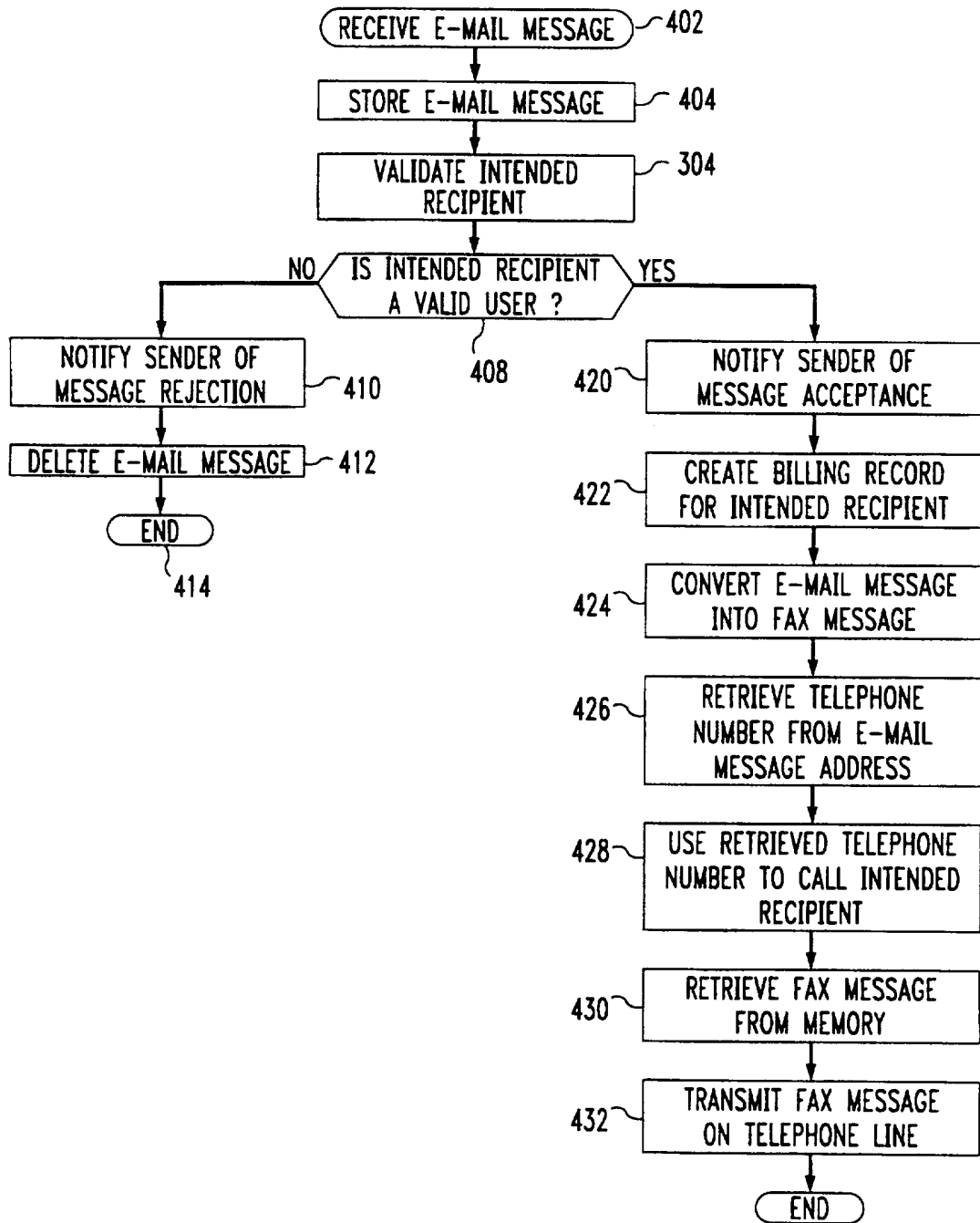


FIG. 4



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US96/19688

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :HO4M 11/00; HO4N1/00
US CL :Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/88, 90, 93, 94, 96, 98, 100; 358/400, 402, 403, 407, 434-436, 438-442, 468

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,461,488 A (Witek) 24 October 1995, cols. 3-5 and figure 1.	1-54
Y	US 5,406,557 A (Baudoin) 11 April 1995, col. 5, lines 5-8 and figure 1.	1-54
Y	US 5,381,242 A (Fujii) 10 January 1995, abstract.	4, 5, 16, 18, 22, 23, 34, 36, 40, 41, 52, 54
Y	US 4,790,003 A (Kepley et al) 06 December 1988, figure 7.	15-18, 33-36, 51-54

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	*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
A document defining the general state of the art which is not considered to be part of particular relevance	*X*	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*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
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)	*&*	document member of the same patent family
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		

Date of the actual completion of the international search

21 FEBRUARY 1997

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26 MAR 1997

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

379/100; 358/400, 402