SYSTEM FOR AUTOMATICALLY SENDING MAIL MESSAGE BY STORING RULE ACCORDING TO THE LANGUAGE SPECIFICATION OF THE MESSAGE INCLUDING PROCESSING CONDITION AND PROCESSING CONTENT

This application is a continuation of application Ser. No. 08/145,527, filed Nov. 4, 1993, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an automatic sending-message processing device and an automatic sending-message processing method in a so-called electronic mail system for interchanging sending messages among a plurality of computer systems which are connected to one another via communication media.

2. Description of the Related Art

A so-called electronic mail system for interchanging sending messages among a plurality of computer systems which are connected to one another via communication media is known.

Message data being sent by a computer user has various attributes. In a case where message switching is effected by use of the above electronic mail system, depending on their attributes, the message data may sometimes be sent without prior processing. In other cases, the message data may be sent through the electronic mail system after the user has activated a command for data processing such as data transformation and file operation.

The above is executed by manually activating the command for data processing before the user transmits the message data. Therefore, even if the data having the same attribute is sent a number of times, a command to process the data needs to be manually activated for each transmission. As a result, sending message through electronic mail tends to be complicated and not very efficient.

SUMMARY OF THE INVENTION

An object of this invention is to provide an automatic sending-message processing device and an automatic sending-message processing method capable of alleviating the complexity of the process for message sending by the computer user at the time of transmission by describing the processing of a message as a rule, automatically effecting the processing according to the rule, and then transmitting the message. More specifically, an object of this invention is to provide an automatic sending-message processing device and an automatic sending-message processing method which are designed to automate the processing and enhance the efficiency thereof by inserting a character string (key word) indicating the process to be effected on the message data into the header information at the time of transmission, analyzing the header information to automatically effect the process for the message data at the time of transmission, and then transmitting the message data together with the header information.

A first automatic sending-message processing device of this invention applied to a computer network which is connected to a plurality of computer systems via communication media and capable of effecting the message switching among the plurality of computer systems using electronic mail system, comprises rule storing means (rule file) for storing a rule in which a processing condition for

processing message data and content of a process obtained when the processing condition is satisfied are described according to the language specification of the message data; control information analyzing means (header information analyzing section) for analyzing control information of the message data; interpreting means (rule analyzing section) for collating the analyzed control information with the processing condition to interpret a process to be executed; and processing means (process executing section) for executing a process corresponding to the process interpreted by the interpreting means. The first automatic sending message processing device of the invention also comprises sending means for sending the message data, which has been processed by the processing means, after attaching header information to the message data.

The rule storing means includes means for storing a condition section for describing identification information indicating the processing condition, and a processing section for describing the content of the process obtained when the processing condition is satisfied. The processing section may contain at least one pair of the condition section and the processing section. The rule storing means further includes means for storing a conditional expression obtained by combining a plurality of processing conditions by use of a logical expression.

The control information analyzing means includes means for extracting a character string containing at least addressee information, addresser information, subject information, and transmission date information, as well as means for setting the extracted character string as a variable.

The processing means includes means for separating header information and message data from each other and further including means for combining the processed header information and the message data.

A second automatic sending-message processing device of this invention applied to a computer network which is connected to a plurality of computer systems via communication media and capable of effecting the message switching among the plurality of computer systems using electronic mail system, comprises input means for inputting message data and control information for the message data; a rule file containing a set of multiple "condition section-processing section" sentences based on the language specification of the message data, the condition section having identification information indicating a process for the message data and the processing section having a process which is effected when the condition of the condition section is satisfied; header information analyzing means for analyzing the header information to obtain subject information indicating at least the content of the process corresponding to the message data; processing means for executing a process set in the processing section of the rule file; rule analyzing means for retrieving the rule file after analyzing the header information by means of the header information analyzing means, and executing the process set in the processing section on the message data by activating the processing means when the subject information coincides with the identification information; and sending means for sending the header information and the processed message data. The rule file is characterized by including means for storing a conditional expression derived by combining a plurality of processing conditions by use of a logical expression.

The header information analyzing means includes means for extracting addressee information, addresser information, and transmission date information, as well as means for setting the subject information, the addressee information,

the addresser information, and the transmission date information as a variable.

An automatic sending-message processing method of this invention applied to a computer network which is connected to a plurality of computer systems via communication media and capable of effecting the message switching among the plurality of computer systems using an electronic mail system, comprises a first step of storing a rule in which a processing condition for processing message data and content of a process which is executed when the processing condition is satisfied are described according to the language specification; a second step of inputting message data and control information for the message data a third step of analyzing the control information of the message data; a fourth step of collating the analyzed control information with the processing condition; a fifth step of subjecting the message data to a preset process based on the collation; and a sixth step of sending the processed message data after attaching header information to the message data.

The first step includes preparing a conditional expression obtained by combining a plurality of processing conditions using a logical expression.

The third step includes extracting a character string containing at least addressee information, addresser information, subject information, and transmission date information, as well as setting the extracted character string as a variable.

The fifth step includes separating header information and message data from each other. The fifth step further includes combining the processed header information and the message data.

According to the device and method of this invention, since a character string (key word) indicating the process to be effected on the message data at the time of transmission is inserted into the header information, which is analyzed to automatically execute the process and sent together with the message data, the process can be automated and the efficiency thereof can be enhanced.

As described above, according to this invention, message data can be automatically processed and then sent by describing the process to be effected on the message data at the time of transmission as a rule based on the language specification of the message. That is, according to this invention, a process required prior to transmission and a process required at the destination can be automated according to the attributes of the message data by simply attaching a preset key word to the subject of the mail or the like. Therefore, the troublesome process to be effected on the message data before being sent by the user can be simplified, thereby making it possible to effect an efficient message switching.

Additional objects and advantages of the present invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the present invention. The objects and advantages of the present invention may be realized and obtained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate presently preferred embodiments of the present invention and, together with the general description given above and the detailed description of the preferred embodiments given below, serve to explain the principles of the present invention in which:

FIG. **1** is a diagram schematically showing the construction of an automatic message sending processing device according to a first embodiment of this invention;

FIG. **2** is a diagram schematically showing the construction of a rule file of the device of the first embodiment;

FIG. **3** is a flowchart schematically showing the operation of the device of this invention;

FIG. **4** is a flowchart showing the operation of a rule analyzing section;

FIG. **5** is a flowchart showing the operation of a header information analyzing section;

FIG. **6** is a flowchart showing the operation of a processing executing section;

FIG. **7** is a diagram showing an example of a rule file in a second embodiment of this invention;

FIG. **8** is a diagram showing an example of a rule file in a third embodiment of this invention; and

FIG. **9** is a diagram showing an example of a rule file in a third embodiment of this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Automatic message sending processing device and method of this invention will be described with reference to the accompanying drawings.

FIG. **1** is a diagram schematically showing the construction of an automatic sending-message processing device according to a first embodiment of this invention, and FIG. **2** is a diagram schematically showing the construction of a rule file of the device of the first embodiment.

Computer systems $\mathbf{11}_1$, $\mathbf{11}_2$, . . . , $\mathbf{11}_n$ are connected to one another via communication media **12** so as to permit respective sending messages to be interchanged, thus completing a computer network of an electronic mail system (mail system).

The computer systems $\mathbf{11}_1$, $\mathbf{11}_2$, . . . , $\mathbf{11}_n$ have the same construction, so the construction thereof will be explained by taking the computer system $\mathbf{11}_1$ as an example.

A transmission data file **21** stores message data of the electronic mail system which is input by a user **22** and header information which is control information of the message data. The header information includes addressee information indicating an addressee of the message data, addresser information indicating an addresser of the message data, subject information constructed by, for example, a character string which will be described later, and message data information indicating the transmission date. The subject information indicates the content of the process to be executed before sending the message data, and if, for example, (trans), (comp) and (crypto) are set as the subject information, the items indicate that it is necessary to execute the processes of data conversion, data compression, and encipherment, respectively, on the message data before transmission.

A user interface **23** is activated by the user **22** to read out the message data and the header information stored in the transmission data file **21** and to transmit them to a rule analyzing section **24** as a message to be sent.

The rule analyzing section **24** calls a header information analyzing section **26** and retrieves a rule file **27** after analyzing the header information. The rule analyzing section **24** checks whether or not subject information obtained by analyzing the header information coincides with identification information set in the condition sections of the rule file

27. When the information coincides, it calls a processing executing section **28** and causes the processing executing section to execute the process set in the processing section of the rule file on the message data. Further, the rule analyzing section **24** transmits the header information and the message data processed before the transmission to an electronic mail sending section **30**.

The header information analyzing section **26** analyzes the header information to extract addressee information, addresser information, subject information, and transmission date information as character strings, sets the respective extracted character strings to corresponding variables.

As shown in FIG. **2**, the rule file **27** is constructed by a set of multiple "condition section-processing section" sentences (which are hereinafter referred to as "IF-THEN" sentences) based on the language specification of the message data and stores a rule created by the user **22**. Identification information for processing the message data is described as a character string after the word "IF", and a program name or command name for processing the message data when the condition is satisfied is described after the word "THEN". The rule analyzing section **26** compares the subject information with the identification information which is constructed by a character string such as "(trans)", "(comp)" or "(crypto)" described in the "IF" phrase. For example, the rule is determined such that if a character string of (trans) is the subject information in the rule file **27**, data conversion of the message data is effected, if a character string of (comp) is the subject information, data compression of the message data is effected, and if a character string of (crypto) is the subject information, encipherment of the message data is effected.

The processing executing section **28** sequentially reads out a program or command corresponding to the program or command name described after the "THEN" sentence from a program/command section **29**, and executes the same.

The electronic mail sending section **30** sends header information and message data which have been processed before being sent as a message, and transmits the same to the other computer systems **11** as electronic mail via the communication media **12**.

Next, the operation of this invention with the above construction is explained.

The operation of the processing device of this invention is explained with reference to the flowchart shown in FIG. **3**. FIG. **3** is a flowchart schematically showing the operation of the device of this invention.

The user **22** activates the user interface **23** (step S1) to input message data and header information including addressee information, addresser information, subject information, and transmission date information to the transmission data file **21** (step S2). The header information and sending information are transferred to the message file **25** as a message to be sent.

The rule analyzing section **24** retrieves the rule file **27** to analyze the rules stored in the rule file **27** and check the header information in the sending message (step S3).

The checking is to see whether or not there is header information which satisfies at least one of the rules stored in the rule file **27** (step S4). If it is detected in the step S4 that there is header information which satisfies at least one of the rules stored in the rule file **27**, the processing executing section **28** activates a program or command described in the rule from the program/command section **29** and subjects the message data to a process specified by the header information, for example, data conversion process (step S5).

The message data is transferred together with the header information to the electronic mail sending section **30** (step S6) as a message to be sent. The message is then sent to the other computer systems **11** via the communication media **12**.

On the other hand, if it is detected in the step S4 that there is no header information which satisfies any of the rules stored in the rule file **27**, the process of step S5 is skipped, and the message data is transferred, without being processed together with the header information to the electronic mail sending section **30** as a message. The message is then sent to the other computer systems **11** via the communication media **12**.

Referring to the flowcharts shown in FIGS. **4** to **6**, the detailed operations of the rule analyzing section **24**, header information analyzing section **26** and processing executing section **28** are explained. FIGS. **4**, **5** and **6** are flowcharts showing the operation of the rule analyzing section **24**, the operation of the header information analyzing section **26**, and the operation of the processing executing section **28**, respectively.

The rule analyzing section **24** opens the rule file **27** (step A1). The rule analyzing section **24** checks whether the rule file **27** is successfully opened or not (step A2), and calls the header information analyzing section **26** (step A3) when determining that the rule file **27** is successfully opened. Then, the process shown in FIG. **5** is effected.

The header information analyzing section **26** opens the message file **25** (step B1). The header information analyzing section **26** reads out header information from the message which is to be sent and is stored in the message file **25** (step B2), and extracts addressee information, addresser information, subject information, and transmission date information of the header information as character strings (steps B3 to B6). The header information analyzing section **26** sets each extracted information as a variable (step B7) and closes the message file **25** (step B8). Then, the process of the header information analyzing section **26** is completed and the process is transferred to the step A4 of FIG. **4**.

The rule analyzing section **24** starts the analysis of the rules from the head of the rule file **27** (step A4). The rule analyzing section **24** checks whether a rule (IF-THEN sentence) is present or not (step A5), and if a rule (IF-THEN sentence) is present, the following step A6 is effected. If it is determined in step A5 that no rule (IF-THEN sentence) is present, the rule file **27** is closed. Since a rule (IF-THEN sentence) is previously set in the rule file **27** when step A5 is first reached, the result of step A5 becomes "YES" and the process succeeding step A6 is effected.

The rule analyzing section **24** checks identification information (described in a character string form) described in the condition section after the word IF of the rule (IF-THEN sentence) at the head of the rule file **21** (step A6). The rule analyzing section **24** effects the collation with the character string of the subject information derived from the analysis of the header information using the header information analyzing section **26** (step A7).

The rule analyzing section **24** checks whether the character string described in the condition section after the word IF in the rule file **27** is contained in the character string of the subject information (step A8). If it is determined that the character string described in the condition section is not contained in the subject information, the process of step A5 is effected to check whether or not a rule (IF-THEN sentence) is present in the rule file **27**. Then, the process from the step A6 to step A8 is effected again. If the rule analyzing section **24** determines in step A8 that the character

string described in the condition section after the word IF is contained in the character string of the subject information, it checks the THEN section of the rule (IF-THEN sentence) containing the method character string (step A9).

The name of a program or command to be executed is described in the THEN section of the rule (IF-THEN sentence). When the condition is satisfied as described before, the preprocessing for transferring the program or command name to the processing executing section **28** is effected by the checking operation of step A9.

The rule analyzing section **24** checks whether or not there is a rule (IF-THEN sentence) which has not been retrieved still existing in the rule file **27**. That is, the rule analyzing section **24** checks whether the operation of checking all of the rules (IF-THEN sentence) in the rule file **27** is completed or not (step A10).

In step A10, if it is determined that an unexamined rule (IF-THEN sentence) still exists in the rule file **27**, the process from step A6 to step A9 is effected again.

If the operation of checking whether any of the character strings described in the condition sections of all of the rules (IF-THEN sentence) in the rule file **27** is contained in the character string of the subject information is completed (step A10), it calls the processing executing section **28** to start the process shown in FIG. **6** (step A11).

The processing executing section **28** reads a message stored in the message file **25** (step C1) and separates the header information and the message data from each other (step C2).

The program names or command names described in the THEN section checked in step A9 are sequentially read (step C3). Specifically, in step C3, if a plurality of character strings (such as (trans), (comp), (crypto), . . .) are described as the subject information, the names of the programs or commands for effecting the data conversion process, the data compression process and the encipherment process are sequentially read.

It is then checked whether a process such as the data conversion process, the data compression process, and the encipherment process is present or not (step C4). If such a process is present, the program or command stored in the program/command section **29** is activated and one of the processes , i.e., the data conversion, data compression, and encipherment processes, is effected for the message data (step C5).

It is further checked in step C4 whether a process still remains or not, and if there is, the next process is executed (step C5).

When all of the processes are executed (step C4), the header information is combined with the message data which have been subjected to the process step C5 as described before (step C6). After this, the process of step A12 of FIG. **4** is effected.

The rule analyzing section **24** closes the rule file **27** (step A12). Data obtained by combining the header information with the message data which have been subjected to the process of step C5 are transferred as a message to the electronic mail sending section **30** (step A13).

Next, although not shown in the drawing, the electronic mail sending section **30** transmits the sending message as electronic mail to the other computer systems **11** via the communication media.

In a case where it is detected in step A5 that a rule (IF-THEN sentence) exists and it is also determined in step A8 that the character string described in the condition section of the rule (IF-THEN sentence) is not included in the character string of the subject information after the processes of the steps A6 and A7 are effected, the process of the step A5 is effected again. When the operation of retrieving all of the rules (IF-THEN sentence) is completed, the rule analyzing section **24** closes the rule file **27** (step A12) and then transmits the message from the electronic mail sending section **30** without effecting any process on the message data (step A13).

As described above, by describing the message data as a character string indicating the process effected before transmission in the subject information of the header information, the message data can be automatically processed, and the message combined with the header information can be output to the other computer systems **11**. Therefore, the process of manually activating each command by the user **22**, as is required in the conventional case, can be omitted, thereby simplifying the process and enhancing the efficiency thereof.

In the first embodiment, a desired process is effected by analyzing the subject information of the header information. The second embodiment is an embodiment in which conditions are created from information other than the subject information among the header information of the message; for example, data is sent to an address containing a ".com" character string according to the destination address, or data is sent before (or after) the date specified as "<1993.04.20" by the date information. According to the second embodiment, a key word satisfying the rule in which the process desired to be effected for the message data can be set in the subject, and the data can be automatically processed before being sent by electronic mail based on the destination and the transmission date.

FIG. **7** is a diagram showing an example of the rule file **27** according to the second embodiment of this invention. In the second embodiment, the construction is the same as that shown in FIG. **1** and the operations of the respective sections are the same as those explained with reference to FIGS. **3** to **6**. Therefore, the drawing and detailed explanation specifically for the second embodiment are omitted.

A rule according to the second embodiment, for automatically effecting the storage of a copy of the message data based on the condition of the destination address, the broadcast to other users based on the date condition, and the encipherment and compression of data according to the character string of the subject will now be described.

In FIG. **7**, ".com", "crypto" and "comp" of the IF sentence in the rule indicate a destination address or key word contained in the subject field used for automatic processing. The data "1993.04.20" is a character string for comparison with the transmission date and time. "crypto_prg $" and "compress_prg $" in the THEN sentence are command names for effecting the encipherment and compression of data like the first embodiment, and they are defined in the form of "crypto_prg file name" and "compress_prg file name", and executed in their normal manner in this specification. "copy_prg" is a command for copying the file and "mail_prg" is a command for sending an electronic mail. They are all contained in the rule file. "$" indicates a message file to be processed in the rule and is rewritten into a file name of a to-be-processed object when a command is activated from the processing executing section.

In order to effect the above-described automatic processing of data, the rule shown in FIG. **7** is described in a part of the message.

The user who is sending the message data specifies the address of an object to which the data is to be transmitted,

the subject, and the transmission data file by use of the user interface. In this case, in order to encipher the transmission data, a character of "crypto" is inserted into the subject information as in the first embodiment.

The operation of the second embodiment is substantially the same as that of the first embodiment, so it will only be briefly explained.

Information such as the destination address, the subject character string, and the date are derived from the transmission data containing the header information output to the rule analyzing section **24** by use of the header information analyzing section **26**. Then, the rule analyzing section **24** reads the rule file **27** and checks the condition from the head of the file. In this case, since the sentence of "crypto" exists in the subject information, the condition is satisfied in the third rule of FIG. **7**, and the process described in the corresponding THEN section is executed. In this example, "crypto_prg $" is executed and "crypto_prg $" is activated from the program/command section **29** in the form of "crypto_prg to-be-processed file name" to execute the process (encipherment) on the transmission data file. When the above process is completed, the remaining portion of the rule is analyzed. If the condition is satisfied, then a corresponding process is executed, and thus, the analysis is effected until the end of the rule.

When the analysis is completed, the enciphered transmission data file is output to the electronic mail sending section **30** and sent as normal electronic mail.

The process of data compression in the above rule is effected in the same manner. If the character string of "comp" is specified at the subject specifying time, the fourth condition in the rule of FIG. **7** is satisfied, and data is sent after data compression is effected. In a case where data is sent after the data is enciphered and compressed, both of the processes are executed for the transmission data by inserting both of the character strings of "crypto" and "comp" into the subject.

The first and second rules of FIG. **7** are not the subject but are the conditions concerning the destination address and the transmission date. The first rule of the rule file indicates the process of effecting the encipherment and compression of data which contains ".com" and then transmission after copying the above data into the directory having a name of "/backup". Further, the second rule indicates the process of transmitting the same message data, whose transmission date is before 1993. 04. 20, to the destination address "user A" by electronic mail.

FIG. **8** is a diagram showing an example of the rule file according to a third embodiment of this invention.

As in the second embodiment, since the construction in the third embodiment is the same as that shown in FIG. **1** and the operations of the respective sections are the same as those explained with reference to FIGS. **3** to **6**, the drawing and detailed explanation of the third embodiment are omitted.

An example according to the third embodiment, in which a complicated condition obtained by using a logical expression in combining a plurality of processing conditions is described in the condition section (IF section), will be shown.

In FIG. **8**, if the character strings of ".com", "comp", and "crypto" are not all contained in the header information or message data, the process is not executed. If all of the character strings are included therein, the transmission data is sequentially subjected to the compression process and the encipherment process after being copied into the directory having a name of "/backup" according to the condition section (THEN section).

As described above, since a process is not necessarily set in one-to-one correspondence with the condition, that is the condition can be freely created and the process corresponding to the condition can be described, a flexible rule can be created.

In an example according to the third embodiment shown in FIG. **8**, complicated conditions combining a plurality of processing conditions by using a logical expression are described and a plurality of processings are performed based on results of processing conditions.

This invention is not limited to the above embodiments.

Multiple "IF-THEN" sentences may be used as shown in FIG. **9**.

FIG. **9** is a diagram showing an example of a rule file in a third embodiment of this invention. As shown in FIG. **9**, a second IF sentence is included in a first IF-THEN sentence (i.e., forming nesting construction), and this IF-THEN sentence performs the following processing. The rule analyzing section **24** analyzes whether or not the character strings of "crypto" indicating an encipherment process exist in the message data whose transmission date is before 1993. 04. 20. If strings "crypto" are found, the processing executing section **28** performs the encipherment process and sends the electronic mail to the user A.

As described above, since a description of the IF-THEN sentence can be freely described according to the processing, a extremely flexible rule can be created. Therefore, it is possible to automate the processing and enhance the efficiency thereof.

Additional advantages and modifications will readily occur to those skilled in the art. Therefore, the present invention in its broader aspects is not limited to the specific details, representative devices, and illustrated examples shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents.

What is claimed is:

1. An automatic sending-message processing device applied to a computer network which is connected to a plurality of computer systems via communication media and capable of effecting message switching among said plurality of computer systems by use of an electronic mail system, comprising:

inputting means for permitting a user to input control information for mail message data to be sent;

rule storing means for storing a rule according to the language specification of a mail message and including a processing condition and a processing content identifying a process to be performed on the mail message data when the processing condition is satisfied;

rule creating means for permitting the user to create the rule stored in said rule storing means;

control information analyzing means for analyzing the control information of the mail message data;

interpreting means for collating the analyzed control information with the processing condition to interpret a process to be executed; and

processing means for executing a process corresponding to the process interpreted by said interpreting means on the mail message data to be sent.

2. An automatic sending-message processing device according to claim **1**, wherein said rule storing means

includes means for storing a condition section for describing identification information indicating the processing condition, and a processing section for describing the content of the process obtained when the processing condition is satisfied.

3. An automatic sending-message processing device according to claim 2, wherein said processing section further contains at least one pair of said condition section and said processing section.

4. An automatic sending-message processing device according to claim 2, wherein said rule storing means includes means for storing a conditional expression obtained by combining a plurality of processing conditions by use of a logical expression.

5. An automatic sending-message processing device according to claim 1, wherein said processing means includes means for separating the control information and mail message data from each other.

6. An automatic sending-message processing device according to claim 5, wherein said processing means further includes means for combining the control information and the processed mail message data.

7. An automatic sending-message processing device according to claim 1, further comprising sending means for sending the mail message data processed by said processing means after attaching the control information to the mail message data.

8. An automatic sending-message processing device according to claim 1, wherein said control information analyzing means includes means for extracting a character string containing at least addressee information, addresser information, subject information and transmission date information.

9. An automatic sending-message processing device according to claim 8, wherein said control information analyzing means includes means for setting the extracted character string as a variable.

10. An automatic sending-message processing device applied to a computer network which is connected to a plurality of computer systems via communication media and capable of effecting message switching among said plurality of computer systems by use of an electronic mail system, comprising:

input means for permitting a user to input mail message data and control information for the mail message data;

a rule file containing a set of multiple "condition section-processing section" sentences based on the language specification of the mail message, the condition section having identification information indicating a processing condition for the mail message data and the processing section having a process which is effected when the condition of the condition section is satisfied;

rule creating means for permitting the user to create a rule stored in said rule file;

control information analyzing means for analyzing the control information to obtain subject information indicating at least the content of the process corresponding to the mail message data;

processing means for executing a process set in the processing section of said rule file;

rule analyzing means for retrieving said rule file after analyzing the control information by means of said control information analyzing means, and executing the process set in the processing section on the mail message data by activating said processing means when the subject information coincides with the identification information; and

sending means for sending the control information and the processed mail message data.

11. An automatic sending-message processing device according to claim 10, wherein said rule file includes means for storing a conditional expression derived by combining a plurality of processing conditions by use of a logical expression.

12. An automatic sending-message processing device according to claim 10, wherein said control information analyzing means includes means for extracting addressee information, addresser information, and transmission date information.

13. An automatic sending-message processing device according to claim 12, wherein said control information analyzing means includes means for setting the subject information, the addressee information, the addresser information, and transmission date information as a variable.

14. An automatic sending-message processing method applied to a computer network which is connected to a plurality of computer systems via communication media and capable of effecting message switching among said plurality of computer systems by use of an electronic mail system, comprising:

a first step of creating and storing by a user a rule according to a language specification of a mail message and including a processing condition for processing mail message data and a content of a process which is executed when the processing condition is satisfied;

a second step of inputting mail message data and control information by the user for the mail message data;

a third step of analyzing the control information of the mail message data;

a fourth step of collating the analyzed control information with the processing condition;

a fifth step of subjecting the mail message data to a preset process based on the collation; and

a sixth step of sending the processed mail message data after attaching the control information to the mail message data.

15. An automatic sending-message processing method according to claim 14, wherein said first step includes a step of preparing a conditional expression obtained by combining a plurality of processing conditions by use of a logical expression as a processing condition for processing mail message data.

16. An automatic sending-message processing method according to claim 14, wherein said third step includes a step of extracting a character string containing at least addressee information, addresser information, subject information and transmission date information.

17. An automatic sending-message processing method according to claim 16, wherein said third step includes a step of setting the extracted character string as a variable.

18. An automatic sending-message processing method according to claim 14, wherein said fifth step includes a step of separating the control information and mail message data from each other.

19. An automatic sending-message processing method according to claim 18, wherein said fifth step further includes a step of combining the control information and the processed mail message data.

* * * * *

US005696902A

United States Patent [19]

Leclercq et al.

[11] Patent Number: 5,696,902

[45] Date of Patent: Dec. 9, 1997

[54] **SYSTEM FOR MANAGEMENT OF THE USAGE OF DATA CONSULTATIONS IN A TELECOMMUNICATION NETWORK**

[75] Inventors: **Thierry Leclercq**, Paris; **Patrick Sallio**, Thorigné-Fouillard, both of France

[73] Assignees: **France Telecom**; **Telediffusion De France**, both of Paris, France

[21] Appl. No.: **316,466**

[22] Filed: **Oct. 3, 1994**

[30] **Foreign Application Priority Data**

Oct. 4, 1993 [FR] France 93 11801

[51] **Int. Cl.**[6] **H01J 13/00**

[52] **U.S. Cl.** **395/200.2**; 395/200.02; 395/200.03; 395/200.06; 395/200.11; 395/200.12; 395/200.13; 395/200.14; 235/379; 235/380; 235/381; 235/382; 370/110.1; 379/91; 379/93

[58] **Field of Search** 395/200.01, 200.06, 395/200.07, 200.09, 200.1, 200.14, 200.11, 200.12, 200.2, 200.21; 364/406; 379/91, 93; 235/379, 380, 381, 382; 370/110.1

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,879,742 11/1989 Taniguchi et al. .

