

