5,283,829 2/1994 Anderson 380/24

5,444,849 8/1995 Farrand et al. 395/200.09

5,446,740 8/1995 Yien et al. 395/200.01

5,457,739 10/1995 Le Cheviller 379/93

5,490,251 2/1996 Clark et al. 395/200.2

FOREIGN PATENT DOCUMENTS

0 539 016 4/1993 European Pat. Off. .

OTHER PUBLICATIONS

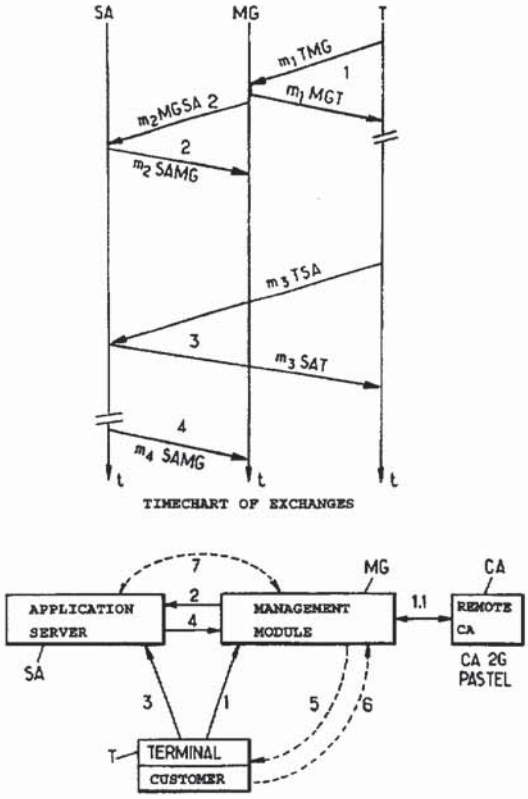
Patent Abstracts of Japan, vol. 6, No. 182, 18 Sep. 1982, JP-A-57 095.

Primary Examiner—Jack B. Harvey
Assistant Examiner—Raymond N. Phan
Attorney, Agent, or Firm—Larson & Taylor

[57] **ABSTRACT**

A system for management of the usage of consultations in a telecommunication network, in which one consultation is carried out by communication between a remote server center, and a local subscriber terminal, via a telecommunication link of switched type. A usage management module is provided, which is external to the link and makes it possible, through interactive communication between the local subscriber terminal and the management module, as well as between the management module and the remote server center, to set up, monitor and acknowledge the usage between the remote server center and a subscriber terminal.

10 Claims, 7 Drawing Sheets



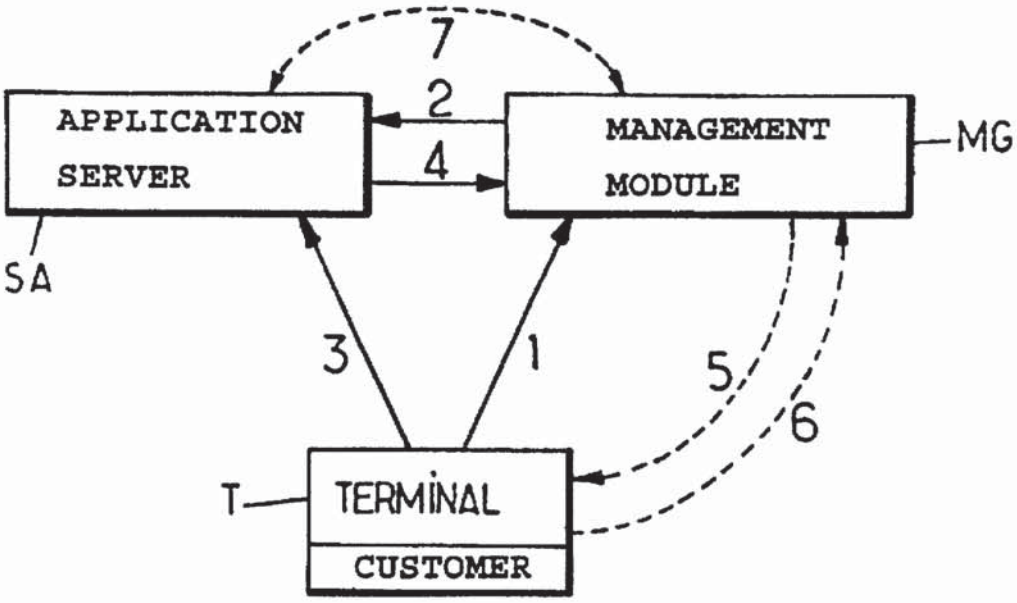

7
2
4
APPLICATION SERVER
MANAGEMENT MODULE
MG
SA
3
1
5
6
T
TERMINAL
CUSTOMER

FIG. 1a

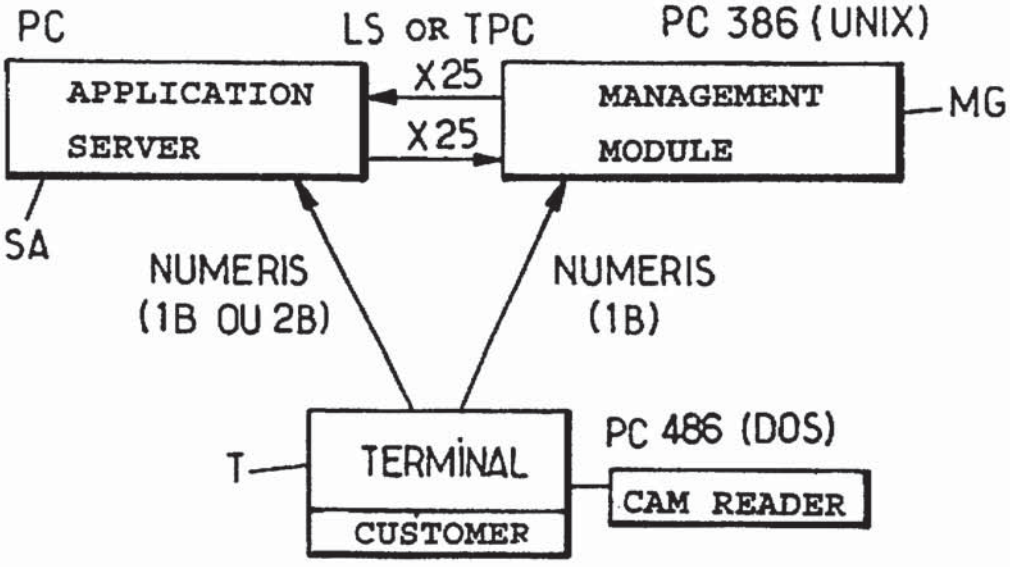

PC
LS OR TPC
PC 386 (UNIX)
X25
X25
APPLICATION SERVER
MANAGEMENT MODULE
MG
SA
NUMERIS (1B OU 2B)
NUMERIS (1B)
T
TERMINAL
CUSTOMER
PC 486 (DOS)
CAM READER

FIG. 1b

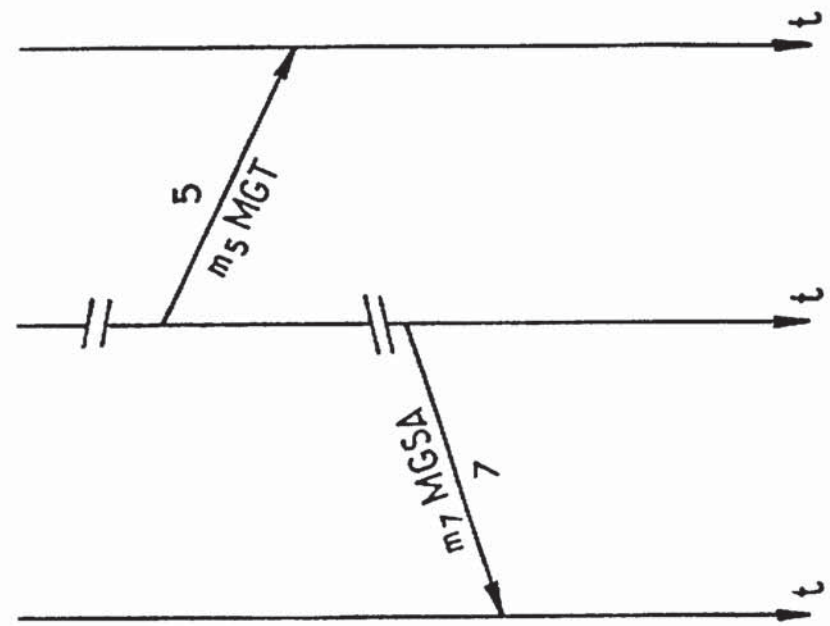


FIG. 1d

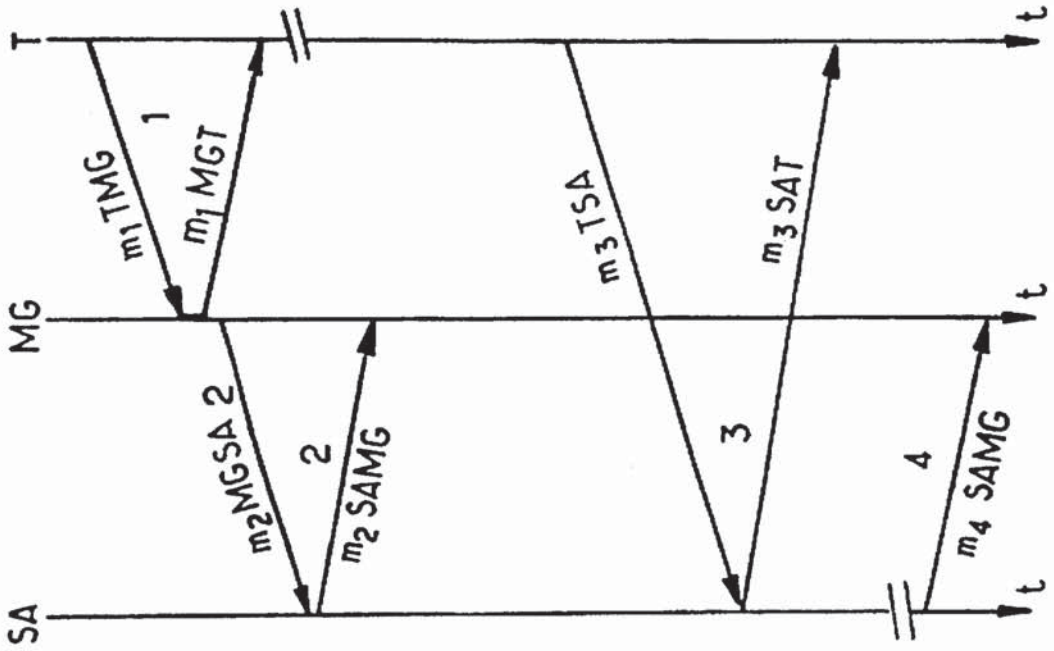


FIG. 1c

TIMECHART OF EXCHANGES

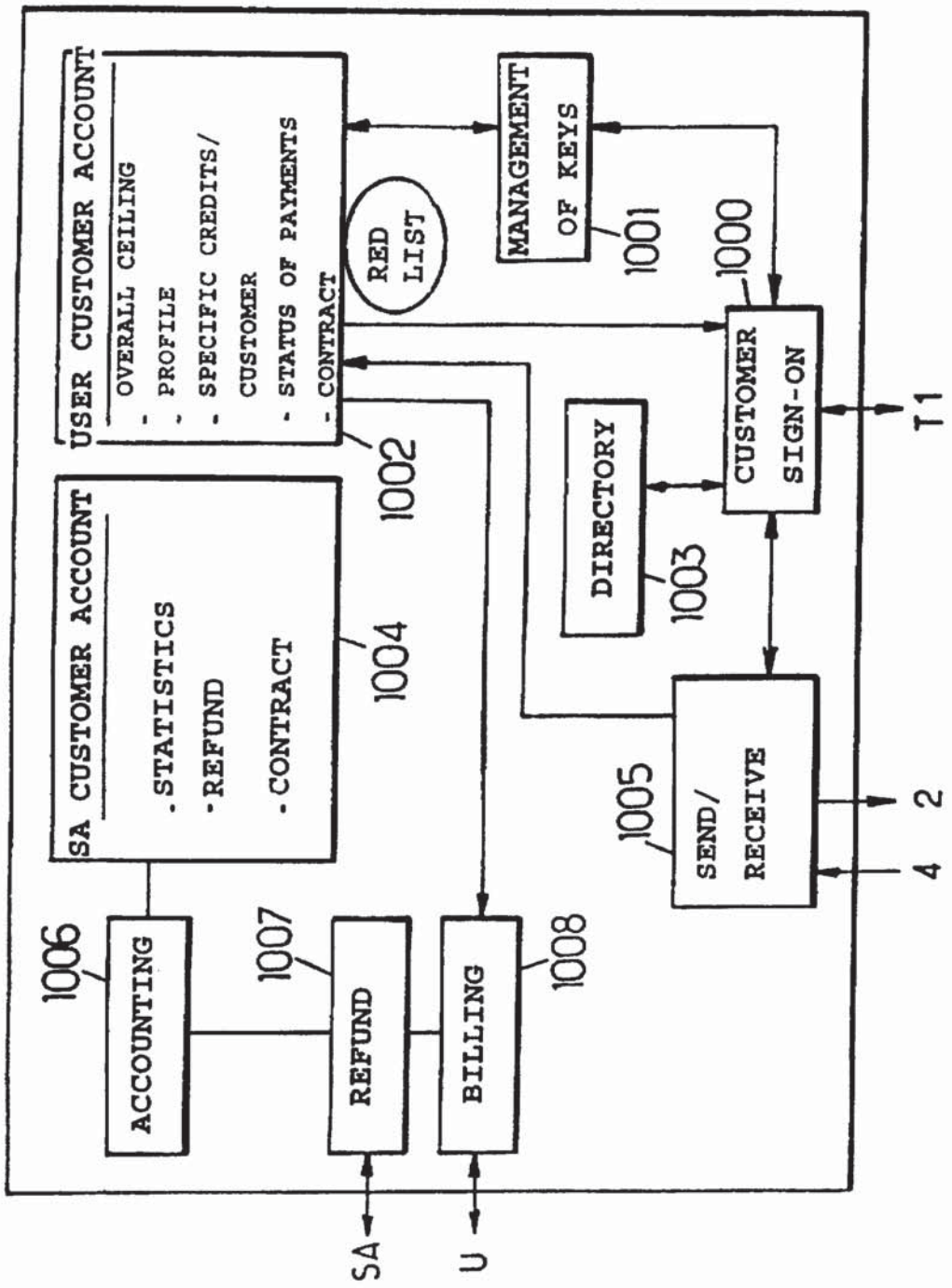

USER CUSTOMER ACCOUNT
- OVERALL CEILING
- PROFILE
- SPECIFIC CREDITS/ CUSTOMER
- STATUS OF PAYMENTS
- CONTRACT
RED LIST
MANAGEMENT OF KEYS
1001
1000
1002
SA CUSTOMER ACCOUNT
.STATISTICS
-REFUND
-CONTRACT
1004
DIRECTORY
1003
CUSTOMER SIGN-ON
T1
1005
SEND/ RECEIVE
4 2
1006
ACCOUNTING
1007
REFUND
BILLING
1008
SA
U

FIG. 2a

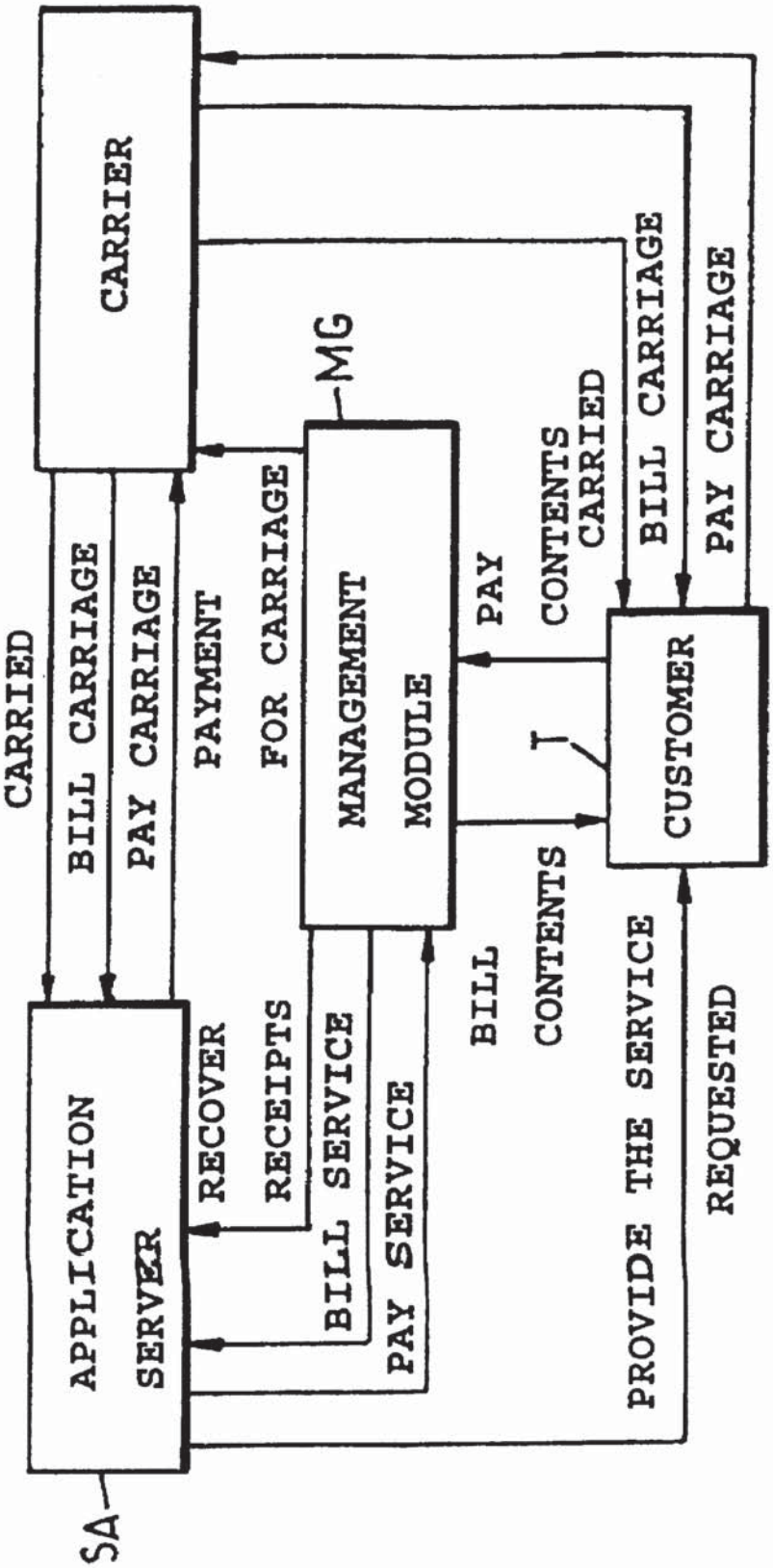

CARRIER
MG
MANAGEMENT MODULE
CUSTOMER
APPLICATION SERVER
SA
BILL CARRIAGE
PAY CARRIAGE
CARRIED
PAYMENT
FOR CARRIAGE
CONTENTS CARRIED
BILL CARRIAGE
PAY CARRIAGE
PAY
BILL
CONTENTS
RECOVER
RECEIPTS
BILL SERVICE
PAY SERVICE
PROVIDE THE SERVICE
REQUESTED

FIG. 2b

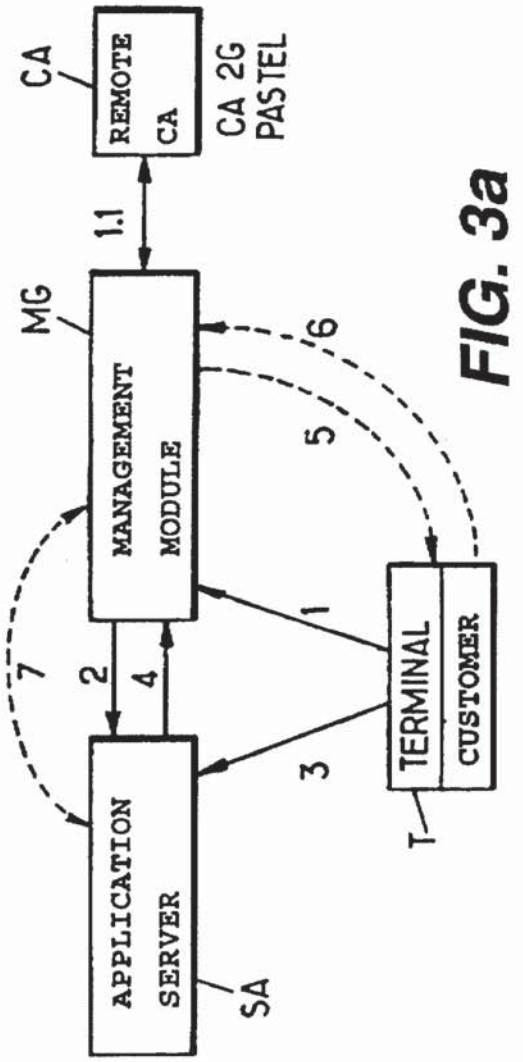

CA
REMOTE CA
CA 2G PASTEL
1.1
MG
MANAGEMENT MODULE
6
5
7
2
4
1
3
APPLICATION SERVER
SA
TERMINAL
CUSTOMER
T

FIG. 3a

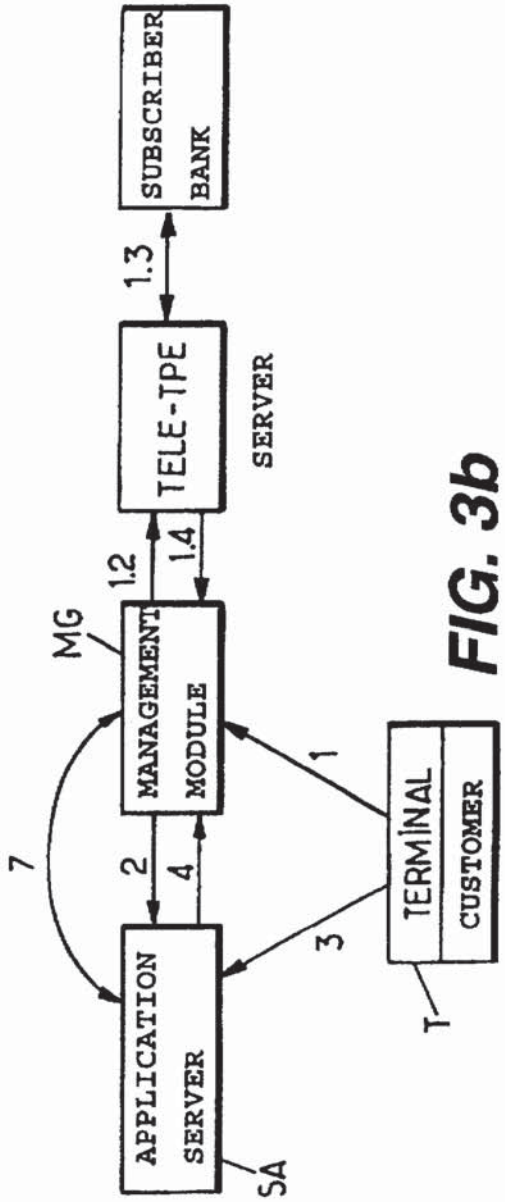

SUBSCRIBER BANK
1.3
TELE-TPE
SERVER
1.2
1.4
MG
MANAGEMENT MODULE
7
2
4
1
3
APPLICATION SERVER
SA
TERMINAL
CUSTOMER
T

FIG. 3b

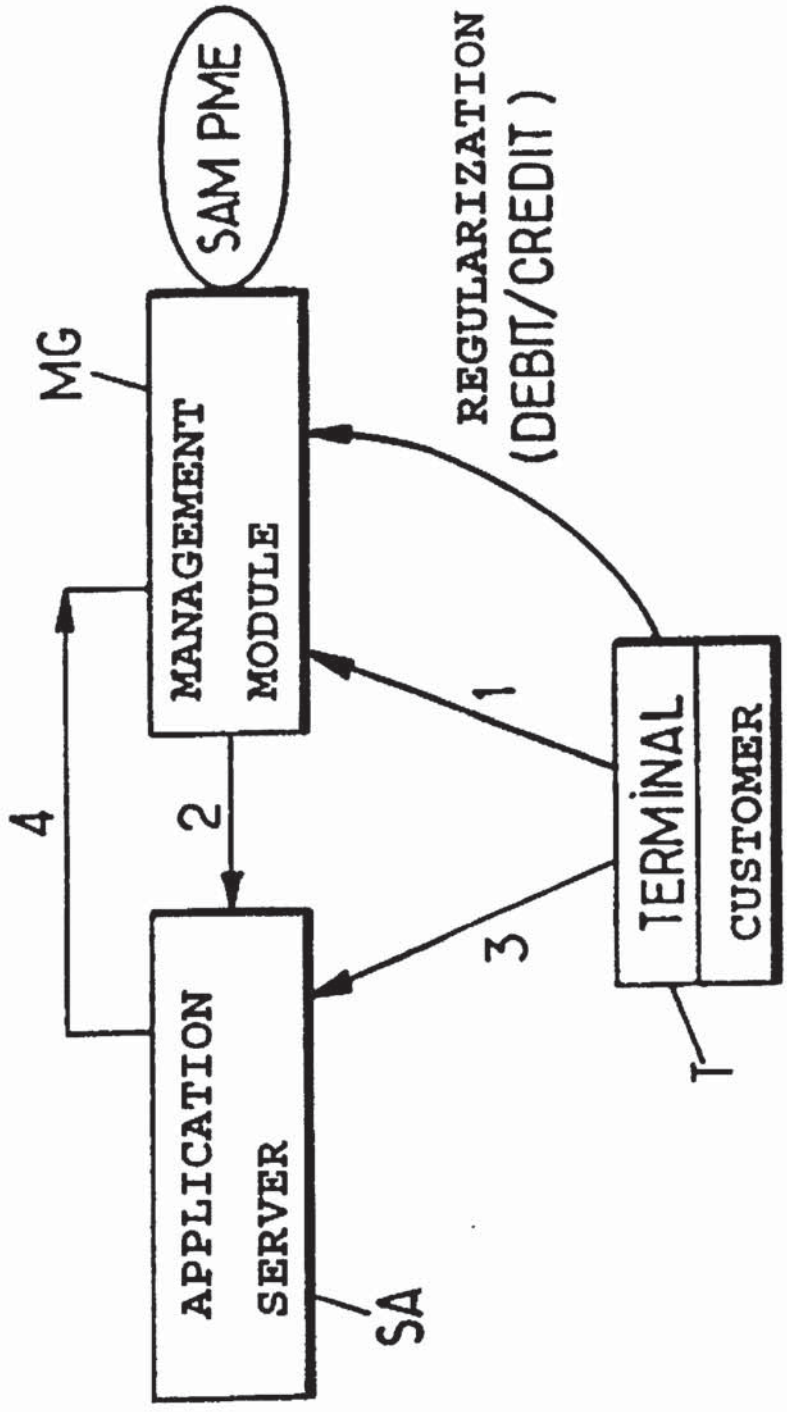

SAM PME
MG
MANAGEMENT MODULE
REGULARIZATION (DEBIT/CREDIT)
1
2
3
4
APPLICATION SERVER
SA
TERMINAL
CUSTOMER
T

FIG. 3c

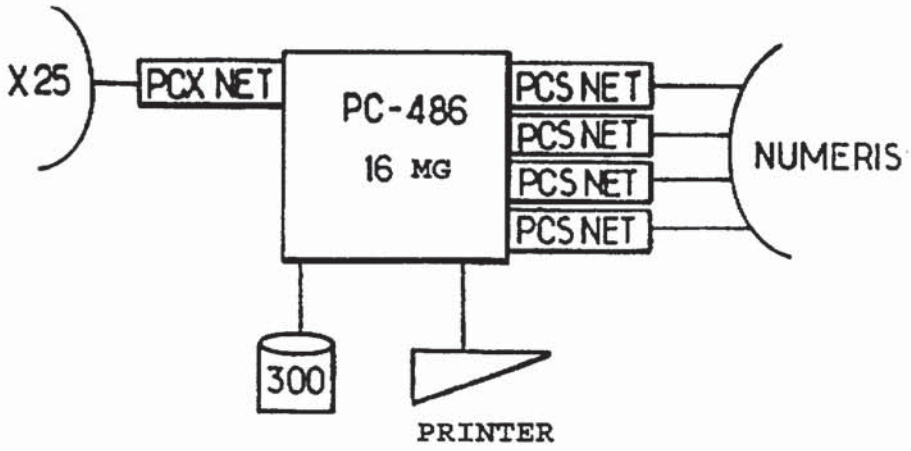


FIG. 4a MANAGEMENT MODULE

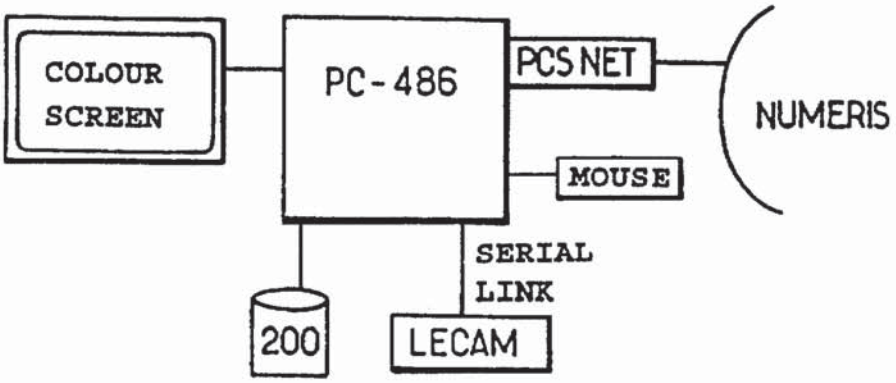


FIG. 4b LOCAL SUBSCRIBER TERMINAL

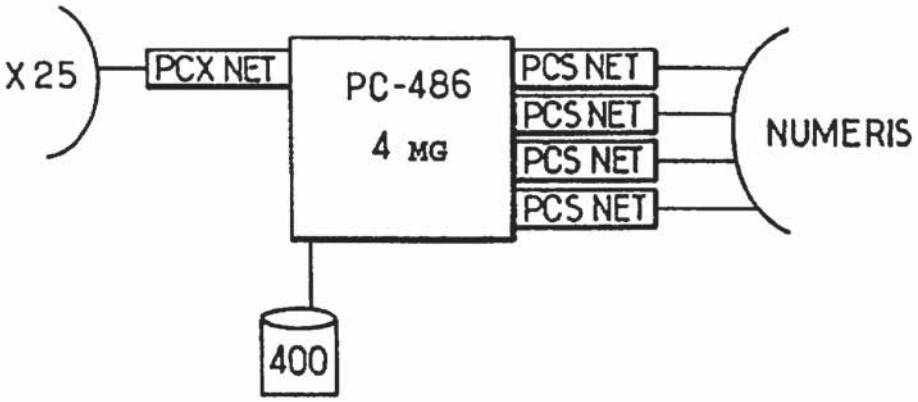


FIG. 4c REMOTE SERVER CENTRE

SYSTEM FOR MANAGEMENT OF THE USAGE OF DATA CONSULTATIONS IN A TELECOMMUNICATION NETWORK

The present invention relates to a system for management of the usage of data consultations in a telecommunication network.

With the rise in data consultation traffic in telecommunication networks, of the digital data transmission network type, a rise due in particular to the increase in and the growing diversity of service provisions supplied by server centres connected to these networks, a major problem of accessibility is currently apparent owing to the declining nature of the availability of these server centres. Although the aforesaid accessibility problem is not posed directly by the transmission capacity of modern digital networks, direct management of the usage of data consultations between subscribers and aforesaid server centres by these latter presents, in the first place, the disadvantage of systematically increasing the duration of the access time, and ultimately the congestion of the network. In the second place it presents the drawback of management bound by the authority responsible for each server centre, something which may slow the development of requests for access thereto by subscribers, the aforesaid responsible authority inevitably becoming judge and jury in the event of management-related litigation with one or more subscribers.

The subject of the present invention is a system for management of the usage of data consultations in a telecommunication network, making it possible in particular to remedy the aforesaid drawbacks.

Another subject of the present invention is in particular the implementation of a system for management of the usage of data consultations in a telecommunication network making it possible to offer suppliers of consultation and remote-entry services in modern digital telecommunication networks the taking into account by a third party of any operation of management of access to the services, of payment for the contents and refund, third parties in whom the various participants have every confidence, this management system appearing, to these participants, as a true tele-informative mediator.

Another subject of the present invention is also the implementation of a system for management of the usage of data consultations in a telecommunication network employing universal mechanisms, which are independent of the specific characteristics of the telecommunication networks.

Another subject of the present invention is also the implementation of a system for managing the usage of data consultations in a telecommunication network, having very great flexibility of use relative to the diversity of services supplied.

Another subject of the present invention is also the implementation of a system for managing the usage of data consultations in a telecommunication network making it possible to rate certain particular subscribers on the basis of specific patterns of usage.

Another subject of the present invention is also the implementation of a system for managing the usage of traffic consultations for a telecommunication network making it possible to offer any subscriber using the network a single networking console or point of entry.

Another subject of the present invention is lastly the implementation of a system for managing the usage of data consultations in a telecommunication network exhibiting the characteristics of an access multinetwork, of a distribution/usage multinetwork, and of multi-application, this allowing

service-supplying server centres a very high flexibility in tariff setting and a very great facility for internationalizing the offering and provision of service.

The system for managing the usage of data consultations in a network for telecommunication between a remote server centre and a local subscriber terminal, communication between the remote server centre and the local subscriber terminal being carried out by way of a link of switched type, is notable in that it includes a usage-management module, external to this link, making it possible, through a communication of interactive type between, on the one hand, the local subscriber terminal and the management module, and, on the other hand, between the management module and the remote server centre, to set up, monitor and acknowledge the said usage between the remote server centre and the local subscriber terminal.

The system for management of the usage of data consultations in a telecommunication network, which is the subject of the present invention, is applicable to the management of the usage of data consultations in a network for telecommunication between a local subscriber terminal and a remote server centre, local subscriber terminal and remote server centre being located in the same national territory or in separate national territories.

A more detailed description of the system for management of the usage of data consultations which is the subject of the present invention will be given in connection with the drawings hereafter in which:

FIG. **1***a* represents a block diagram of a system for management of the usage of consultations in a telecommunication network in accordance with the subject of the present invention;

FIG. **1***b* represents a particular embodiment of the system which is the subject of the present invention such as represented in FIG. **1***a*,

FIGS. **1***c* and **1***d* represent, by way of illustration, a timing diagram of the exchanges of messages between the various constituent elements of the system which is the subject of the present invention, these exchanges together possibly constituting a communication protocol of interactive type between these various elements,

FIG. **2***a* represents, in block diagram form, a functional breakdown of a consultation-usage management module which is a constituent of a system which is the subject of the present invention,

FIG. **2***b* represents a chart for sharing the tasks among the various constituent elements of the system which is the subject of the present invention and an operator undertaking the carriage or conveying of the messages and of the consulted data,

FIGS. **3***a*, **3***b* and **3***c* represent respectively a first, a second and a third variant embodiment of the system which is the subject of the present invention, such as represented in FIG. **1***a*,

FIGS. **4***a*, **4***b* and **4***c* represent respectively a block diagram of the hardware configuration of the management module, of the local terminal and of a remote server centre, application server, allowing the construction of a system according to the object of the present invention.

A more detailed description of a system for management of the usage of data consultations in a network for telecommunication between a remote server centre and a local subscriber terminal, in accordance with the subject of the present invention, will now be given in connection with FIG. **1***a* and the following figures.

In the first place, the concepts of local subscriber terminal and remote server centre will be made clear within the

meaning employed in the context of the description of the present patent application.

A local subscriber terminal is a terminal capable of generating and receiving messages in a telecommunication network, in accordance with the telecommunications-related legal stipulations of a given national territory.

A remote server centre is a server centre capable of generating and receiving messages in a telecommunication network, this server centre being situated in the same national territory or in a national territory separate from the territory in which any local subscriber terminal, according to the aforesaid definition, is situated.

Thus, the link between the remote server centre, denoted SA, and the local subscriber terminal, denoted T, is effected by way of a telecommunication link of switched type. It will be recalled that the concept of a telecommunication link of switched type covers both the switching of networks and the switching of information packets transmitted in digital form.

In accordance with a particularly notable aspect of the management system which is the subject of the present invention, the latter comprises a management module, denoted MG, for this usage, this module being external to the link between the remote server, SA, and the local subscriber terminal, T. It is pointed out that, generally, the management module, MG, makes it possible, through a communication of interactive type between, on the one hand, the local subscriber terminal, T, and the management module, MG, by way of a link denoted **1** in FIG. **1***a*, and, on the other hand, between the management module, MG, and the remote server centre, SA, by way of links **2** and **4**, for example, to set up, monitor and acknowledge the usage of consultations set up by way of the switched-type telecommunication link, denoted **3** in FIG. **1***a*, between the remote server centre, SA, and the subscriber terminal, T.

A more detailed description of the structure of the management system which is the subject of the present invention will now be given in connection with FIG. **1***b*.

According to an advantageous characteristic of the aforesaid management system, communication between the said management module, MG, and the remote subscriber terminal, T, can be carried out by way of a telecommunication link whose data rate is less than or equal to the data rate of the link between the local subscriber terminal, T and the remote server, SA.

In a particular embodiment, it is pointed out that the aforesaid telecommunication links can consist of a link of the integrated services digital network type, ISDN, and in particular of the NUMERIS network (1B), as regards the link denoted **1** between the local subscriber terminal T and the management module, MG, and of this same NUMERIS network (**1B**) or (**2B**), as regards the switched type telecommunication link between the local subscriber terminal, T, and the remote server, SA.

As regards communication between the management module, MG, and the remote server centre, SA, it can preferably be carried out by way of a packet-switching digital link satisfying the X.25 packet-switching recommendation of the C.C.I.T.T. (International Telegraph and Telephone Consultative Committee).

It is pointed out that this link can in particular be effected by a specialized link, LS, or by way of the TRANSPAC network. In FIG. **1***b*, these links are denoted LS or TPC respectively.

Generally, it is pointed out that the local subscriber terminal, T, can be embodied by means of a personal microcomputer, of PC type, including a microprocessor of the INTEL 80 486 type. The management module, MG, can be constructed from a PC-type microcomputer including a microprocessor of the INTEL 80 386 type for example, as will be described later in the description.

Of course, the management system which is the subject of the present invention employs for its operation, that is to say in order to set up communication of interactive type between the various elements, a communication protocol which is illustrated diagrammatically in FIG. **1***c*.

In the aforesaid figure, it is pointed out that the vertical axis represents the time axis, starting from an arbitrary origin, the events being plotted for the local subscriber terminal, T, the management module, MG, and the remote server, SA. These events correspond to the sending and/or receiving of messages whose numbered indices correspond to the number of the link followed.

According to a particularly advantageous aspect of the management system which is the subject of the present invention, the communication protocol includes at least successively the steps of connection of the local subscriber terminal, T, to the management module, MG, and of acknowledgement of this connection. For convenience, the acknowledgement messages, which form part of the protocols normally employed for the transmission and reception of data over the various relevant links, will be neither designated nor described in detail since these acknowledgment messages correspond to known message formats.

The message for connection of the local subscriber terminal to the management module, MG, this message being denoted m_1TMG, is transmitted over the aforesaid telecommunication link **1**, in the form of a short communication, that is to say a communication whose duration is between at most 10 seconds and 15 seconds.

The connection message, m_1TMG, can comprise, in an advantageous embodiment, a subscriber identification field, the subscriber possibly having, at the level of the local subscriber terminal, a password or identification card reader, this subscriber possibly being the holder of a corresponding identification card. The connection request message, m_1TMG, can also include a field for nomination by the customer of the identity of the service which he wishes to use, that is to say the identity of the remote server centre and of the nature of the data or information which he wishes to obtain therefrom, and taken into account by the management module, MG, a field representing the profile and class of the subscriber, as will be described later in the description.

Subsequent to the reception by the management module, MG, of the aforesaid connection request message m_1TMG, the management module, MG, makes it possible, under the criterion of comparability of the data contained in the connection request message, m_1TMG, with preloaded parameters relating to this subscriber, to authorize or deny the opening of a credit allotted by transaction and access by this subscriber to the requested service, that is to say to the identified remote server centre, SA.

Upon a positive decision relative to this authorization, the management module, MG, makes it possible to assign to the relevant subscriber a temporary key authorising, in respect of this subscriber, access to the application server, SA, and the making available of the information necessary for connection to the aforesaid remote server or application server, SA. This information necessary for connection relates for example to an access or call code for the aforesaid server.

Subsequent to the aforesaid positive decision, an operation **2** of transmission by the management module, MG, to the remote server centre of a service request authorization message in respect of the relevant subscriber terminal is

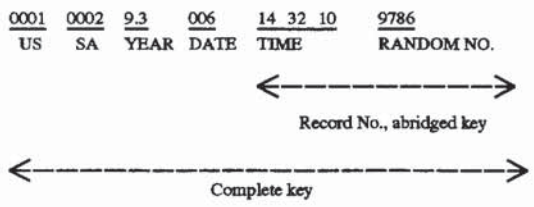
performed by the dispatching by the management module, MG, to the remote server centre, SA, of a corresponding message, denoted m_2MGSA in FIG. 1*c*. This message m_2MGSA includes the temporary key for access to the remote server centre, SA.

The temporary key is generated by the management module MG when a customer, who has satisfied password, credit and profile checks, selects the application service which he wishes to consult. It is firstly transmitted to the application server which keeps it for a certain time. It is then transmitted to the terminal, which supplies it to the server at the time of the call. The contents of the key comply with the following constraints:

- it must be the unique reference, present in all exchanges related to a transaction (usage of a service and billing): T-MG, MG-SA and T-SA exchanges,
- it must make it possible, in the event of litigation, to retrieve the log of a transaction,
- it must not be able to be "guessed" by a customer whilst it is valid in respect of the remote server centre SA.

On the basis of these criteria, a suitable structure may be as follows:

complete key: [customer code] [SA code] [year] [date] [record number], together with [year] in two digits [date], day of the year from 1 to 365, [record number] equal to [time] equal to [random number], with [time] in hh mm ss of the assigning of the key, and [random number], numeral from 0000 to 9999. For example, the complete key generated for the customer with code 0001, service 0002, on 6 Jan., 1993 at 14 h 32 min 10 s, created with a random number 9876 will be:



Only the number of the record (abridged key) is known to the customer. It is displayed on the screen of the terminal before connection to the application server. This record number being unique, it makes it possible to retrieve a posteriori the events which occurred during the transaction (causes of error or charging problems). The management module MG ensures that two customers cannot have the same record number by comparing it with the numbers already generated during the current second.

Generally, and particularly advantageously, it is pointed out that the transmission of the message m_2MGSA is performed likewise through a short communication, allowing the transmission of the previously mentioned temporary key to the remote server centre, SA, of the amount of credit allotted by the management module, MG, as well as of specific information regarding the subscriber, the configuration of the local terminal in his possession and the link with the server centre, SA.

The management module, MG, transmits by way of the link 1, mentioned previously, a message for activation of the local subscriber terminal, T, this message being denoted m_1MGT and containing in particular the temporary key for access to the remote server centre, SA, so as to allow the local subscriber terminal, T, to make the request for connection with the aforesaid remote server centre, SA.

Subsequent to the reception of the validation message m_1MGT, mentioned previously, the link **1** is broken. The local subscriber terminal, T, then transmits a connection request message from the subscriber terminal to the remote server centre, this message being denoted m_3TSA and transmitted by way of the switched type telecommunication link **3**.

Generally, it is pointed out that this connection request message, m_3TSA, naturally includes the temporary access key which, being likewise known to the remote server centre, SA, makes it possible to perform the direct interconnection of the local subscriber terminal, T, and the remote server centre, SA, under the customary conditions of connection specific to this type of telecommunication link, such as the integrated services digital network (ISDN).

Naturally, subsequent to the reception of the connection request message, m_3TSA, the remote server centre, SA, can generate a message for validation of the aforesaid connection request message and performs the transmission and the exchange of data between the remote server centre, SA, and the subscriber terminal, T, in accordance with the service provision requested, by dispatching one or more successive messages, which with a view to simplification will be denoted by the designation m_3SAT. The exchange of data, and, consequently, the provision of the service requested, is of course performed by the link **3** mentioned previously in the description.

Lastly, subsequent to the supplying of the requested service provision, the link **3** is broken by the remote server centre, SA, which, in accordance with a particularly advantageous aspect of the protocol for interactive dialogue between the various elements of the management system which is the subject of the present invention, performs the transmission to the management module, MG, of a service provision status message denoted m_4SAMG via the link **4** to the management module, MG. It is recalled that the transmission of this service provision status message is performed by a packet-switched digital link of the specialized link type, or TRANSPAC.

Generally, it is pointed out that the connection request message from the local subscriber terminal to the remote server centre, message m_3TSA in FIG. 1*c*, can include information allowing the subscriber to negotiate the actual amount of the usage in accordance with specific commercial criteria, such as purchase volume, decreasing tariff, supply and demand algorithm, type of use and customer profile, as mentioned previously.

As regards the service provision status message, m_4SAMG, transmitted from the remote server centre, SA, to the management module, MG, it is pointed out that the latter is likewise performed by way of a short communication, this message relating to certain characteristics of the usage by the subscriber, characteristics such as the previously mentioned nature and negotiated amount for example.

Generally, it is pointed out that unacknowledged usage is not billed by the management module, MG, and that usage exceeding the amount authorized by the management module, MG, that is to say an amount used which is greater than the credit allotted, also cannot be billed in its entirety by the management module, MG.

Furthermore, as represented in FIG. 1*d*, the interactive communication protocol for the various constituent elements of the management system which is the subject of the present invention can include, subsequent to validation of the service provision status message, message m_4SAMG mentioned previously, steps of transmission by the management module, MG, to the local subscriber terminal, T, of a message, denoted m_5MGT, of information regarding the billing of the service provision undertaken, this message consisting essentially of a debit associated with the relevant subscriber terminal, T.

The protocol can furthermore include, as represented in FIG. 1*d*, a step of transmission by the management module, MG, to the remote server centre, SA, of a message, denoted m_7MGSA, of refund of the remaining credit allotted in favour of the subscriber terminal, T.

The information message regarding billing, m_5MGT, is compiled from a customer account file-file of payers, which is managed by the management module, MG, allowing management of the billing for the account of a supplier, that is to say for the account of a remote server centre, SA. This information can contain, for example, the frequency of sending of bills and the type of billing for usage.

By way of non-limiting example, in FIGS. 1*a* and 1*b* in particular, it is indicated that payment by the subscriber of his bill at the management module, MG, can be undertaken in particular by way of electronic payment. This type of payment will be described later in the description.

As regards transmission by the management module, MG, to the remote server centre, SA, of the refund message, m_7MGSA, it is indicated that this message comprises information compiled in accordance with the criterion negotiated by contract between the subscriber and the management module, MG, on the basis of the arrangements for remuneration and payment for provisions rendered.

Generally, it is pointed out that the step of connection of the local subscriber terminal, T, to the management module, MG, the step of transmission by the management module, MG, to the remote server centre, SA, of the service request authorization message and the step of transmission by the local subscriber terminal, T, to the remote server centre, SA, of a connection request message, m_3TSA, as well as the step of transmission and of exchange of data between the remote server centre and the subscriber terminal, T, then the step of transmission by the remote server centre, SA, to the management means of the service provision status message, m_4SAMG, can be carried out in real time. By carrying out these steps in real time, it is pointed out that the only offsets in time between the sequential carrying-out of the transmission of these various messages is attributable to the message transmission time and to the response time of the decision elements, subsequent to the reception of the aforesaid messages.

By contrast, as regards the step of transmission by the management module, MG, to the local subscriber terminal, T, of the billing message, m_5MGT, and the step of transmission by the management module, MG, to the remote server centre, SA, of the refund message, m_7MGSA, it is indicated that these steps can be performed in real time by corresponding links **5** or **7**, under the conditions defined previously or in non-real time. Of course, execution of these steps in non-real time can be carried out by non-datacomms means, the information message regarding billing, m_5MGT, possibly consisting in such a case of a message in the form of a postal letter, for example. The same is also true when, for the payment of the billing represented by step **6** in FIG. 1*a*, for example, payment is made by non-electronic or non-datacomms means of payment.

A more detailed description of the various functions actually carried out by the management module, MG, of the management system which is the subject of the present invention, for implementation of the previously described protocol, in connection with FIGS. 1*c* and 1*d*, will now be given in relation to FIG. 2*a*.

Generally, it is pointed out that the management module, MG, includes the following functions:

management of access in respect of a relevant subscriber, identification of the subscriber,

centralized management of access, that is to say control of access to the remote server centre, supplier of provisions, with the aim of payment and sending-out of the temporary access keys, at **1001**,

management of cards in the case where an access card is allocated to each subscriber, or management of a password,

management, at **1002**, of the contracts and of the subscriber customer accounts, that is to say management of the rights associated with the latter, of their credits, of ceilings, of updated defaulters, of supervision lists of red-list type, at **1002**,

management of the payment of the contents used in the relevant remote server, SA,

sending of bills and close management of billing, at **1008**,

recovery of these bills for the account of the suppliers, that is to say management of a customer account by the remote server centre, SA, at **1004**,

payment interface, accounting, at **1006**,

refund management,

management of the supplier contracts for each remote server centre, SA, and refund to them, at **1004**, as well as statistics of usage Within this same module,

management of a directory, at **1003**, with management of services corresponding to commercial tendering of the management module, MG,

option of downloading lists of directories,

utilization of the directory as service promotion advertising by the remote server centre, SA,

management of the operating interface together with in particular, at **1005**,

execution of the physical links **2** and **4** by way of the packet-switched link between the management module, MG, and each remote server centre, SA,

refund management, at **1007**, and billing management, at **1008**.

It is of course understood that the aforesaid modules, denoted **1000** to **1008**, are embodied by the corresponding program modules within which all the parameters are encoded in logic variable form.

In FIG. 2*b* is represented a chart of the sharing of tasks between the management system which is the subject of the present invention, formed by a terminal, T, local subscriber, a management module, MG, and one or more remote servers, SA, all these elements being interconnected, as described previously in the description, in connection with FIGS. 1*a* or 1*b*, for example, by means of the telecommunication lines and links managed by the carrier, which thereby undertakes sole provision for the conveying of the data between the various aforesaid elements.

As may be observed in the aforesaid FIG. 2*b*, the communications **1**, **2** and **4** are of short duration, and this makes it possible to envisage the implementation of the management system which is the subject of the present invention under the conditions described previously. It is pointed out in particular that the management module can be placed with respect to the local subscriber terminal, T, either locally, according to the definition given earlier in the description, that is to say that the management module, MG, is situated in the same national territory as the local subscriber terminal utilizing the latter, or on the contrary situated remotely, the management module, MG, being situated in a national territory separate from that in which is situated the local subscriber terminal, T, calling upon the aforesaid management module, MG.

It is thus understood that, for any given installation site for the management module, MG, that is to say any national territory, the latter, although remaining subject from the point of view of the transmission of messages to the corresponding telecommunications-related national legislation, can however comprise within its tariff-setting and contract management modules all the elements corresponding to particular specifications of the national territory, within which the local subscriber terminal, T, is installed.

In this respect, it is pointed out that, according to a particularly advantageous characteristic of the management system which is the subject of the present invention, effective separation of tariff setting between the contacts of the information carried and the carriage of this information is therefore implemented as follows:

- payment on action by the subscriber, the amount of which is wholly controlled by the remote server centre, SA, and specific billing by the management module, MG,
- carriage: the communications **1** and **3** are taken on board by the subscriber on the telecommunication bill compiled by the authority of the country in which the local subscriber terminal is installed, the communications **2** and **4** being taken on board by the management module, MG/remote server centre, SA pair.

The management module, MG, allows payment for usage of low or, on the contrary, high amount. It takes the risk of authorizing or denying the credit allotted to the local subscriber terminal, T, of managing disputes such as defaulters, non-deliveries of the provision, and manages subscriber refunds.

The management module, MG, is apparently a necessary agent in solving disputes of any kind.

In connection with FIG. **2***b*, it is pointed out that the national authority providing for the carriage or conveying of the data transported by the various messages provides for the carriage of this data, the billing of this carriage in accordance with the regulations specific to the legislation in force in the relevant country depending on the place of installation, either of the corresponding local subscriber terminal, or of the aforesaid application server or remote server centre, SA.

On the contrary, the management module, MG, bills the service to the remote server centre, SA, and the contents of the provision to the local subscriber terminal, T.

Various alternative embodiments of the management system which is the subject of the present invention will now be described in connection with FIGS. **3***a* and **3***c*.

In a first particular embodiment represented in FIG. **3***a* it is pointed out that there can be associated with the management module, MG, a means of identification consisting for example of a remote authorization centre, CA, interconnected to the management module, MG, by way of a packet-switching link, denoted **1.1**, of X.25 type, for example. Thus, this link can therefore consist of a link comparable to the links **2** and **4** of FIG. **1***a*, **1***b*. In such a case, the local subscriber terminal, T, can be furnished with a card reader, and the subscriber can be the holder of a stand-alone access card, for example a card of the PASTEL type which does indeed provide a means of identification, but not a point of entry means to the management service, and in particular to the management module, MG. It is also pointed out that the stand-alone access card can consist of a PC2 card, for example. The link **1.1** is a real-the link which is effected under the protocol associated with the management system which is the subject of the present invention, immediately after the link **1**, but prior to the link **2**.

It is pointed out lastly that the aforesaid link **1.1** can allow the downloading of discriminatory lists, red lists, under the supervision of the management module, MG, from the remote authorization centre, CA.

In FIG. **3***b* is represented a second alternative embodiment, in which payment is effected with the aid of electronic payment means for example.

Depicted, in connection with FIG. **3***b*, is the use of a bank-card type procedure with a possible opening to subscribers or customers of the general-public type, especially with a view to making an effective prepayment.

Three ways of making a remote payment by bank card can be envisaged:

- the management module, MG, manages access to an electronic payment terminal, denoted TPE, by way of a link, denoted **1.2**, this electronic payment terminal being remote, of known type, this electronic payment terminal itself being interconnected by a link **1.3** to the subscriber's banking organization. The prepayment is then made by way of the link **1.4** to the management module, MG, and this comes close to the procedures for secure telepayment by bank card with network rerouting function. It is pointed out that links **1.2**, **1.3** and **1.4** are links of the packet-switching telecommunication link-type for example, such as links **2** and **4** described previously in the description.
- the management module, MG, can also be recognized as an electronic payment terminal by the banking organization. In such a case, the links **1.2** and **1.4** can then be omitted.
- payment can also be made directly at the remote server centre or application server, SA.

It is pointed out that, in the case of FIG. **3***b*, the payment made is a payment of the just-before-usage type, according to a procedure for making deposits into an intermediate account, such as an electronic purse, PME.

Lastly, in the case of FIG. **3***c*, the electronic payment is made by way of an intermediate account, of the electronic purse or electronic token-holder type, in an identified phase at the end of usage. In such a case, it is pointed out that the management module, MG, has or has access to a security authentification module SAM.

So as to avoid a break in communication between the remote server and the local subscriber terminal, in respect of a payment into the electronic purse, PME, and forced return at the end of connection **3** to the management module, MG, it is then sensible to provide for the debitting of the electronic purse, PME, of the subscriber, not only just after usage, but on the next connection of the subscriber to the corresponding remote server. In such a case, the management module, MG, in fact performs a regularization, the management module retaining a bill pending which can be analyzed as a temporary credit.

Such a mechanism can be operated both for the management of the electronic purse, PME, and that of the electronic token-holder, PJE. In the latter case, the concept of security authentification module disappears.

A more detailed description of the management module, MG, of the local subscriber terminal, T, and of the remote server centre, SA, or at the least a hardware configuration envisaged for them will be given in connection with FIGS. **4***a*, **4***b* and **4***c*.

In FIG. **4***a* is represented a configuration of the management module, MG, which, apart from the previously mentioned microprocessor clocked at a frequency of 33 MHz, is equipped with a 16 MB random-access memory, a plurality of microcomputer telecommunication cards allowing attachment of a plurality of local subscriber terminals to the management module. It is pointed out that these telecom-

munication cards can consist of PCSNET-OST cards satisfying the NUMERIS standard and allowing simultaneous access by 8 terminals to the management module, MG.

Furthermore, the management module, MG, comprises a plurality of microcomputer/packet-switched digital link interface cards providing for the access and simultaneous connection of the management module, MG, to several separate remote server centres, SA. These cards are of the PCXNET-OST type allowing simultaneous access to several remote servers.

Generally, it is pointed out that the management module, MG, and the constituent microcomputer thereof are equipped with a UNIX-type operating system. This operating system, by virtue of its multiprocessor and multi-task architecture, makes it possible in particular to manage the multi-user and multi-network aspects of the management module, MG.

Application of the management module, MG, such as defined in connection with FIGS. **2***a* and **2***b* in particular, can be carried out by way of standardized server software, of REFTEL type. This software provides for the management of 8 subscribers, for example, connected by way of the NUMERIS network, and allows for the carrying-out of the aforesaid interactive dialogue. It also manages the multimedia and STUCAM protocols and allows easy upgrading to other types of networks.

Finally, a data-base management system of ORACLE type can be installed. It is of course pointed out that for installation of this set of functions, the aforesaid microcomputer can be furnished with a 300 MB hard disc.

As represented in FIG. **4***b*, each local subscriber terminal, T, can be installed in a micro-computer containing the type of processor mentioned previously in the description, furnished with its peripherals. It also contains a NUMERIS, PCSNET-OST-type link card, a 200 MB capacity hard disc, a LECAM-type card reader with memory, and a mouse-type pointer.

The terminal is equipped with software of the applications software type including the REFTEL software, allowing multimedia consultation and file transfer, for example.

Finally, the remote server centre represented in FIG. **4** can also be installed in a PC microcomputer-type machine containing a processor mentioned previously in the description clocked at 33 MHz and a 4 MB random-access memory, for example. Each application server, SA, is also equipped with its peripherals and, furthermore, with microcomputer telecommunication cards for access by the terminals. These cards are of the PCSNET-OST type for example.

Access to the management module, MG, is likewise ensured by a PCXNET-OST-type packet-switched digital link microcomputer interface card.

All the references bearing the mark OST denote software products marketed in France by the company QUEST STANDARD TELEMATIQUE.

As regards intercommunications between the various elements of the management system which is the subject of the present invention, it is pointed out that the protocols employed to undertake the various communications are the protocols represented in the table below:

PROTOCOL	DESIGNATION	EXCHANGE
ETS 300 080	Access to NUMERIS in X.25	T-MT and T-SA
ETS 300 079	Com. protocol in NUMERIS	T-MT and T-SA
ETS 300 075	STUTEL file transfer	T-SA
ETS 300 072	Alphamosaic	T-MT and T-SA
ETS 300 073	Geometric	T-SA
ETS 300 177	JPEG photo syntax	T-SA
ETS 300 149	Audio syntax	T-SA
ETS 300 076	Terminal identification	T-MT and T-SA
JPEG	Picture compression	T-SA
G7 xx	Digital sound	T-SA
STUCAM	LECAM control	T-MT

Among the protocols mentioned in the above table, it is pointed out that the label ETS designates the protocol defined in accordance with the specifications of the European Telecommunication Standard Institute, the designation JPEG designates protocols corresponding to the specifications defined by the International Standardization Organization.

The designation STUCAM corresponding to specifications published in France by FRANCE TELECOM.

There has thus been described a system for management of the usage of data consultations in a telecommunication network which is of especially high performance both from the point of view of the speed of action and ultimately of execution of the service provision and from the point of view of the flexibility of use.

As regards the speed of service provision, it is pointed out that, in the embodiment described in connection with FIG. **1***b* in particular, the access times are as follows:

- 3 seconds to 6 seconds to get through to the management module, MG, these times corresponding to the set-up time of the NUMERIS link,
- a few seconds for the processing by the management module, MG, these processing operations including in particular identification of the subscriber and application server to be consulted, verification of the credits assigned, and sending of the temporary key to the remote server, SA, and to the local subscriber, T,
- 3 seconds to 6 seconds to get through to the remote server, SA,
- 1 second for the application server, SA, to check the key.

The overall minimum set-up time for the subscriber is therefore less than 15 seconds.

Furthermore, from the point of view of the flexibility of use, it is pointed out that the management module, MG, enables the remote server centre, SA, to keep a rein on the amount of the tariff setting.

The subscriber can thus negotiate at the remote server centre, SA, the amount to be paid and vice versa, the remote server centre, SA, possibly having various strategies depending on the type of subscriber, contractually free from action, decreasing tariff commensurate with duration. The strategy matched to the user can thus be implemented on the basis of information corresponding to a user profile, which is communicated in the link **2**.

Furthermore, the management module, MG, is a third party in whom the various subscribers have confidence. It is pointed out in particular that the management module, MG, can be stationed in any national territory which can be accessed by the telecommunication networks described previously in the description.

Finally, the management module, MG, manages two types of credit:

- the total credit allotted to the customer account, which can be managed with the technique of ceilings sliding over specified time intervals,
- the specific credit allotted per transaction and per individual, that is to say per local subscriber.

Finally, as regards the comparative areas of responsibility of the management module, MG, and of the remote server centre, SA, in regard to the local subscriber, it is pointed out that:

- the offering of the application servers or remote servers, SA, and the fixing of the amount to be registered are in the area of responsibility of the application servers,
- the defining of the amount of the credit accorded to a customer and the recovering of the negotiated amounts are in the area of responsibility of the management module, MG.

Finally, the architecture of the management system which is the subject of the present invention is open to other functional procedures, such as in particular the methods of payment and means of payment.

In the above description, access to a remote server SA was envisaged for a single management module MG. It goes without saying however, and this without departing from the scope of the subject of the present invention, that access to one and the same remote server can be managed, for a plurality of subscribers, by several separate management modules through identification of each relevant management module.

We claim:

1. A management system for managing data consultations in a network for telecommunication between a remote server center and a local subscriber terminal, communication between the remote server center and the local subscriber terminal being carried out by way of a telecommunication link of a switched type, said system including a management means, external to said link, for providing, through communication of an interactive type between said local subscriber terminal and said management means and between said management means and said remote server center, respectively, a communication protocol including successive steps comprising:

- connection of said local subscriber terminal to said management means, acknowledgement of said connection and issuing of an access key providing access to said remote server center,
- transmission by said management means to said remote server center of a service request authorization message with respect to a corresponding subscriber terminal, and, on a first validation, by said remote server center, of said service request authorization message,
- request for connection and service provision of said local subscriber terminal to said remote server center, by transmission to said remote server center of a connection request message comprising said access key, and on a second validation of said connection request message,
- transmission of data between said remote server center and said local subscriber terminal in accordance with said requested service provision, and subsequent to said requested service provision being supplied and,
- transmission by said remote server center to said management means of a status message indicating the status of said requested service provision.

2. Management system according to claim **1**, wherein communication between said management means and said local subscriber terminal is carried out by way of a telecommunication link whose data rate is less than or equal to the data rate of the link between the local subscriber terminal and the remote server.

3. Management system according to claim **1**, wherein communication between said management means and said remote server center is carried out by way of a packet-switched digital link.

4. Management system according to claim **1**, wherein said communication protocol further includes, subsequent to validation of said service provision status message by said management means, steps comprising:

- transmission by said management means to said local subscriber terminal of an information message regarding billing of said service provision, and comprising a debit associated with said subscriber terminal, and
- transmission by said management means to said remote server center of a refund message for any remaining credit allotted in favor of said local subscriber terminal.

5. Management system according to claim **1**, wherein said connection request message includes information allowing the local subscriber terminal to negotiate an actual amount of said communication.

6. Management system according to claim **1**, wherein said step of connection of said local subscriber terminal to said management means, said step of transmission by said management means to said remote server center of a service request authorization message, said step of transmission by said local subscriber terminal to said remote server center of a connection request message, said step of transmission and exchange of data between said remote server centre and said local subscriber terminal, and said step of transmission by said remote server center to said management means of a service provision status message are carried out in real time.

7. Management system according to claim **1**, wherein said management means comprises:

- at least one microcomputer furnished with peripheral elements, said microcomputer comprising
- a plurality of telecommunication cards for said microcomputer allowing attaching of a plurality of local subscriber terminals, and
- a plurality of packet-switching digital link microcomputer interface cards enabling access and simultaneous connection to a plurality of separate remote server centers.

8. Management system according to claim **4**, wherein said step of transmission by said management means to said local subscriber terminal of said information message regarding billing and said step of transmission by said management means to said remote server center of said refund message are performed in real or non-real time.

9. Management system according to claim **7**, wherein said management means is interconnected with a remote authorization center.

10. Management system according to claim **7**, wherein said management means is interconnected with an electronic payment system.

* * * * *

US005742905A

United States Patent [19]

Pepe et al.

[11] Patent Number: 5,742,905

[45] Date of Patent: Apr. 21, 1998

[54] **PERSONAL COMMUNICATIONS INTERNETWORKING**

[75] Inventors: **David Matthew Pepe**, Middletown; **Lisa B. Blitzer**, Manalapan; **James Joseph Brockman**, Perrineville; **William Cruz**, Eatontown; **Dwight Omar Hakim**, Matawan, all of N.J.; **Michael Kramer**, Bronx County, N.Y.; **Dawn Diane Petr**, Basking Ridge, N.J.; **Josefa Ramaroson**, Freehold, N.J.; **Gerardo Ramirez**, Bridgewater, N.J.; **Yang-Wei Wang**, Howell, N.J.; **Robert G. White**, Morristown, N.J.

[73] Assignee: **Bell Communications Research, Inc.**, Morristown, N.J.

[21] Appl. No.: **309,336**

[22] Filed: **Sep. 19, 1994**

[51] **Int. Cl.**[6] **H04Q 7/20**

[52] **U.S. Cl.** **455/461**; 455/445; 455/417; 379/210

[58] **Field of Search** 379/56, 57, 58, 379/63, 210, 211, 212, 213, 214, 142, 67, 88, 201, 207, 229; 455/403, 414, 417, 445, 422, 461

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,644,351	2/1987	Zabarsky et al.	340/825.44
5,029,196	7/1991	Morganstein	379/67
5,090,050	2/1992	Heffernan	379/58 X
5,109,405	4/1992	Morganstein	379/67 X
5,311,570	5/1994	Grimes et al.	379/57
5,327,486	7/1994	Wolff et al.	379/96
5,329,578	7/1994	Brennan et al.	379/67
5,353,331	10/1994	Emery et al.	379/58
5,467,390	11/1995	Brankley et al.	379/229
5,479,411	12/1995	Klein	379/88 X
5,479,472	12/1995	Campana, Jr. et al.	379/58
5,559,860	9/1996	Mizikovsky	379/58

FOREIGN PATENT DOCUMENTS

2193861 8/1987 United Kingdom .

OTHER PUBLICATIONS

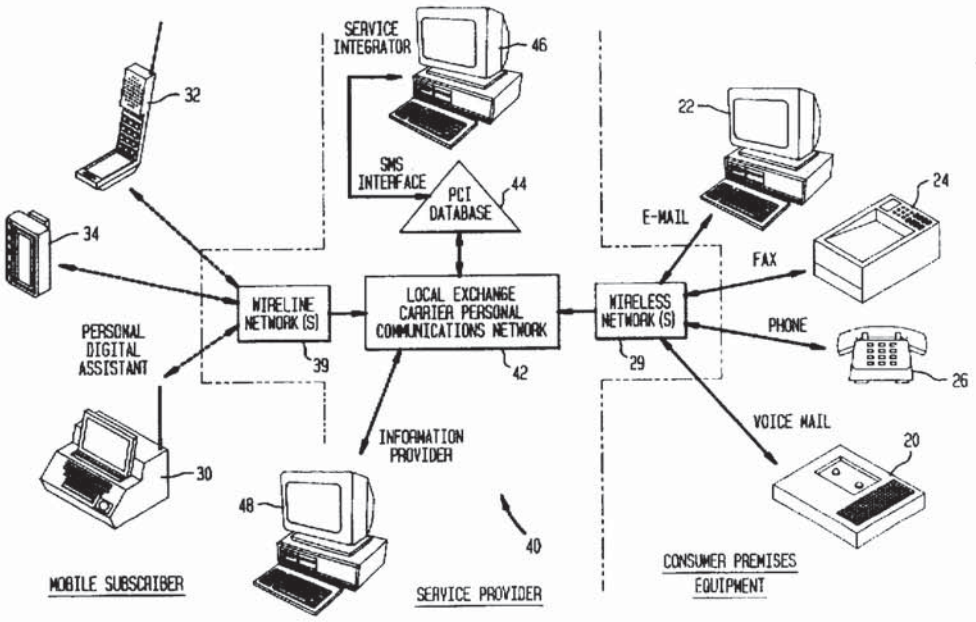
Hientz et al., A Short Message Service—A New Service of Digital Mobile Communication, pp. 517–526, Sep. 1993.

Primary Examiner—Dwayne Bost
Assistant Examiner—William G. Trost
Attorney, Agent, or Firm—Loria B. Yeadon; Joseph Giordano

[57] **ABSTRACT**

A person communications internetworking provides a network subscriber with the ability to remotely control the receipt and delivery of wireless and wireline voice and text messages. The network operates as an interfaces between various wireless and wireline networks, and also performs media translation, where necessary. The subscriber's message receipt and delivery options are maintained in a database which the subscriber may access by wireless or wireline communications to update the options programmed in the database. The subscriber may be provided with CallCommand service which provides real-time control of voice calls while using a wireless data terminal or PDA.

11 Claims, 26 Drawing Sheets



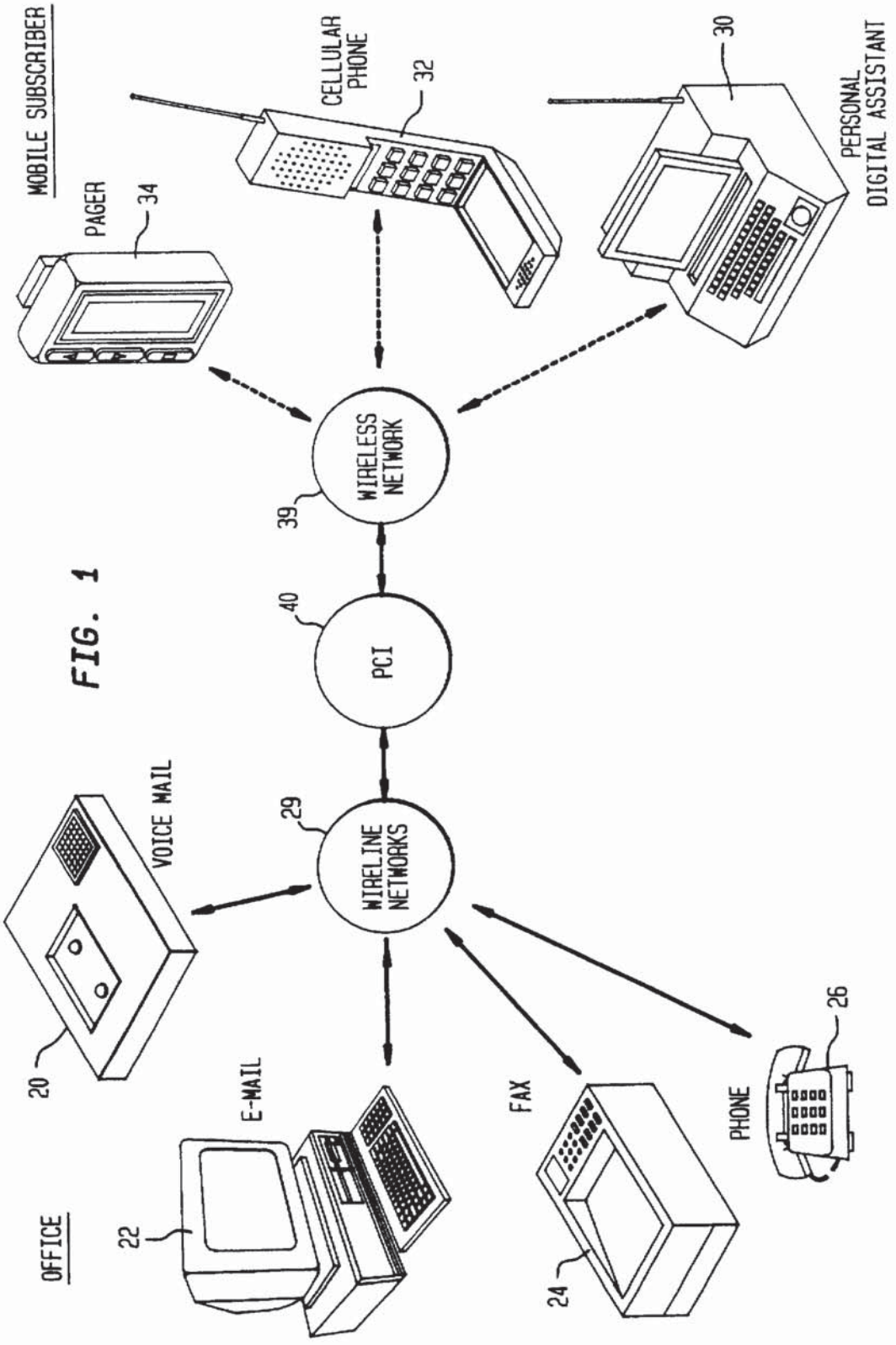

MOBILE SUBSCRIBER
PAGER
34
CELLULAR PHONE
32
30
PERSONAL DIGITAL ASSISTANT
WIRELESS NETWORK
39
PCI
40
WIRELINE NETWORKS
29
VOICE MAIL
20
E-MAIL
22
FAX
24
PHONE
26
OFFICE

FIG. 1

FIG. 2

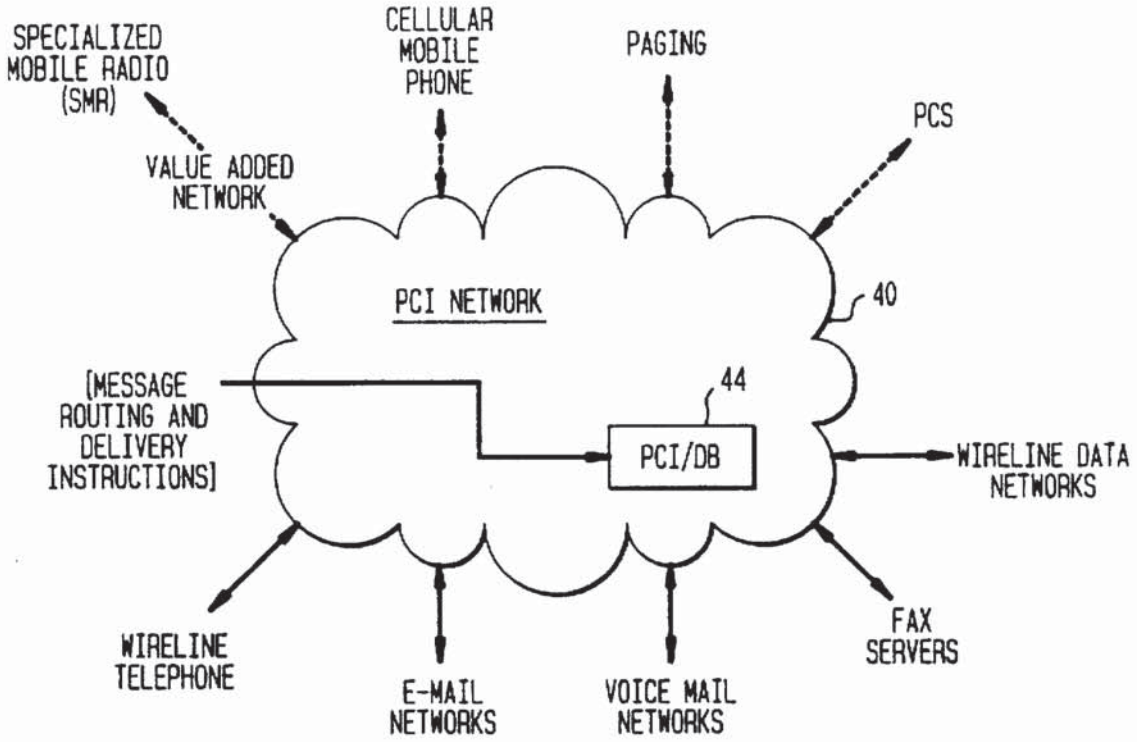

SPECIALIZED MOBILE RADIO (SMR)
CELLULAR MOBILE PHONE
PAGING
PCS
VALUE ADDED NETWORK
PCI NETWORK
40
[MESSAGE ROUTING AND DELIVERY INSTRUCTIONS]
44
PCI/DB
WIRELINE DATA NETWORKS
WIRELINE TELEPHONE
E-MAIL NETWORKS
VOICE MAIL NETWORKS
FAX SERVERS

FIG. 3

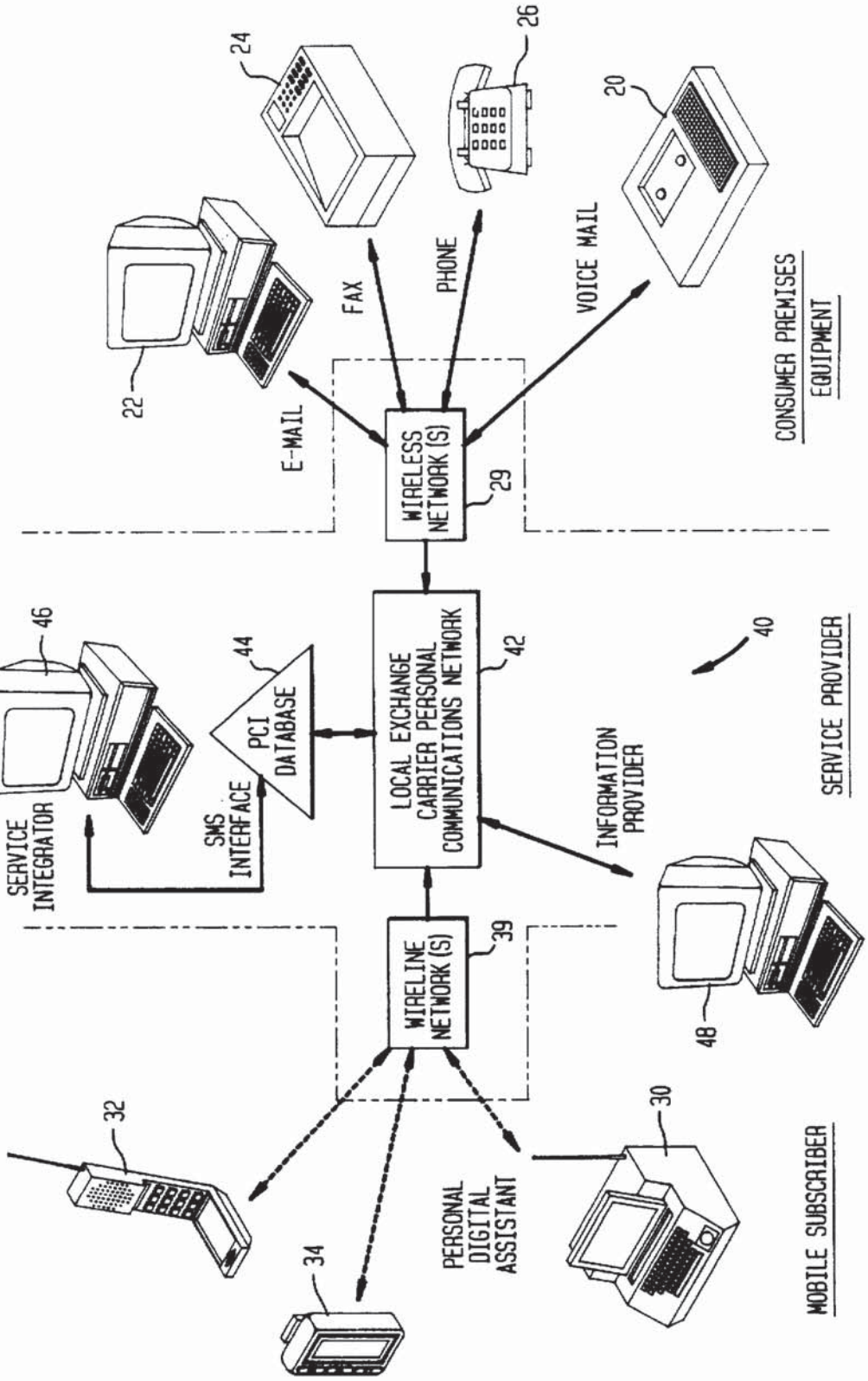
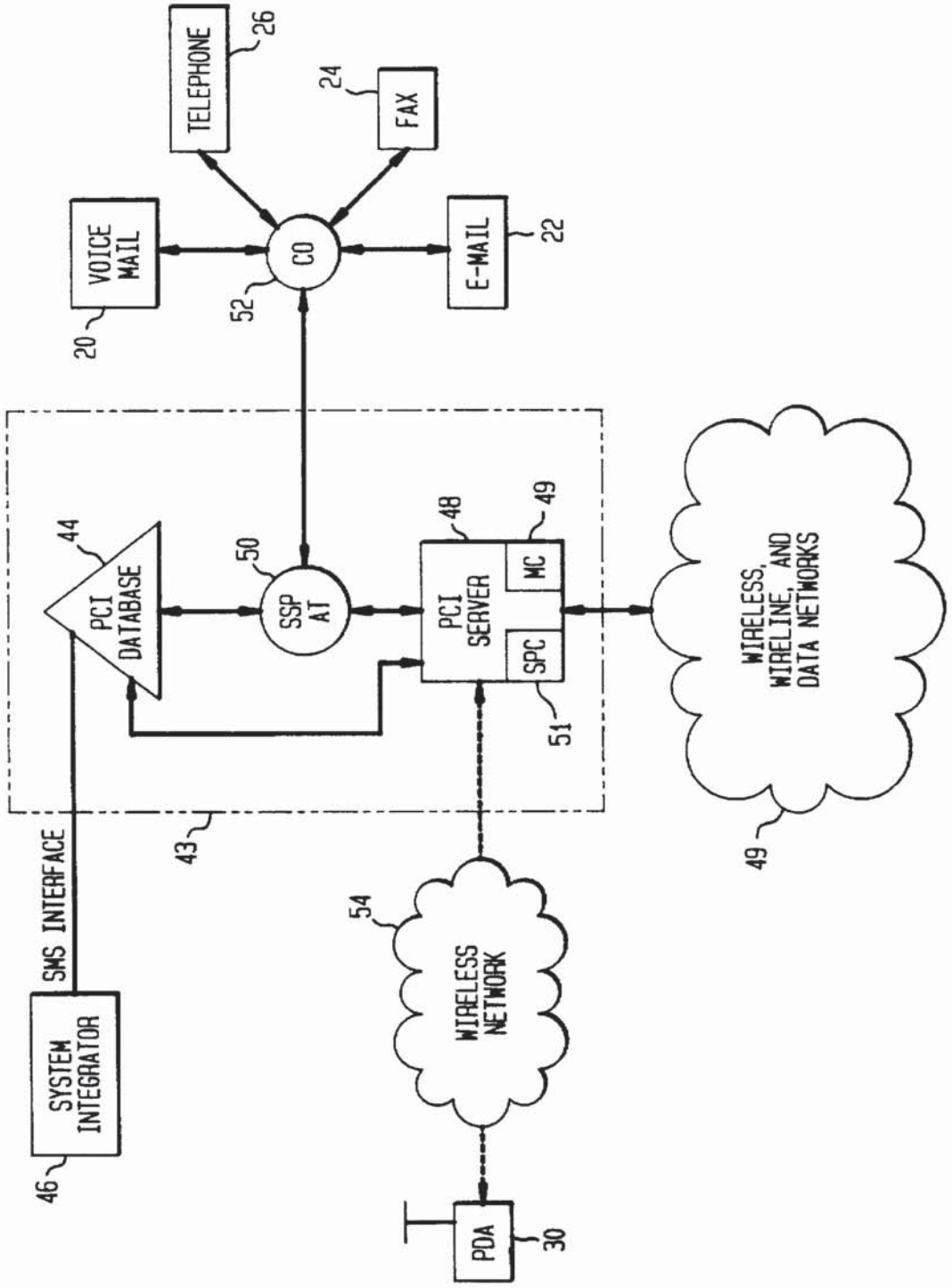

24
26
20
22
FAX
PHONE
VOICE MAIL
E-MAIL
WIRELESS NETWORK (S)
29
CONSUMER PREMISES EQUIPMENT
46
44
PCI DATABASE
LOCAL EXCHANGE CARRIER PERSONAL COMMUNICATIONS NETWORK
42
40
SERVICE INTEGRATOR
SMS INTERFACE
INFORMATION PROVIDER
SERVICE PROVIDER
WIRELINE NETWORK (S)
39
48
32
30
34
PERSONAL DIGITAL ASSISTANT
MOBILE SUBSCRIBER

FIG. 4


TELEPHONE
26
FAX
24
VOICE MAIL
20
CO
52
E-MAIL
22
PCI DATABASE
44
SSP AT
50
PCI SERVER
48
MC
49
SPC
51
WIRELESS, WIRELINE, AND DATA NETWORKS
49
43
SMS INTERFACE
SYSTEM INTEGRATOR
46
WIRELESS NETWORK
54
PDA
30

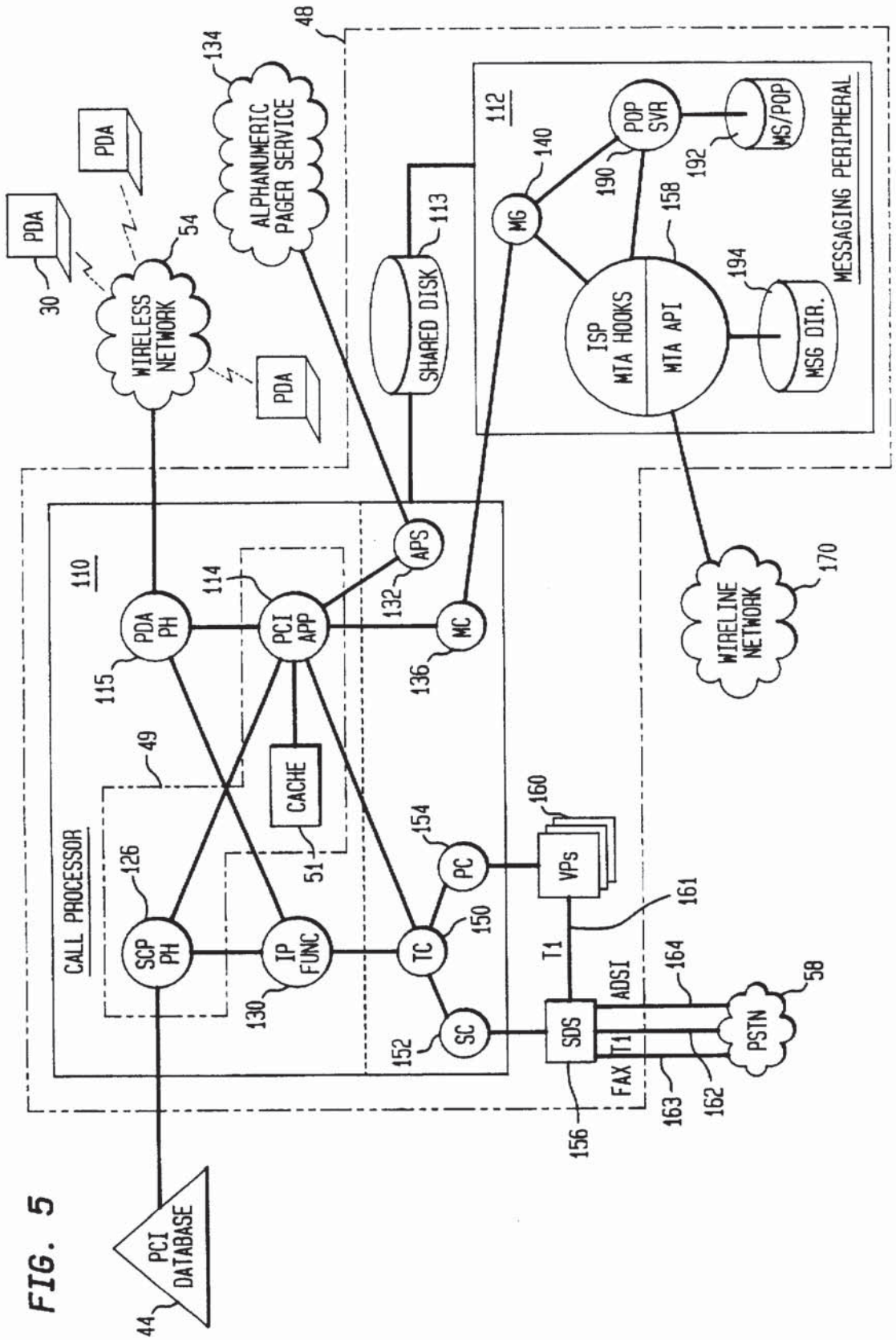

48
134
ALPHANUMERIC PAGER SERVICE
PDA
PDA
30
54
WIRELESS NETWORK
PDA
SHARED DISK
113
112
MG
140
POP SVR
190
MS/POP
192
158
ISP MTA HOOKS
MTA API
194
MSG DIR.
MESSAGING PERIPHERAL
110
APS
132
PDA PH
115
PCI APP
114
MC
136
WIRELINE NETWORK
170
49
CACHE
51
CALL PROCESSOR
126
SCP PH
IP FUNC
130
TC
150
PC
154
VPs
160
161
T1
ADSI
164
SC
152
SDS
T1
FAX
156
163
162
PSTN
58
PCI DATABASE
44

FIG. 5

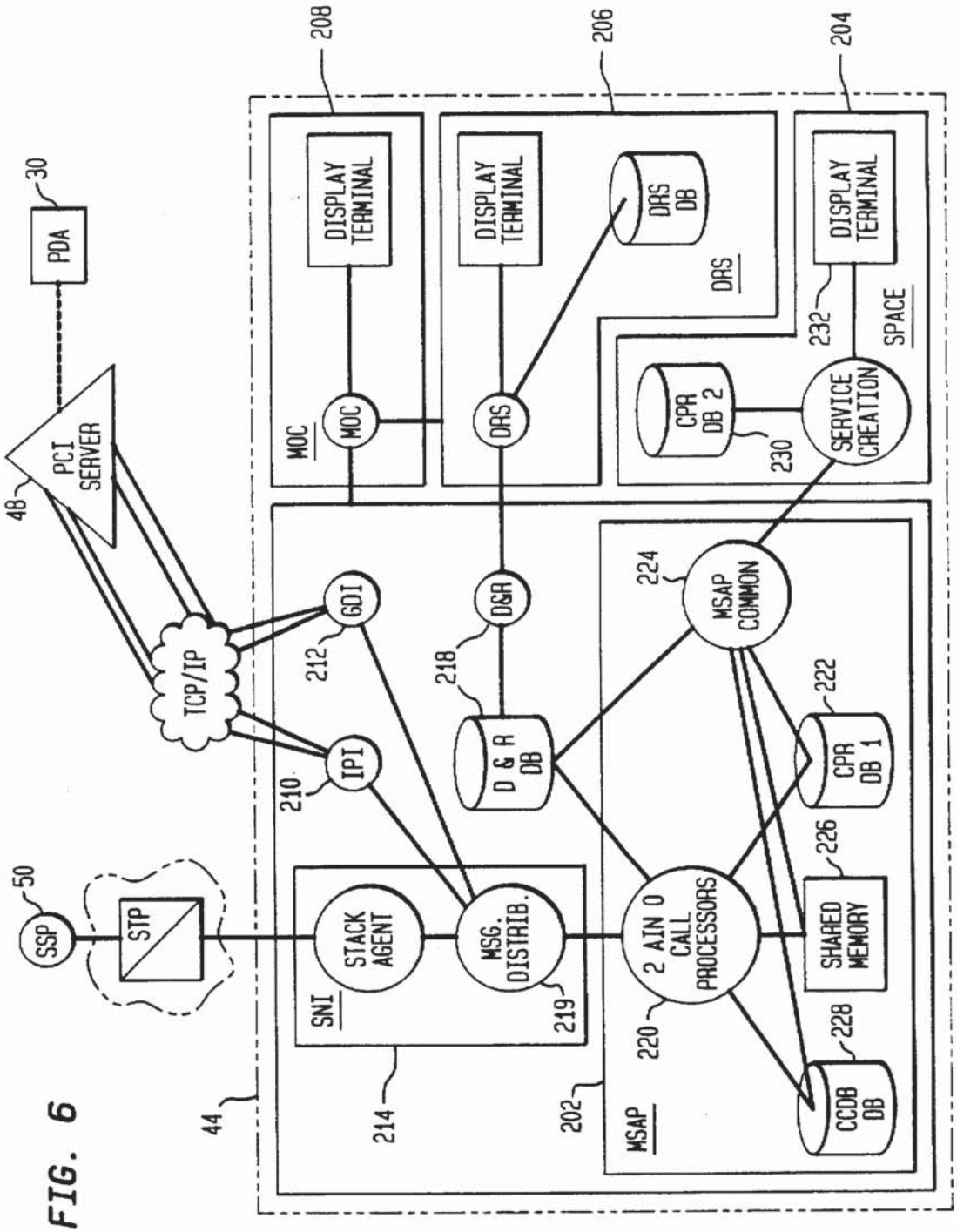

208
206
204
30
PDA
DISPLAY TERMINAL
DISPLAY TERMINAL
DISPLAY TERMINAL
DRS DB
DRS
232
SPACE
MOC
MOC
DRS
CPR DB 2
230
SERVICE CREATION
48
PCI SERVER
TCP/IP
GDI
212
D&R
218
224
MSAP COMMON
222
CPR DB 1
IPI
210
D & R DB
226
SHARED MEMORY
50
SSP
STP
STACK AGENT
MSG. DISTRIB.
2 AIN 0 CALL PROCESSORS
220
228
CCDB DB
SNI
214
219
202
MSAP
44

FIG. 6

FIG. 7

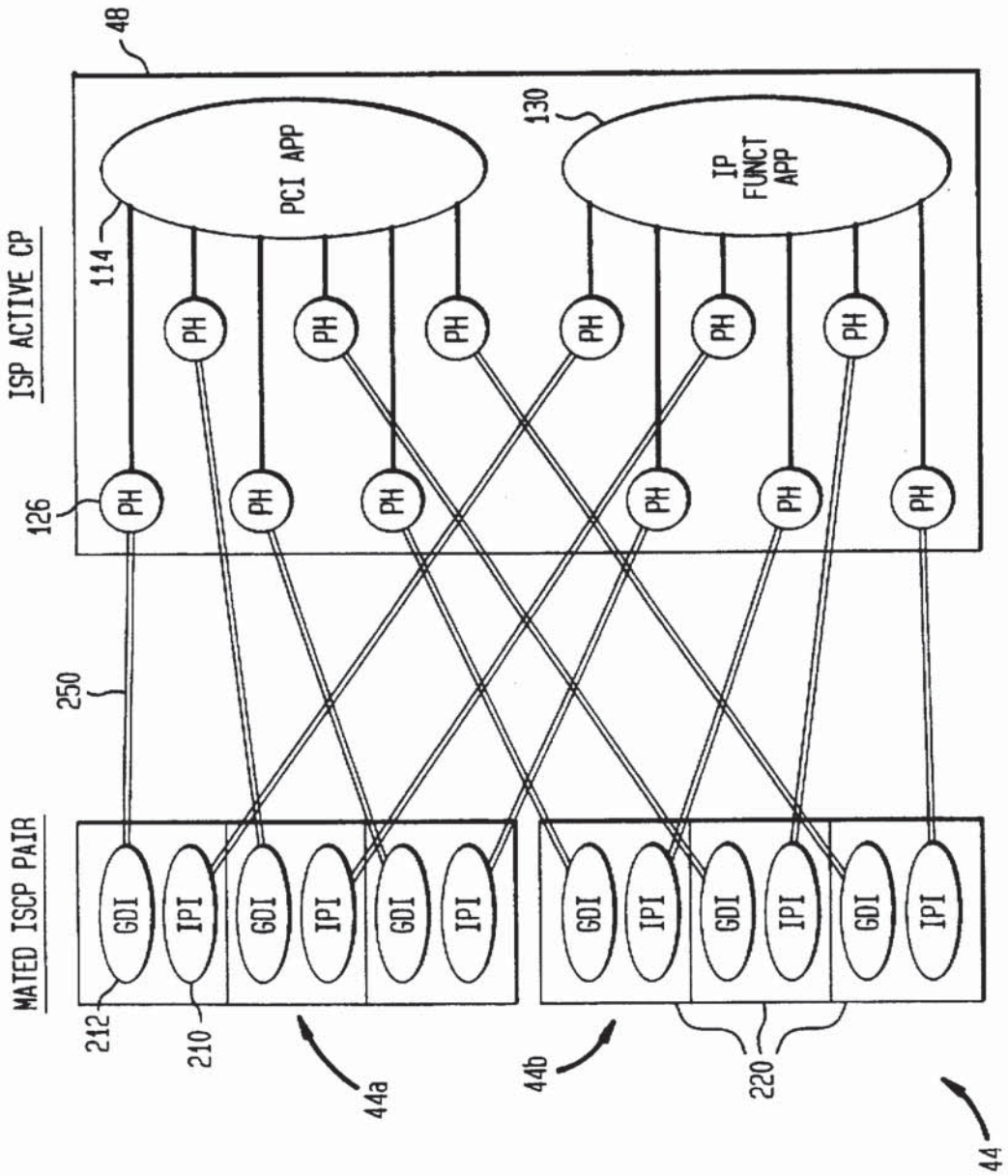

48
ISP ACTIVE CP
114
PCI APP
130
IP FUNCT APP
PH
126
250
MATED ISCP PAIR
GDI
IPI
212
210
44a
44b
220
44

FIG. 8

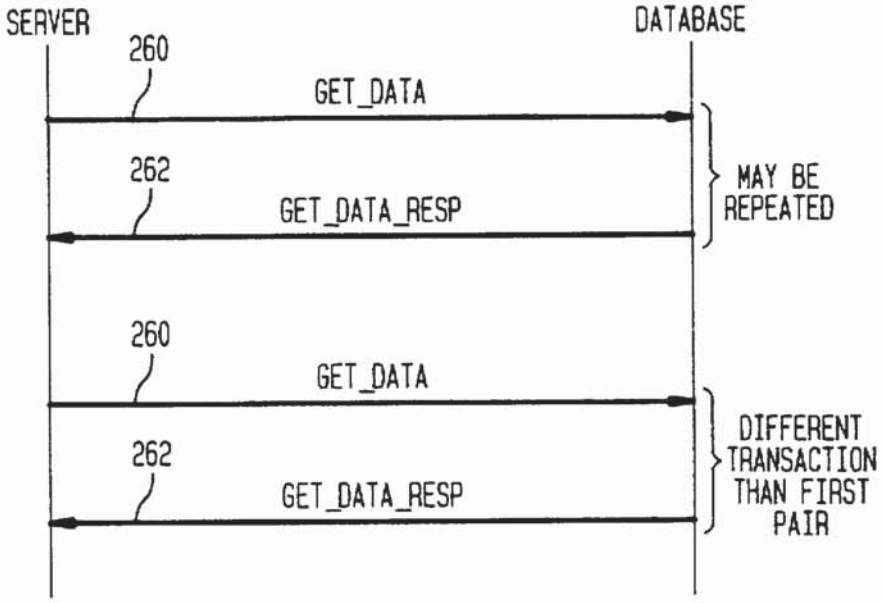

SERVER
DATABASE
260
GET_DATA
262
GET_DATA_RESP
MAY BE REPEATED
260
GET_DATA
262
GET_DATA_RESP
DIFFERENT TRANSACTION THAN FIRST PAIR

FIG. 9

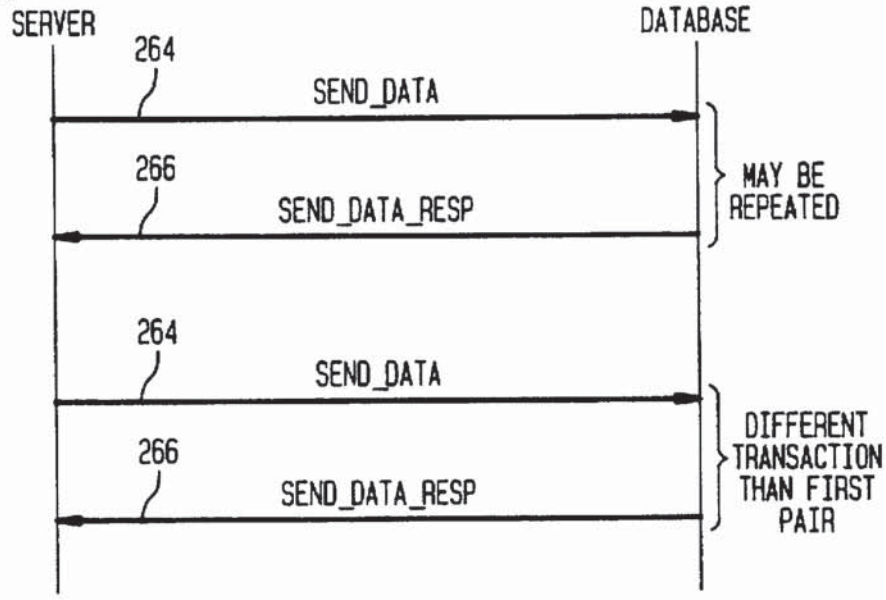

SERVER
DATABASE
264
SEND_DATA
266
SEND_DATA_RESP
MAY BE REPEATED
264
SEND_DATA
266
SEND_DATA_RESP
DIFFERENT TRANSACTION THAN FIRST PAIR

FIG. 10

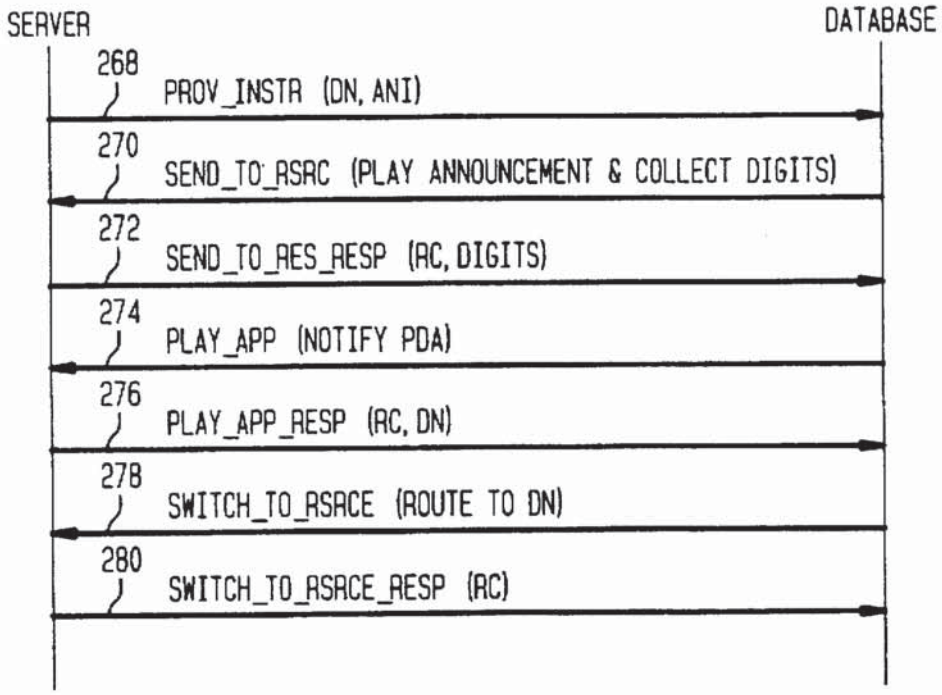

SERVER
DATABASE
268
PROV_INSTR (DN, ANI)
270
SEND_TO_RSRC (PLAY ANNOUNCEMENT & COLLECT DIGITS)
272
SEND_TO_RES_RESP (RC, DIGITS)
274
PLAY_APP (NOTIFY PDA)
276
PLAY_APP_RESP (RC, DN)
278
SWITCH_TO_RSRCE (ROUTE TO DN)
280
SWITCH_TO_RSRCE_RESP (RC)

FIG. 11

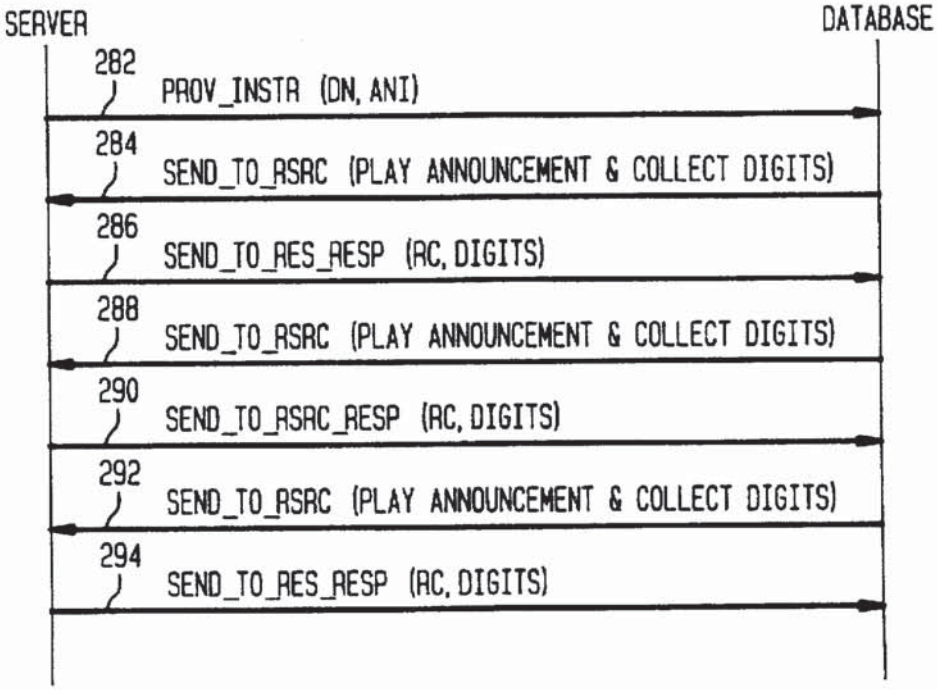

SERVER
DATABASE
282
PROV_INSTR (DN, ANI)
284
SEND_TO_RSRC (PLAY ANNOUNCEMENT & COLLECT DIGITS)
286
SEND_TO_RES_RESP (RC, DIGITS)
288
SEND_TO_RSRC (PLAY ANNOUNCEMENT & COLLECT DIGITS)
290
SEND_TO_RSRC_RESP (RC, DIGITS)
292
SEND_TO_RSRC (PLAY ANNOUNCEMENT & COLLECT DIGITS)
294
SEND_TO_RES_RESP (RC, DIGITS)

FIG. 12

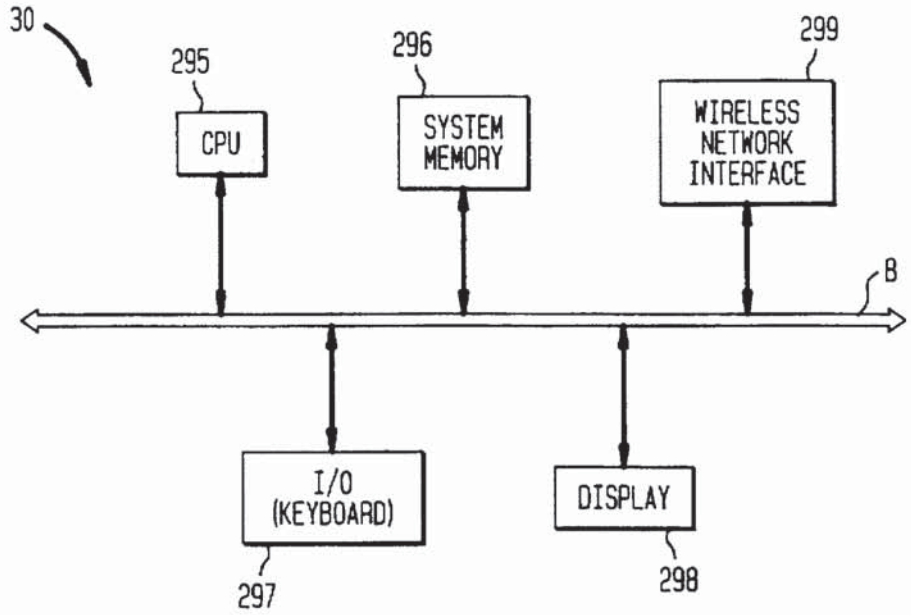


FIG. 13

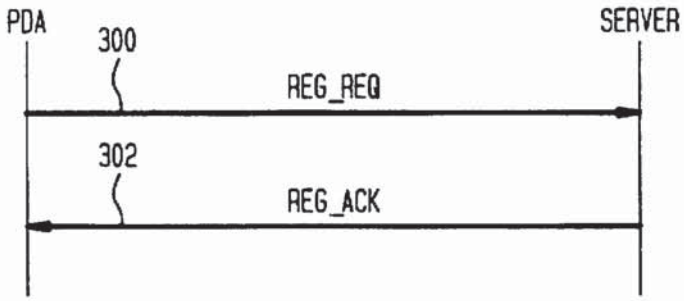


FIG. 14

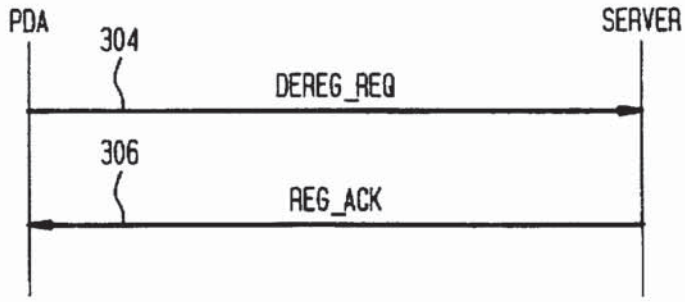


FIG. 15

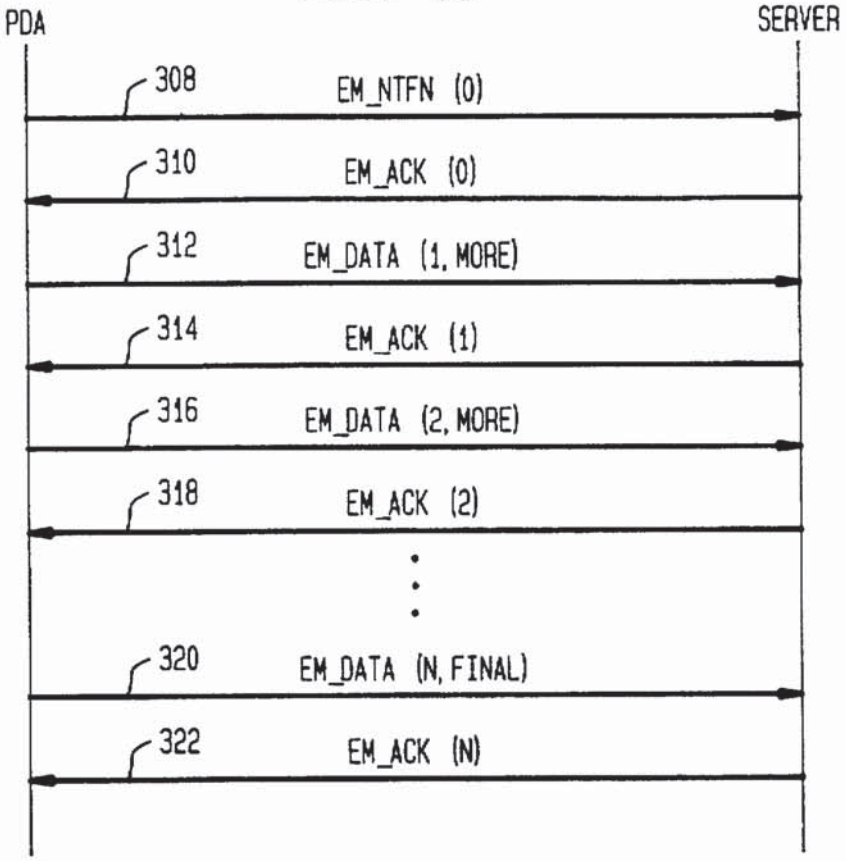


FIG. 16A

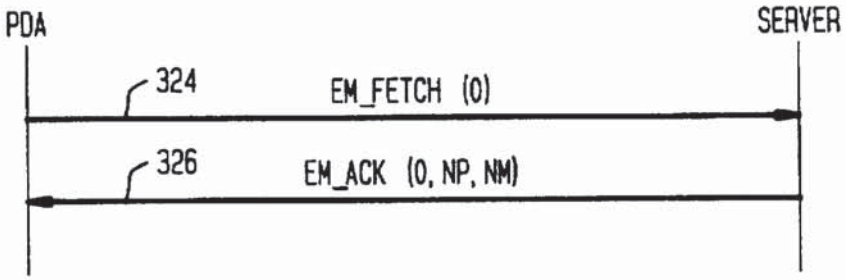


FIG. 16B

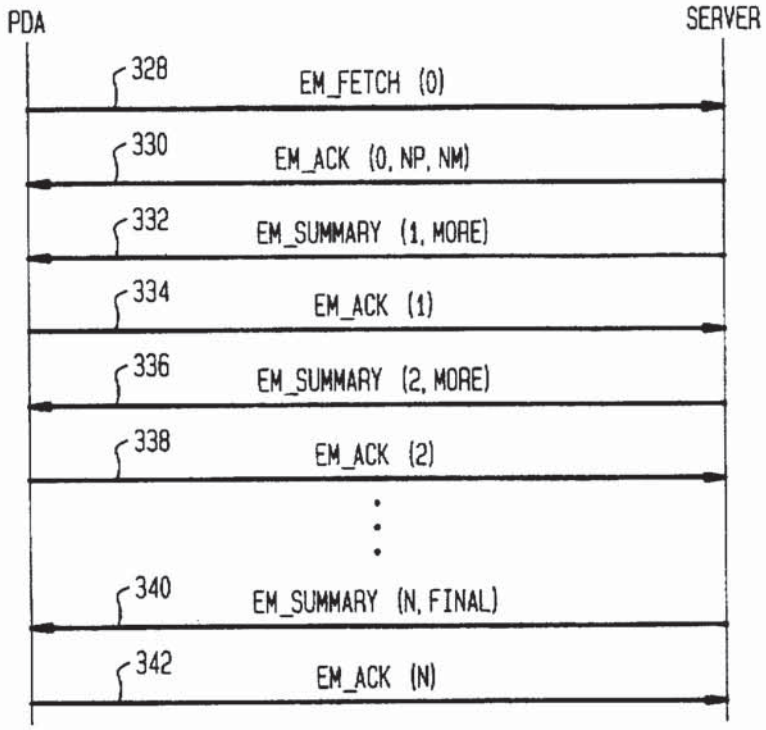


FIG. 17

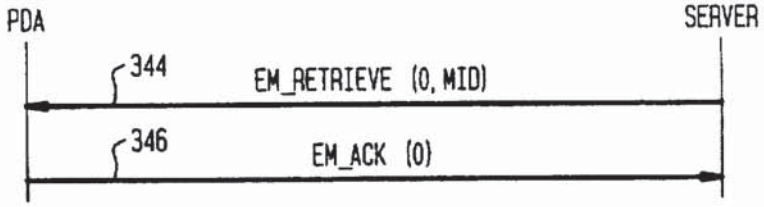


FIG. 18

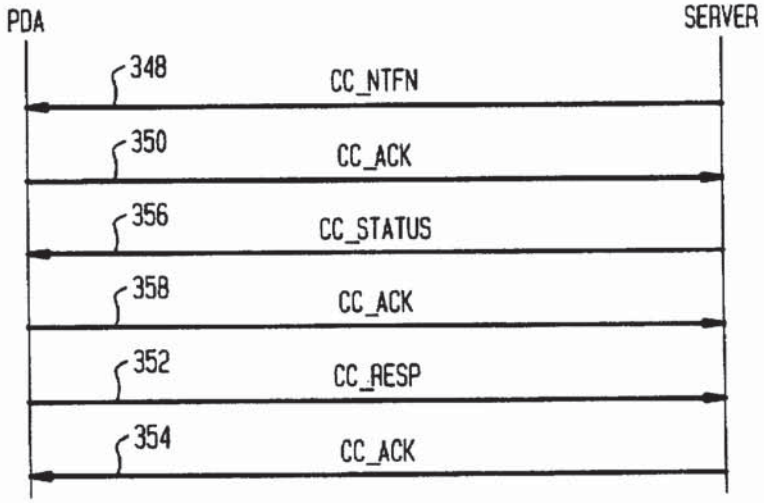


FIG. 19

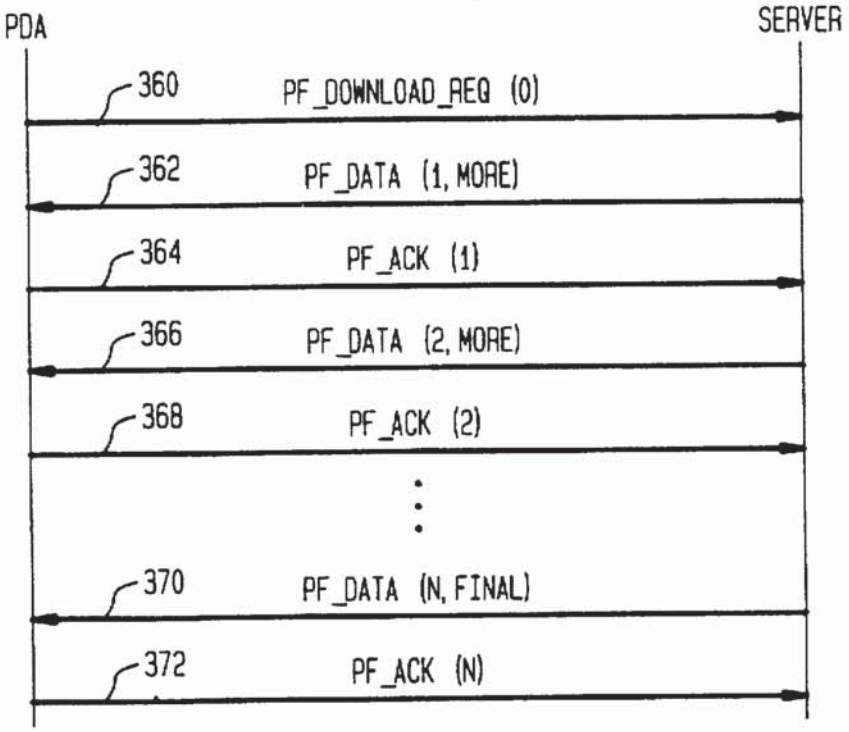


FIG. 20A

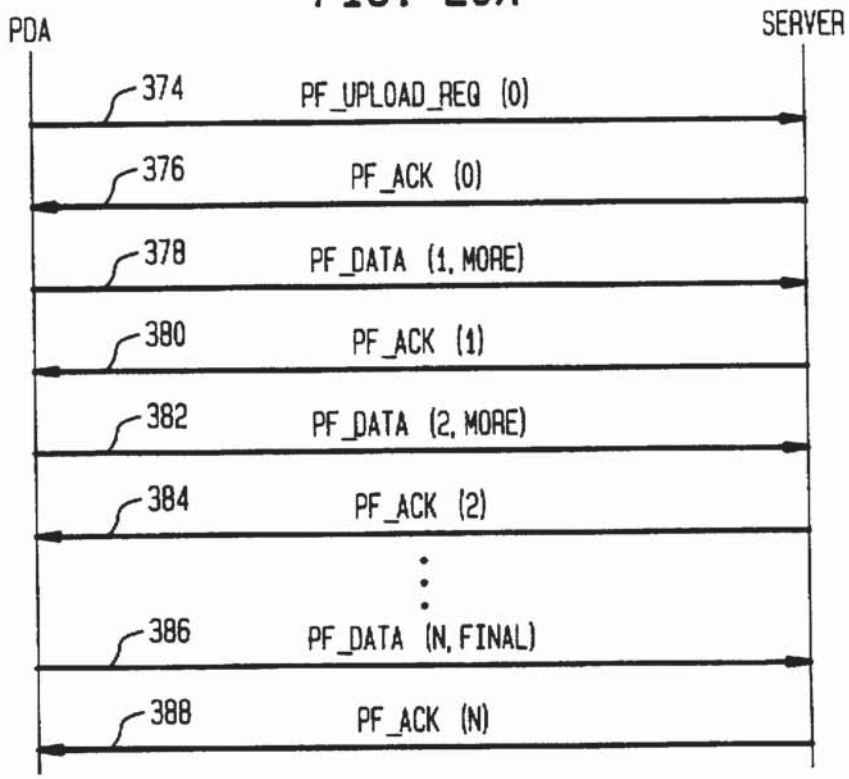
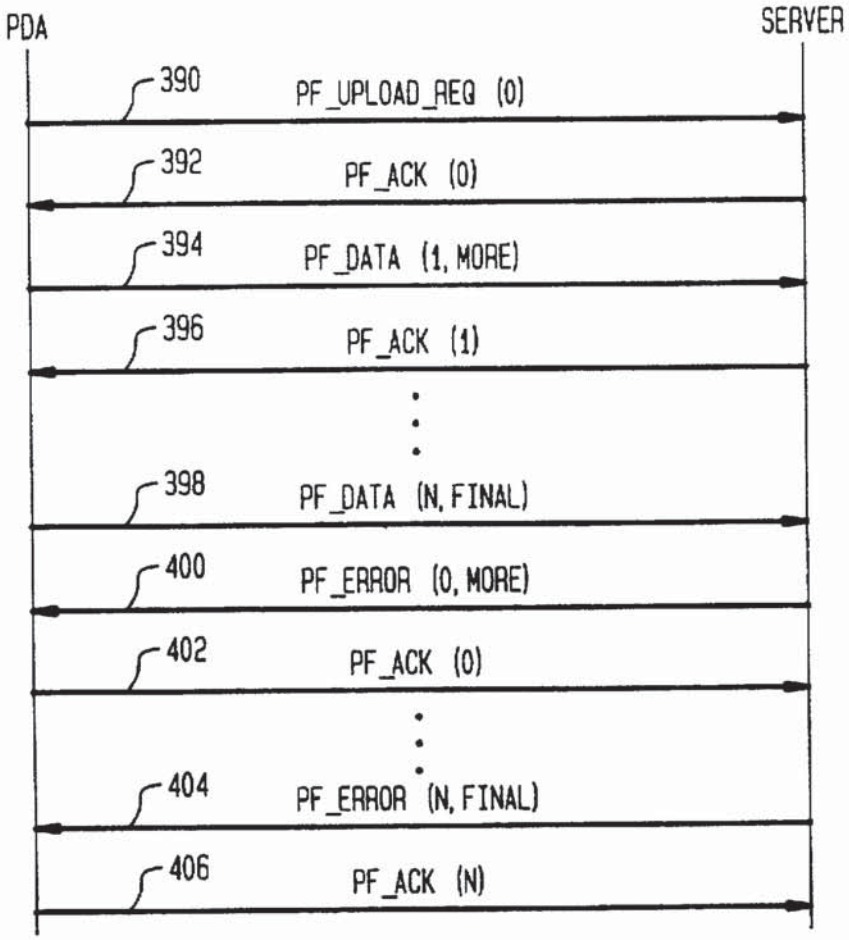


FIG. 20B


PDA
SERVER
390
PF_UPLOAD_REQ (0)
392
PF_ACK (0)
394
PF_DATA (1, MORE)
396
PF_ACK (1)
398
PF_DATA (N, FINAL)
400
PF_ERROR (0, MORE)
402
PF_ACK (0)
404
PF_ERROR (N, FINAL)
406
PF_ACK (N)

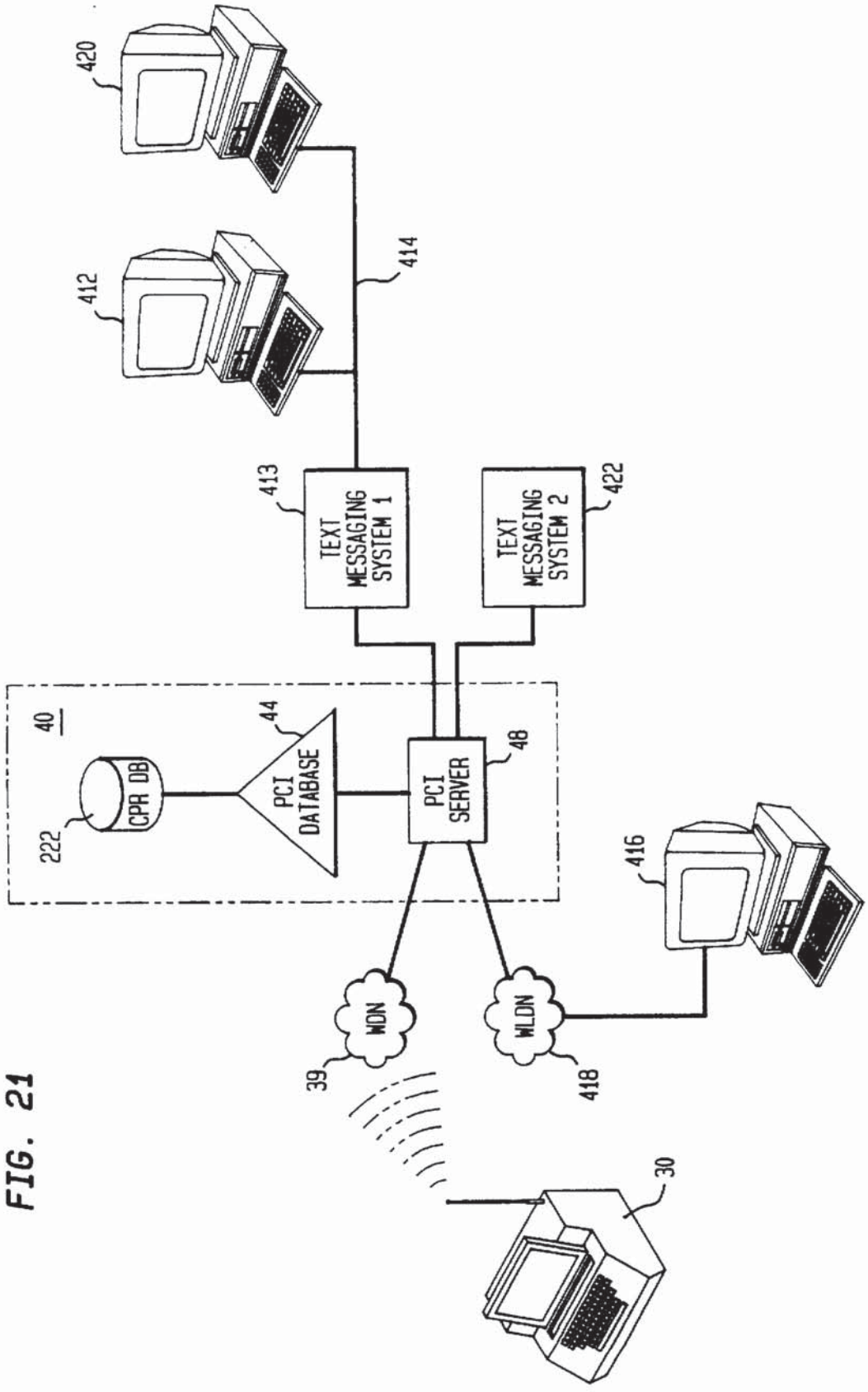

420
412
414
413
TEXT MESSAGING SYSTEM 1
422
TEXT MESSAGING SYSTEM 2
40
44
PCI DATABASE
48
PCI SERVER
222
CPR DB
416
WDN
39
WLDN
418
30

FIG. 21

FIG. 22

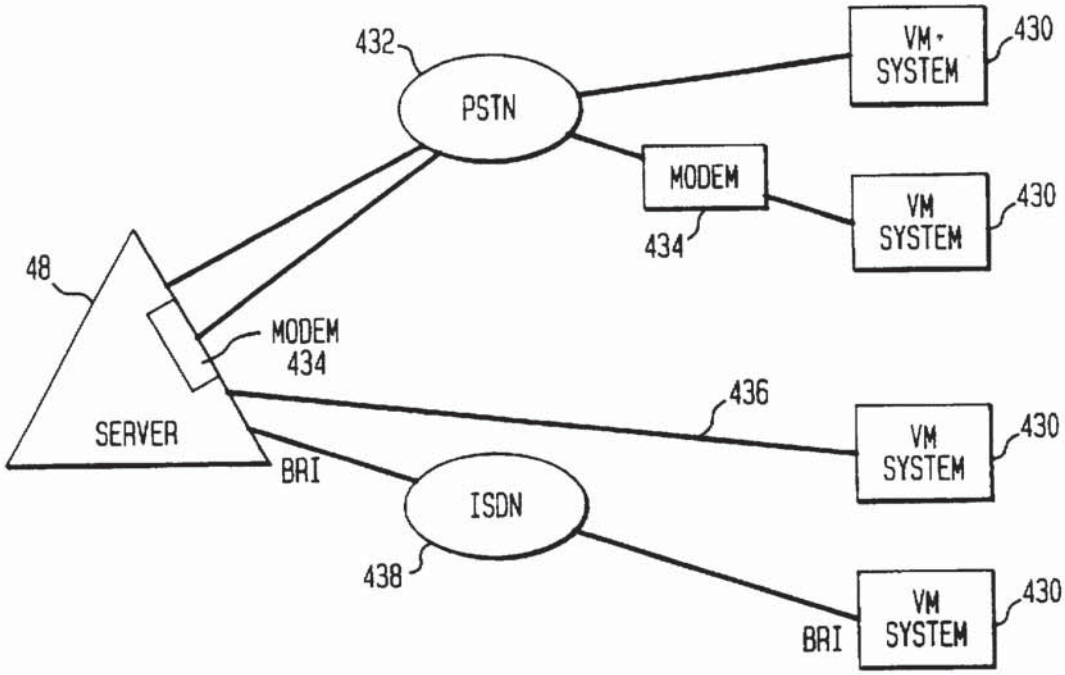
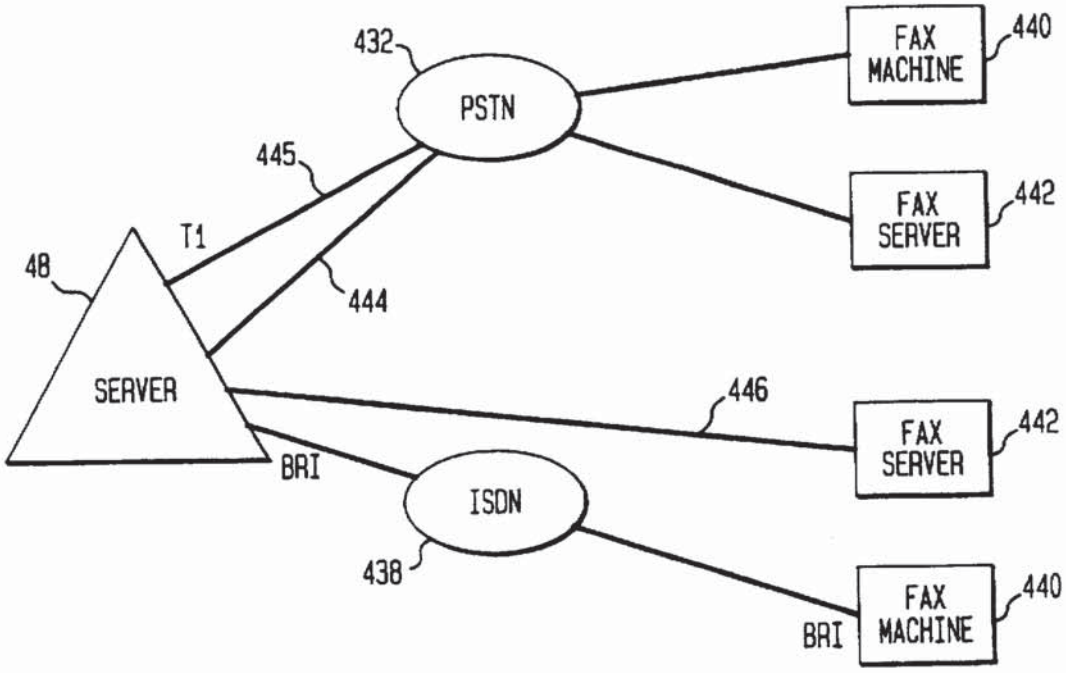

432
PSTN
VM SYSTEM
430
MODEM
434
VM SYSTEM
430
48
MODEM
434
SERVER
436
VM SYSTEM
430
BRI
ISDN
438
VM SYSTEM
430
BRI

FIG. 23


432
PSTN
FAX MACHINE
440
445
FAX SERVER
442
T1
48
444
SERVER
446
FAX SERVER
442
BRI
ISDN
438
FAX MACHINE
440
BRI

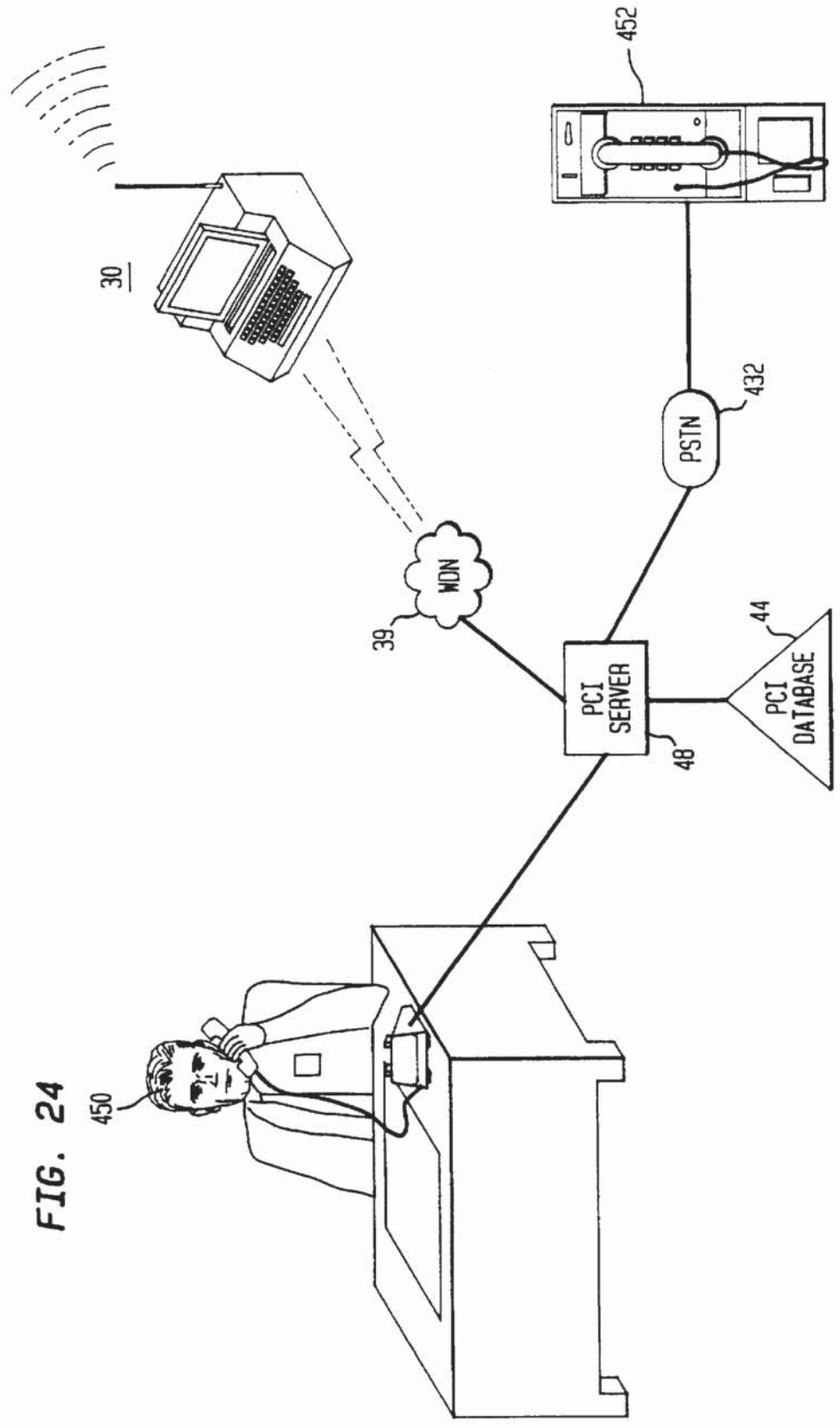


FIG. 24

FIG. 25

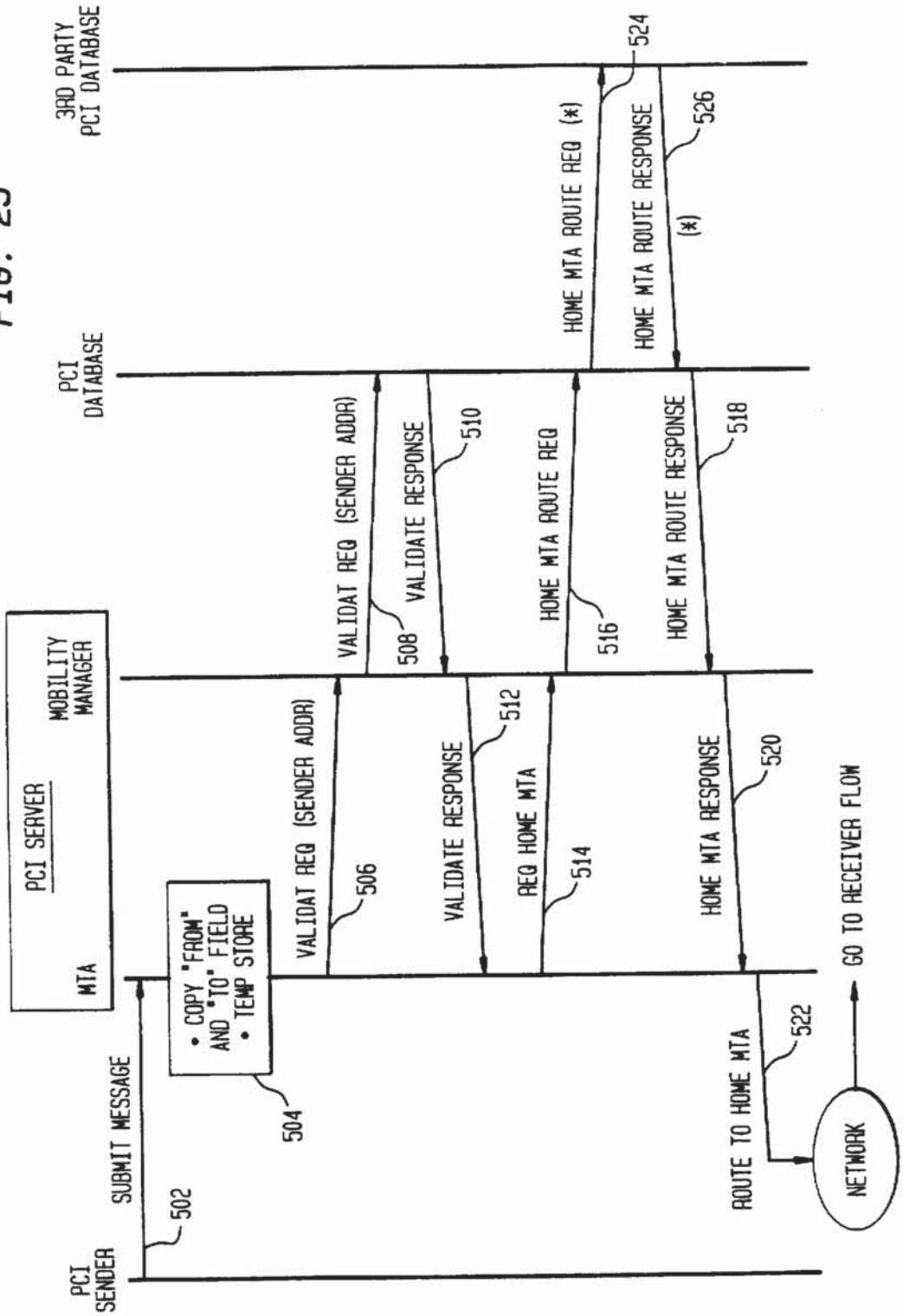

PCI SENDER
SUBMIT MESSAGE
502
PCI SERVER
MOBILITY MANAGER
MTA
• COPY 'FROM' AND 'TO' FIELD
• TEMP STORE
504
VALIDAT REQ (SENDER ADDR)
506
VALIDATE RESPONSE
508
VALIDAT REQ (SENDER ADDR)
510
REQ HOME MTA
512
HOME MTA ROUTE REQ
514
HOME MTA RESPONSE
516
HOME MTA ROUTE RESPONSE
518
ROUTE TO HOME MTA
520
GO TO RECEIVER FLOW
522
NETWORK
PCI DATABASE
HOME MTA ROUTE REQ (*)
524
HOME MTA ROUTE RESPONSE (*)
526
3RD PARTY PCI DATABASE

FIG. 26

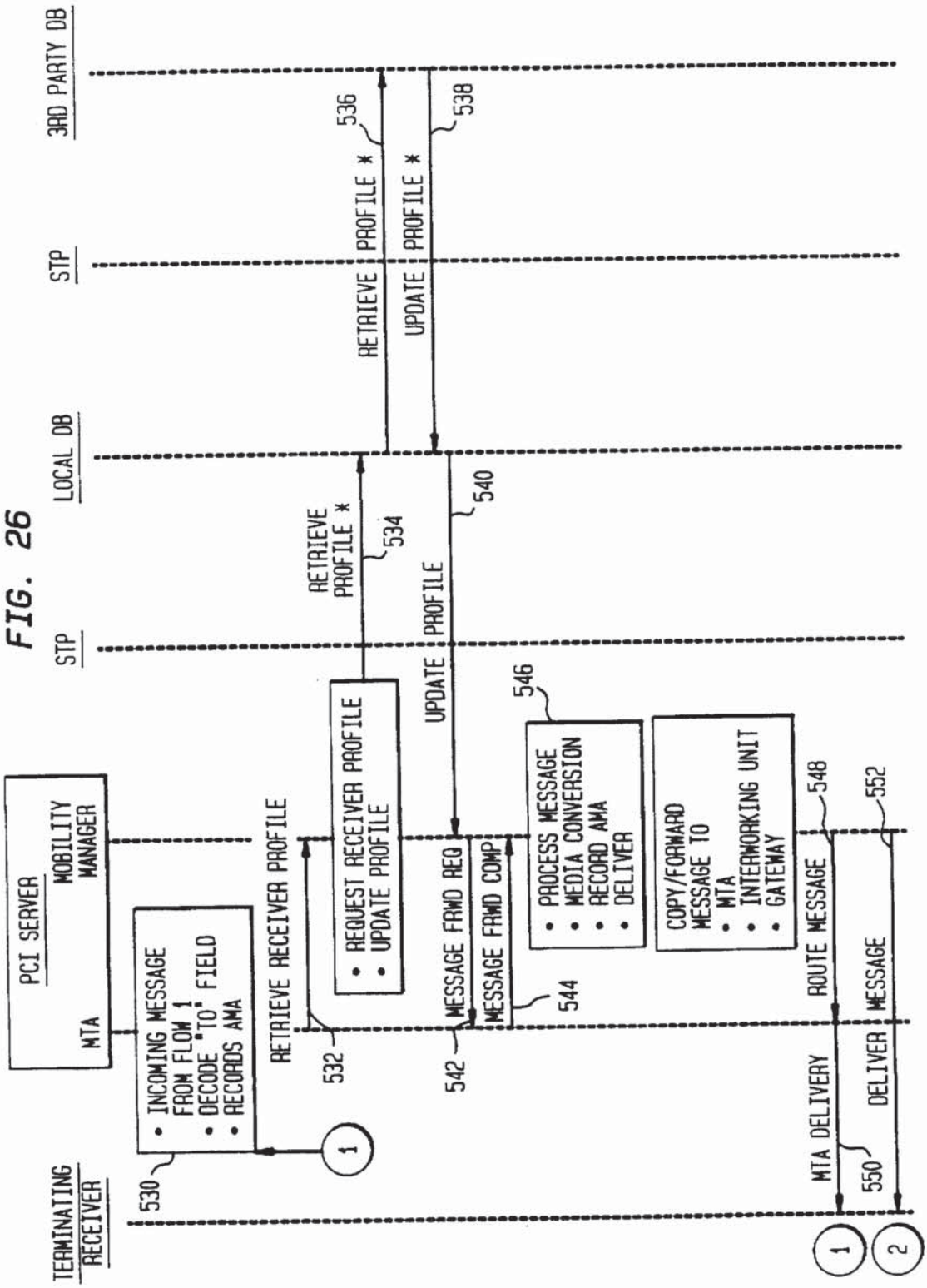

TERMINATING RECEIVER
PCI SERVER
MOBILITY MANAGER
MTA
LOCAL DB
STP
3RD PARTY DB
• INCOMING MESSAGE FROM FLOW 1
• DECODE "TO" FIELD
• RECORDS AMA
530
RETRIEVE RECEIVER PROFILE
532
• REQUEST RECEIVER PROFILE
• UPDATE PROFILE
RETRIEVE PROFILE *
534
RETRIEVE PROFILE *
536
UPDATE PROFILE
540
UPDATE PROFILE *
538
MESSAGE FRWD REQ
542
MESSAGE FRWD COMP
544
• PROCESS MESSAGE
• MEDIA CONVERSION
• RECORD AMA
• DELIVER
546
COPY/FORWARD MESSAGE TO
• MTA
• INTERWORKING UNIT
• GATEWAY
ROUTE MESSAGE
548
MTA DELIVERY
550
DELIVER MESSAGE
552
1
2

FIG. 27

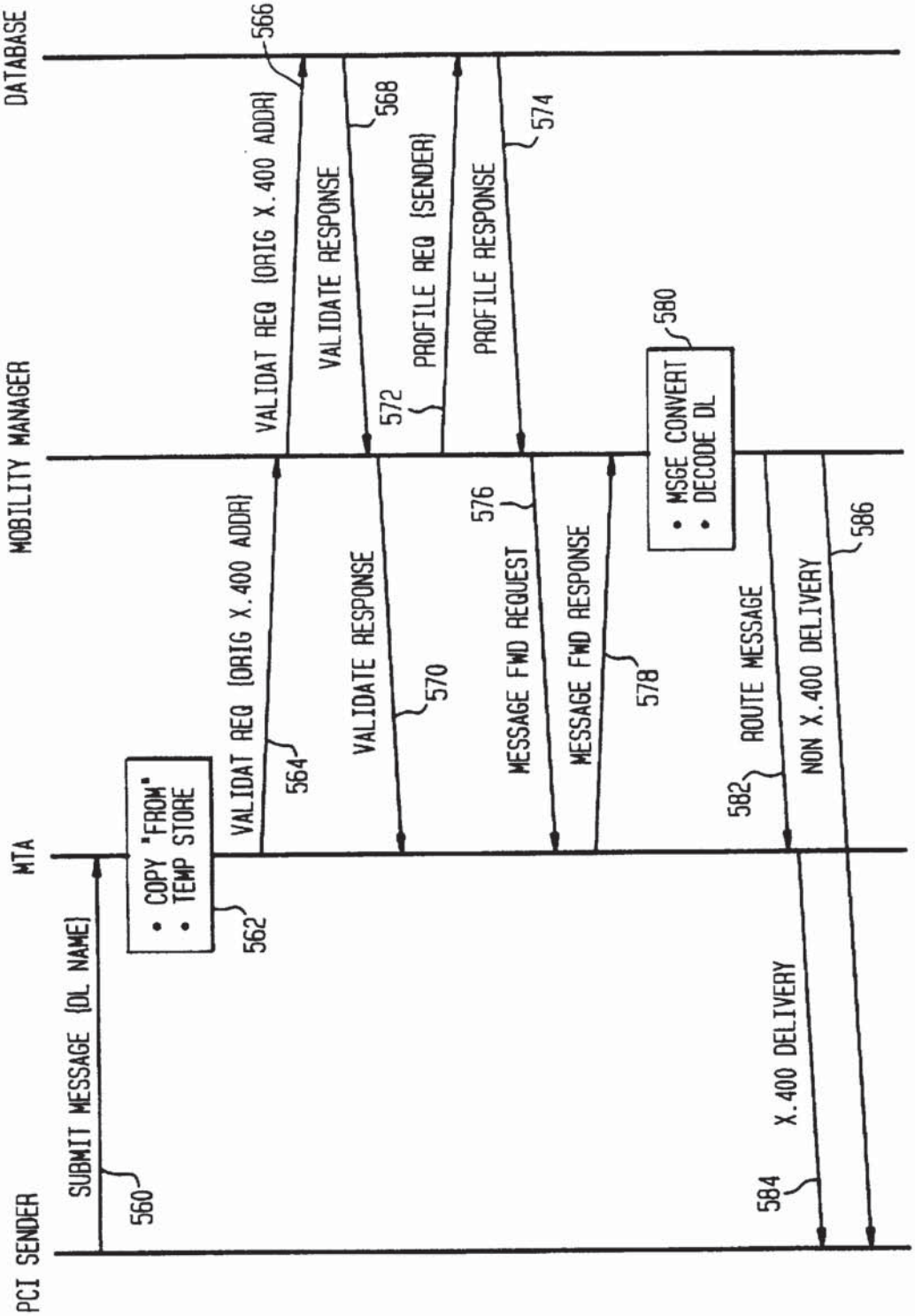

PCI SENDER
MTA
MOBILITY MANAGER
DATABASE
SUBMIT MESSAGE (DL NAME)
560
• COPY 'FROM'
• TEMP STORE
562
VALIDAT REQ (ORIG X.400 ADDR)
564
VALIDAT REQ (ORIG X.400 ADDR)
566
VALIDATE RESPONSE
568
VALIDATE RESPONSE
570
PROFILE REQ (SENDER)
572
PROFILE RESPONSE
574
MESSAGE FWD REQUEST
576
MESSAGE FWD RESPONSE
578
• MSGE CONVERT
• DECODE DL
580
ROUTE MESSAGE
582
X.400 DELIVERY
584
NON X.400 DELIVERY
586

FIG. 28

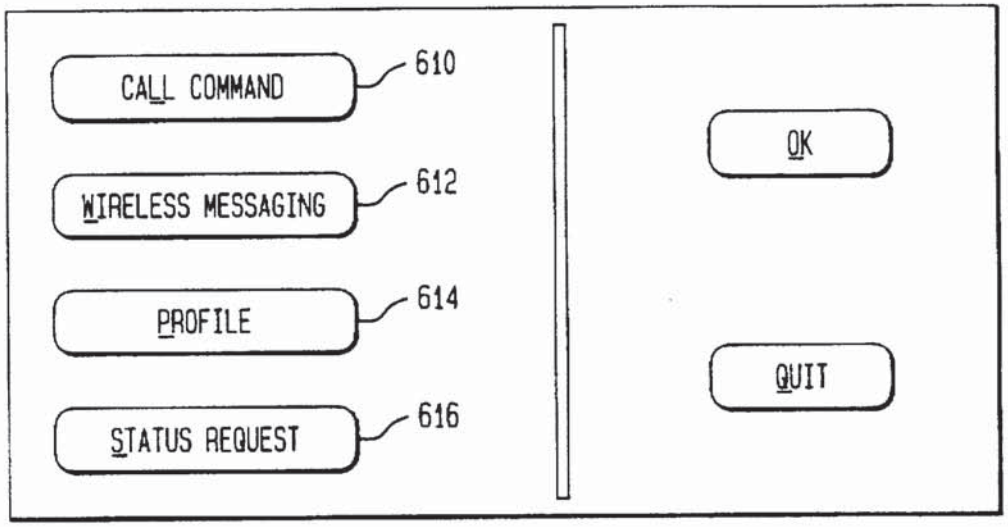


FIG. 29

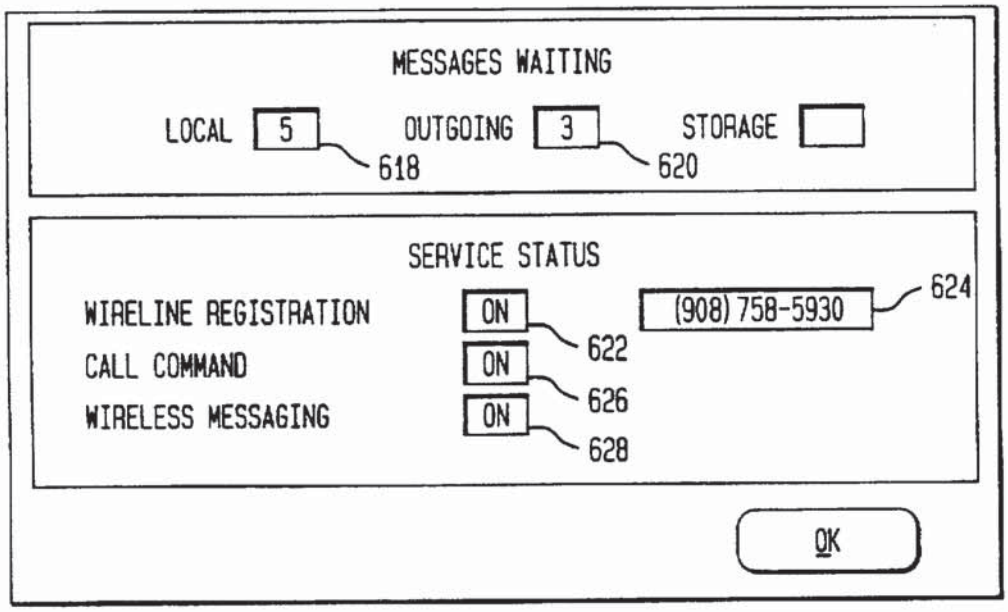


FIG. 30

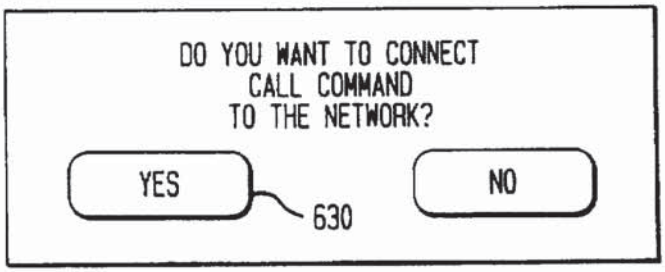


FIG. 31

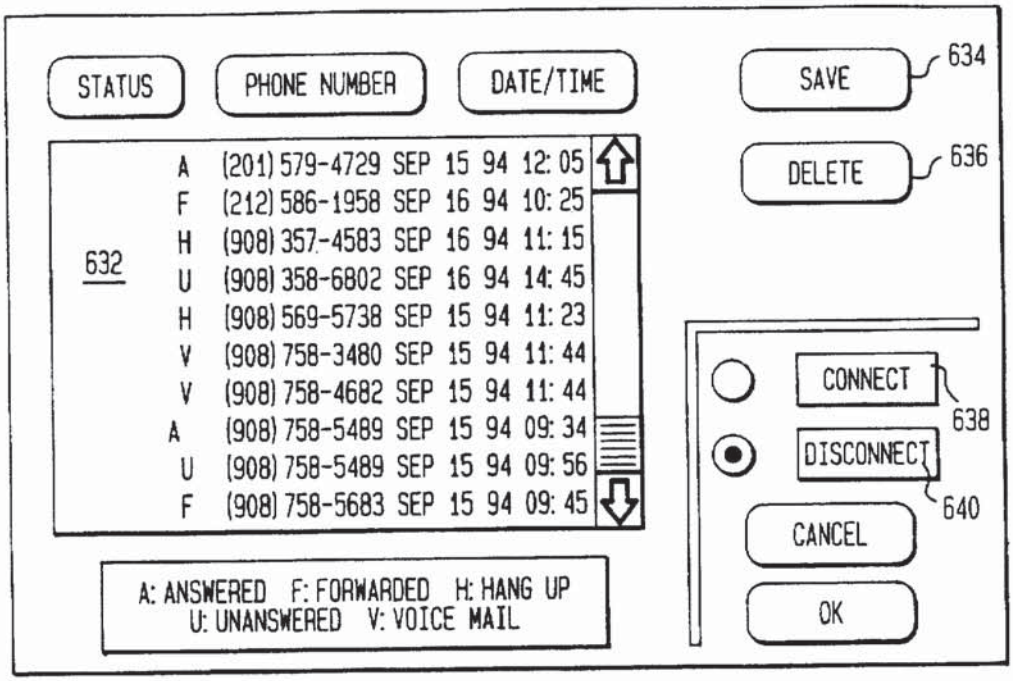


FIG. 33

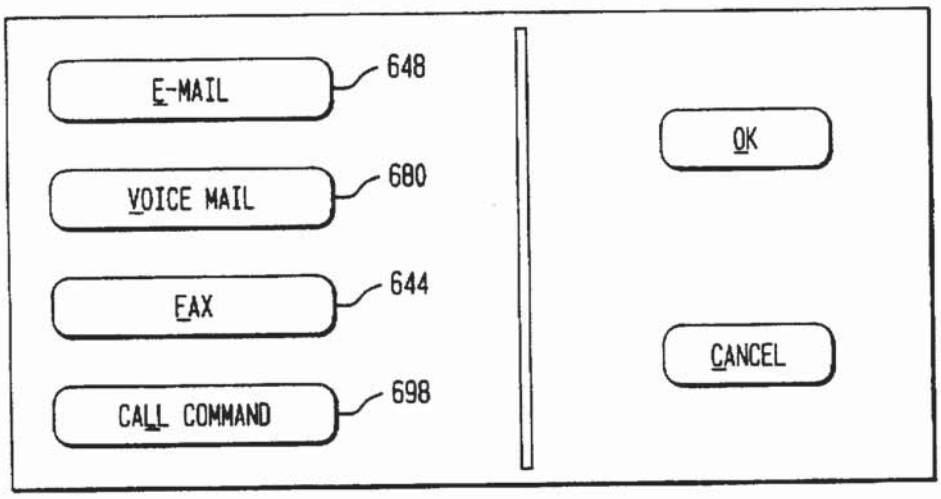


FIG. 32

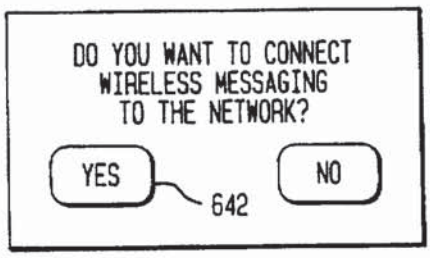


FIG. 34

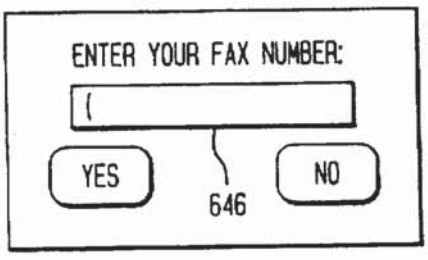


FIG. 35

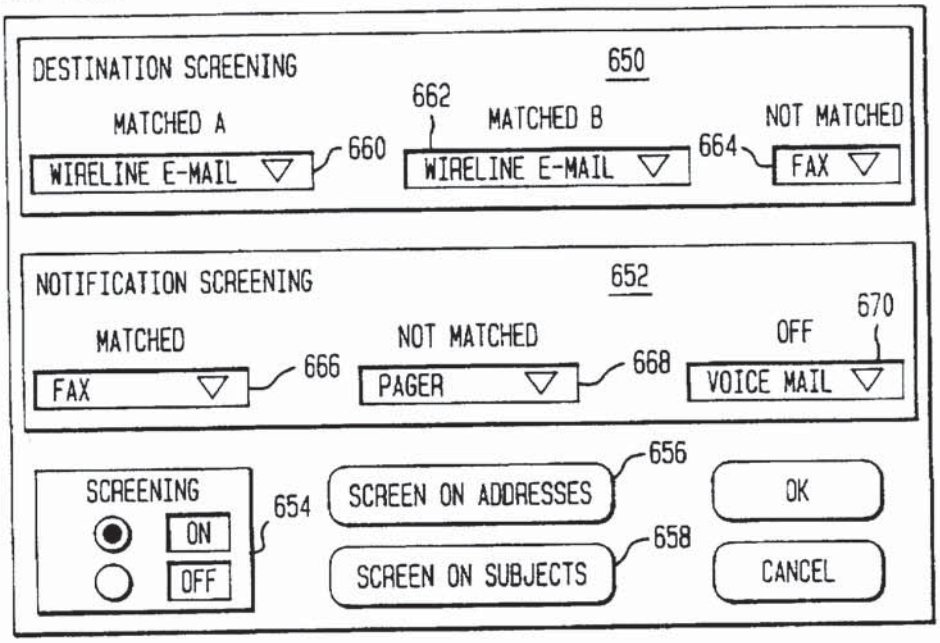


FIG. 36

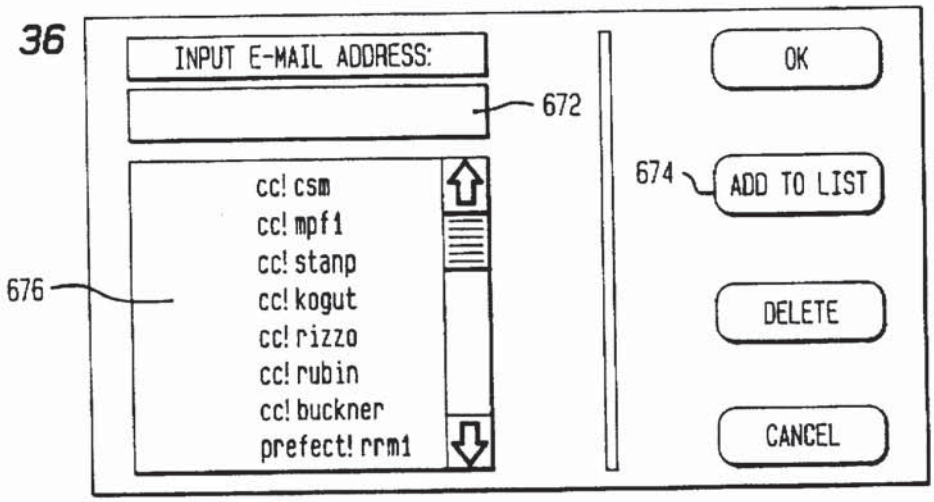


FIG. 37

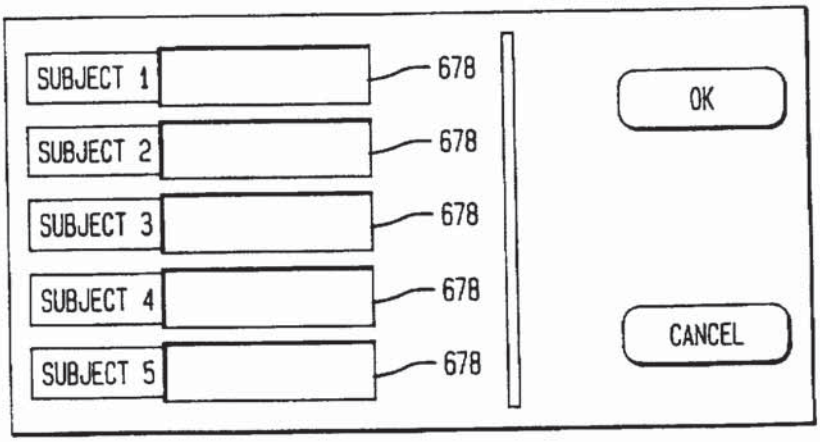


FIG. 38

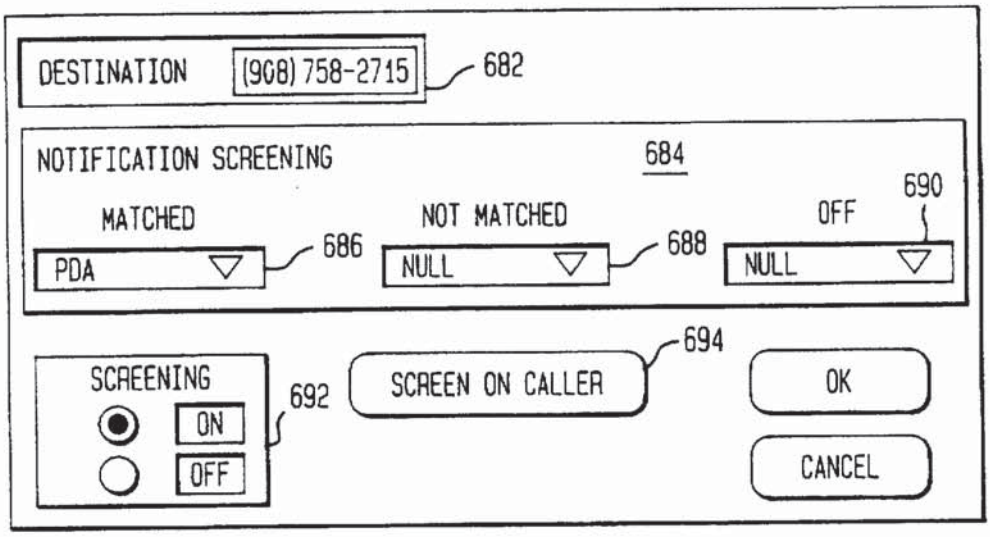


FIG. 39

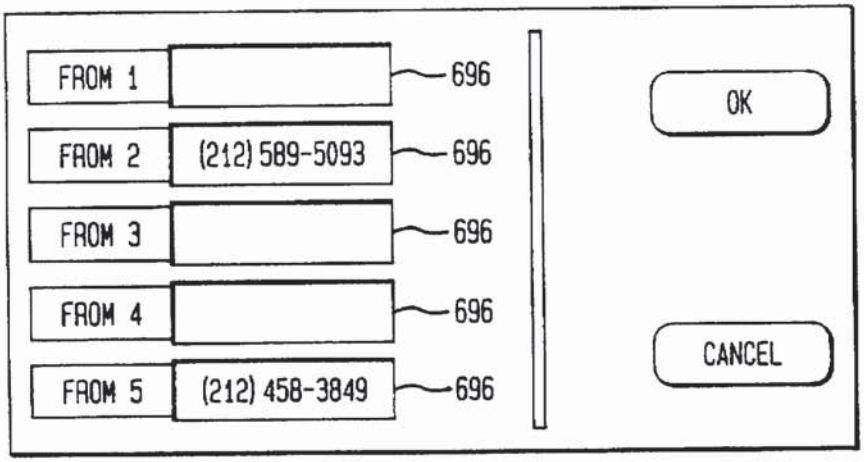


FIG. 40

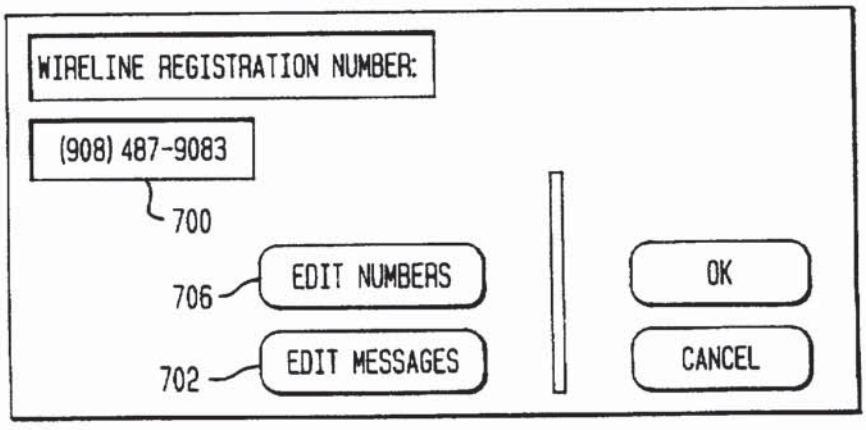


FIG. 41

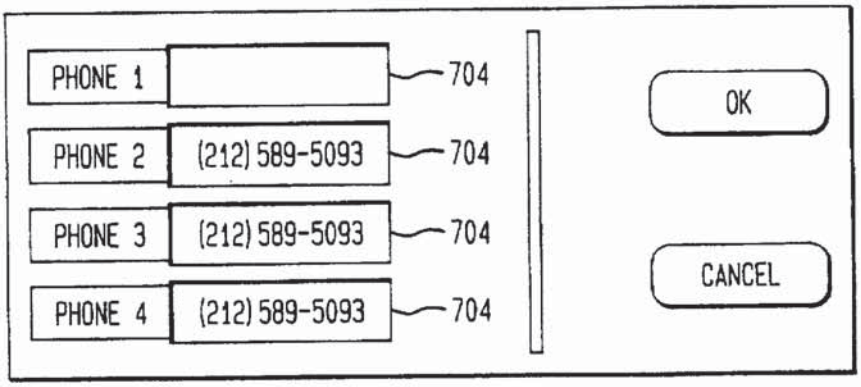


FIG. 42

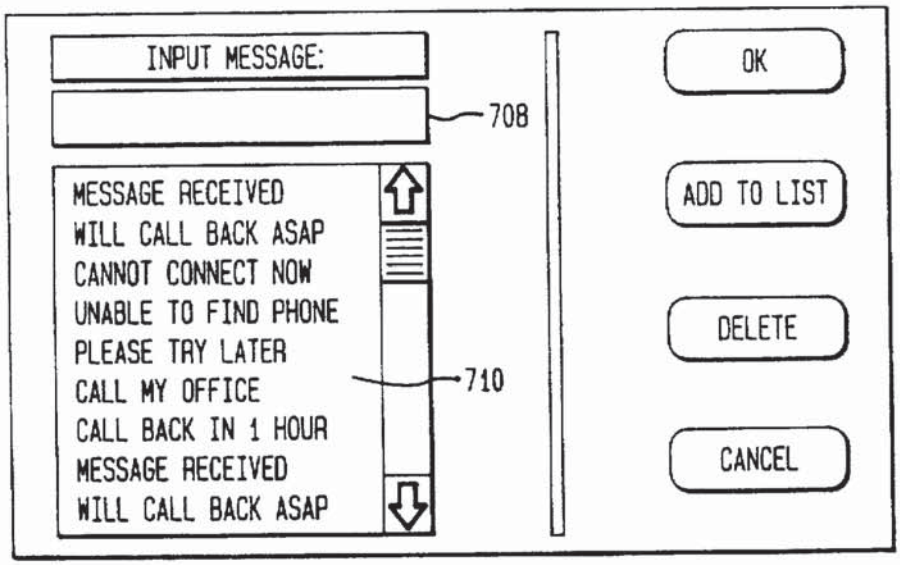


FIG. 43

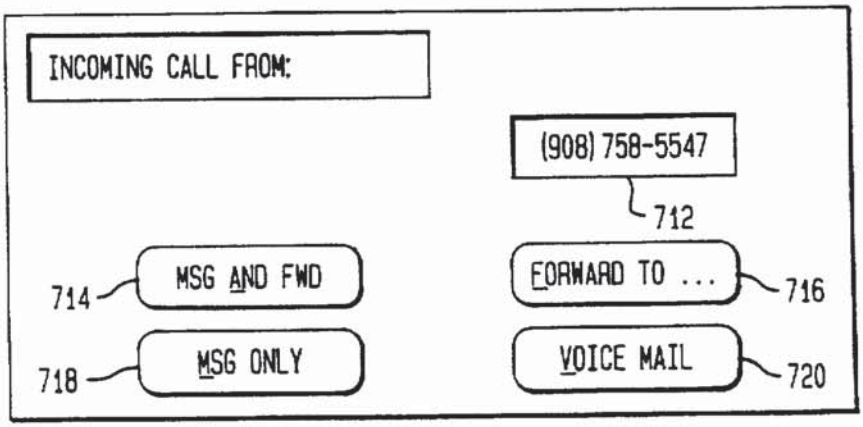


FIG. 44

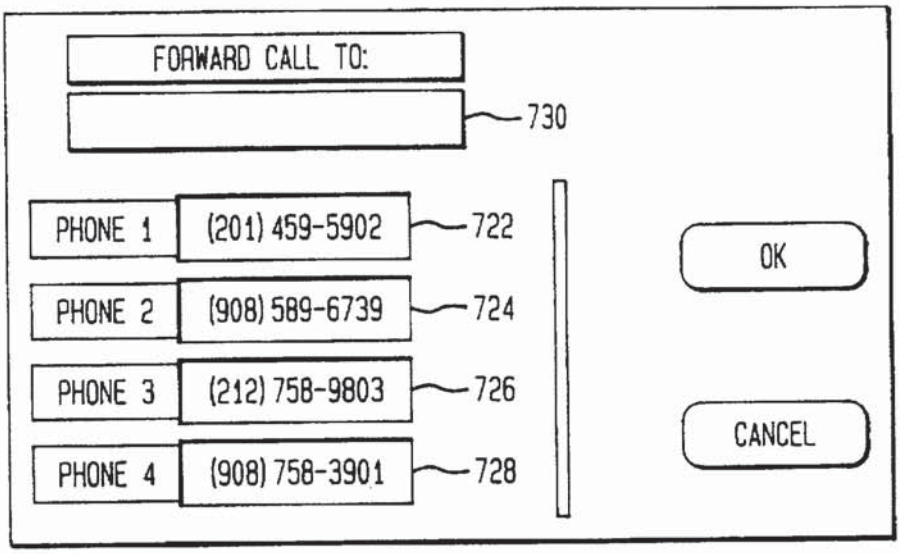
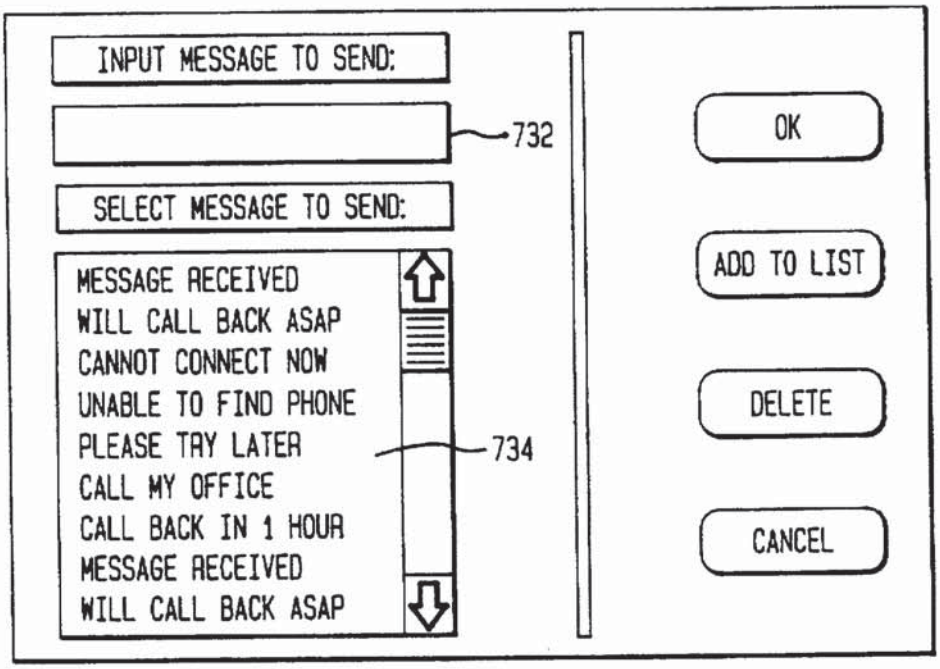

FORWARD CALL TO:
730
PHONE 1
(201) 459-5902
722
PHONE 2
(908) 589-6739
724
PHONE 3
(212) 758-9803
726
PHONE 4
(908) 758-3901
728
OK
CANCEL

FIG. 45


INPUT MESSAGE TO SEND:
732
SELECT MESSAGE TO SEND:
MESSAGE RECEIVED
WILL CALL BACK ASAP
CANNOT CONNECT NOW
UNABLE TO FIND PHONE
PLEASE TRY LATER
734
CALL MY OFFICE
CALL BACK IN 1 HOUR
MESSAGE RECEIVED
WILL CALL BACK ASAP
OK
ADD TO LIST
DELETE
CANCEL

PERSONAL COMMUNICATIONS INTERNETWORKING

FIELD OF THE INVENTION

The present invention is directed to an internetwork for personal communications and, more particularly, to a network which allows a mobile communications subscriber to remotely control personal communications delivery options.

BACKGROUND OF THE INVENTION

The use of messaging as a means of day-to-day communications continues to grow and evolve, particularly in a business context. Messaging includes electronic mail (e-mail), facsimile transmissions (fax), paging, voice mail, and telephone communications. The introduction of the cellular phone and other wireless communications facilitated the advent of the "mobile office". The mobile office allows an employee, for example, to work away from the office on a portable computer and be in constant touch with the office via a cellular phone.

The messaging options described above are available to businesses of all sizes, as well as individual users, from a variety of service providers. Many offices have some or all of the messaging options described above. The office may have certain messaging equipment (referred to as "consumer premises equipment" or "CPE") connected to one or more wireline networks. That is, the office may have telephones, fax servers, and voice mail systems connected to phone lines, and computers having modems for e-mail connected to packet networks which are connected via phone lines. The mobile employee may have certain wireless messaging equipment, such as a pager, a cellular telephone, or a personal digital assistant ("PDA"), which is typically a notebook computer connected to a wireless communication network.

One important goal of personal communication services is to allow users to communicate from anywhere to anywhere at any time. Such personal communication services generally involve multiple service providers including local and long distance telephone companies and cellular telephone companies. An example of a personal communication service is as follows:

A personal communication service provider (e.g., a cellular telephone company) enables traveling users to rent a wireless portable phone from a rental phone company (e.g., from an airline or car rental company). Using the rental phone, the user is provided with basic mobile phone service from the personal communication service provider. In addition, the user would like the following features:

1) The user wants calls directed to his/her office or home to be automatically forwarded to the rental portable phone, without informing anyone that he/she is traveling.

2) To avoid unimportant incoming calls (and corresponding incoming call charges), the user would like to restrict the number of people who can call the rented portable phone.

3) It is important to the user that the rental phone features be activated instantly, so that calls can be made immediately upon the user's arrival at the visiting location.

This kind of personal communication service involves a plurality of service providers. These providers are (a) the local telephone company at the home location, (b) a long distance telephone company, (c) the local telephone company at the visiting location, and (d) the personal communication service provider (i.e., the cellular telephone company) at the visiting location. All of these are referred to herein as "service providers".

To enable this kind of personal communication service, involving multiple service providers, interoperability problems among the different service providers must be resolved. The interoperability problems can be divided into two categories: (a) location tracking and (b) service management.

The interoperability problem for location tracking has been addressed by adopting signaling protocols used by the mobile phone industry. Location tracking functions are implemented using two location registers. One of the registers, maintained by the local telephone company of the user's home location, is called the Home Location Register (HLR). The other register, maintained by the local telephone company of the visiting location, is called the Visiting Location Register (VLR). The HLR stores customer profile data and the location of the VLR of the user. The customer profile data contains important information such as the user's name, address, preferred long distance carrier, service features (e.g., call forwarding and call restriction), billing, and other administrative related information. When the user travels to a new visiting location, a new VLR is created in the new location. A part of the profile data stored in the HLR is transmitted and loaded into the VLR such that the service provider at the visiting location can implement service features for the visiting user. When the user travels to a new visiting location the location of the VLR stored in the HLR is changed to the new VLR location, and the VLR in the previously visited location is deleted. The process of creating a new VLR, loading profile data to the VLR, and updating the visiting location of a user in the HLR is called "automatic roamer registration".

The interoperability problem for service management is much more complex than that for location tracking. Service management refers to a collection of functions required to enable a personal communication service user to subscribe to, modify, and activate service features anywhere and at any time. Examples of service management functions include phone number administration, customer profile data management, service activation, and security administration. The phone number administration function is important for maintaining the uniqueness of phone numbers. The customer profile data management function provides customer profile databases and user interfaces for creating, modifying, or transferring such databases. The service activation function extracts part of the data specifying service features from the profile data and loads this data into physical communication systems that process calls. The service activation function also controls the activation and deactivation of the service features. The security administration function prevents or detects unauthorized uses of services and service management functions.

Service management functions of this type are needed to provide personal communication services involving multiple service providers. Such service management functions generally require interactions between application software and various databases owned and operated by the different service providers. Consider an application which enables a nomadic user to subscribe to a personal communication service from any service provider at any location. An example of such a service is call forwarding to a temporarily rented portable phone. The application may, for example, need to perform the following database access operations at databases maintained by various different service providers:

check credit databases owned by credit card companies or phone companies to determine whether the user is able to pay for the service;

check the customer profile database in the user's HLR to determine whether the user is currently located in a place other than the visiting location currently stored in the HLR;

check the credit and network databases of long distance phone companies specified by the user to determine whether the user can use a particular long distance carrier in the visiting location;

load profile data into the VLR at the visiting location and update the HLR with the location of the VLR if necessary; and

load the profile data to the call processing systems and activate the service.

The user may need to send or receive messages from any or all of the messaging options described above at a visiting location. That is, the user may want to receive or receive notification of e-mail, faxes, phone calls, or voice mail at a visiting location or to send e-mail or faxes from a wireless terminal. The need to integrate these various types of messaging options and to interconnect the many service providers has, until now, been largely unaddressed.

It is also desirable for the mobile employee to be able to limit the messages sent to the wireless messaging equipment, so that only urgent messages are received when away from the office and unwanted in-coming calls are avoided. The mobile employee may also wish to route certain incoming wireless messages and phone calls to other destinations, such as an office fax machine or a colleague's telephone.

Therefore, it is an object of the present invention to provide a mobile service subscriber the ability to control and integrate a plurality of messaging options.

It is another object of the present invention to provide a mobile service subscriber with the ability to remotely control the addressability, routing, accessibility, and delivery of messaging options.

It is yet a further object of the present invention to provide an internetwork which interconnects messaging services with both wireless and wireline networks.

It is yet a further object of the present invention to provide a subscriber with real-time control of voice calls while using a wireless data terminal or PDA.

It is yet a further object of the invention to provide a control over the messages routed to wireless messaging options.

SUMMARY OF THE INVENTION

These objects are obtained by a personal communications internetwork providing a network subscriber with the ability to remotely control the receipt and delivery of wireless and wireline voice and text messages. The network operates as an interface between various wireless and wireline networks, and also performs media translation, where necessary. The subscriber's message receipt and delivery options are maintained in a database which the subscriber may access by wireless or wireline communications to update the options programmed in the database. The subscriber may be provided with CallCommand service which provides real-time control of voice calls while using a wireless data terminal or PDA.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects and features of the invention will become apparent from the following drawings, wherein:

FIG. **1–3** are overviews of the PCI networks;

FIG. **4** is an overview of one node of the PCI network according to the present invention;

FIG. **5** is a block diagram of an exemplary PCI server according to the present invention;

FIG. **6** is a block diagram of an exemplary embodiment of a PCI database according to the present invention;

FIG. **7** is a block diagram of the logical connections between the PCI server and PCI database according to the present invention;

FIGS. **8–11** illustrate exemplary message flows between a server and a database according to the present invention;

FIG. **12** is a block diagram of a personal digital assistant according to the present invention;

FIGS. **13–20** illustrate exemplary message flows between a PDA and PCI server;

FIG. **21** is a block diagram of a text messaging portion of a PCI network;

FIG. **22** is a block diagram of a voice messaging portion of a PCI network;

FIG. **23** is a block diagram of a facsimile messaging portion of a PCI network;

FIG. **24** is a diagram illustrating an exemplary CallCommand service network;

FIGS. **25–27** illustrate exemplary message flows in the PCI network; and

FIGS. **28–45** illustrate exemplary screens displayed to a PCI subscriber using a wireless PDA.

DETAILED DESCRIPTIONS OF PREFERRED EMBODIMENTS

For clarity of presentation, the detailed description is set out in the following subsections:

I. PCI Overview

The overall network is illustrated in FIGS. **1–4** The network is an interface between a plurality of wireless and wireline networks, providing a subscriber with a variety of wireless and wireline message and voice delivery and receipt options.

II. The PCI Server

The PCI Server is illustrated in FIG. **5**. The PCI server is a peripheral which performs messaging and call redirection functions and interfaces with the PCI database to update the subscriber profile.

III. The PCI Database

The PCI Database is illustrated in FIG. **6**. The PCI database maintains the subscriber profile, controls CallCommand functions, and handles DTMF-based subscriber profile updates.

IV. The Server/Database Interface

The Server/Database interface is illustrated in FIGS. **7–11**. The PCI server/PCI database interface provides for the transfer of information regarding the subscriber profile and the CallCommand services.

V. The PDA/PCI Interface

The PDA/PCI interface is illustrated in FIGS. **12–20**. The PDA/PCI interface provides for the transfer of information between a remote wireless subscriber and the PCI.

VI. Services

A. E-Mail Messaging

E-Mail messaging in the PCI is illustrated in FIG. **21**. The PCI network provides the subscriber with a variety of e-mail delivery, receipt, and notification options, including screening and selective destination delivery of incoming e-mail.

B. Voice Messaging

Voice messaging in the PCI is illustrated in FIG. **22**. The PCI provides the subscriber with a variety of voice mail delivery, receipt, and notification options, including screening and selective destination delivery of incoming voice mail.

C. Facsimile Messaging

Facsimile messaging in the PCI is illustrated in FIG. **23**. The PCI provides the subscriber with a variety of facsimile delivery, receipt, and notification options, including screening and selective destination delivery of incoming faxes.

D. CallCommand

The CallCommand service is illustrated in FIG. **24**. CallCommand service provides real-time control of voice calls while using a wireless data terminal or PDA.

VII. Message Flows

Certain message flows for wireless messaging in the PCI are illustrated in FIGS. **25–27**. The three message flows illustrated are sending a message from one subscriber to another, receiving a message regardless of whether the subscriber is using a wireless or wireline terminal, and sending a message to a non-subscriber.

VIII. The PDA Application

The application residing in the PDA is described in FIGS. **28–45**, which illustrate exemplary screens displayed to a PCI subscriber using a wireless PDA.

IX. Billing

Billing procedures for a PCI network use is briefly described.

X. Conclusion

A glossary of acronyms used in this specification is attached as Appendix A.

I. PCI Overview

FIG. **1** is a simplified overview of a personal communications internetworking ("PCI") according to the present invention. A consumer, an office for example, has various messaging equipment, such as a voice mail system **20**, an e-mail terminal **22**, fax machines **24**, and telephones **26**. These are all connected to wireline networks **29**. For example, the fax **24**, phone **26**, and voicemail system **20** may be connected to a Public Switched Telephone Network (PSTN), part of which belongs to a particular local phone service company, and part of which belongs to a particular long distance service provider. The e-mail terminal **22** may be connected to a data packet network, such as Internet, whose packets are carried over phone lines.

A mobile communications subscriber (for example an employee who works at the office described above and travels frequently) has various portable messaging equipment, such as a PDA **30**, a cellular phone **32**, and a pager **34**. These are connected to wireless networks **39**. These wireless messaging options may be provided by different service providers. That is, the cellular phone may be connected to a wireless network of a cellular phone service provider, the pager may be connected to a different wireless network maintained by a pager service provider, and the PDA may be connected to a third wireless communications network maintained by yet another service provider.

A Personal Communications Internetworking network ("PCI") **40** according to the present invention is connected between the wireless **39** and wireline networks **29**. The PCI **40** permits the mobile communications subscriber to send and receive messages between disparate networks and messaging systems and a variety of service providers. The mobile communications subscriber can receive e-mail, fax, pages, and voice messages under a single phone number while using either a wireless or wireline network. The subscriber may also select the media format and serving network used to receive messages. The subscriber may also select cross-media notification of incoming messages, (i.e., the subscriber may receive notification from a pager message that a voice mail message was received).

The subscriber selects the wireline or wireless network and media format to be used for delivering messages or notification of message receipt. The PCI **40** will perform a media conversion to allow, for instance, an e-mail message to be delivered to a fax server. The PCI **40** may also include accessibility controls which allow the user to screen messages by selected criteria such as media type (e.g., e-mail, fax, etc.), message length (e.g., voice mail messages less than three minutes), or sender (e.g., only messages from the office and a certain client are to be forwarded).

For example, the subscriber may have notification of a voice mail or fax message receipt directed to a wireless PDA in the form of e-mail messages. If the subscriber's wireless PDA is not turned on or otherwise not operating, the notification may be routed to an alternate wireless or wireline network. Notification to the subscriber that a voice mail message was received may be, for example, rerouted to the subscriber's pager, and notification that a fax has been received may be rerouted to the wireline e-mail.

FIG. **2** is a simplified version of the interconnections between various messaging systems and a PCI. As shown in FIG. **2**, a subscriber provides the network with message routing and delivery instructions. These instructions are received by a PCI database **44** and stored in a "subscriber profile" for that subscriber. This database controls the delivery of outgoing messages and the routing of incoming messages and message notification. (In FIG. **2**, wireline communications are indicated with solid line connections and wireless communications are indicated with dashed line connections. The instructions to the PCI are shown with a solid line, but as will be explained in greater detail below, the instructions may be sent either by a wireline or wireless network.)

The PCI database **44** supports access to information authenticating the subscriber's identity and validating the types of services subscribed to, the subscriber's message delivery (incoming messages) options and origination (outgoing messages) options and voice (telephone call and voice mail) options. For origination, the subscriber may select message distribution lists with specific media delivery options. The database **44** also supports access to the portions of the subscriber profile that the subscriber may control.

The subscriber may use a personal telephone number to register at alternate wireline and wireless terminals while maintaining use of the message screening and delivery options selected and stored in a subscriber's profile. This is called "personal mobility". Information about the location of a wireless or wireline network location to which the subscriber's terminal is connected automatically registers and deregisters a subscriber's terminal. This is called "terminal mobility."

FIG. **3** shows the PCI **40**. The CPE (voice mail **20**, e-mail **22**, fax **24**, and phone **26**) are connected to wireline networks **29**. The mobile subscriber equipment (PDA **30**, cellular phone **32**, and pager **34**) are connected to wireless networks **39**. Both the wireline and wireless networks **29**, **39** are connected to a PCI **40** at a service provider. The networks **29**, **39** are connected to a local exchange carrier (LEC) **42** for the personal communications internetworking.

A PCI database **44** is a physical communication system which provides call processing functions for a collection of central office switches. The PCI database **44** includes the mobile subscriber's profile, including message sending, message receiving, and service control options. The PCI database **44** may be a service control point or a network adjunct. The PCI database may be connected via a service management system (SMS) interface to a service integrator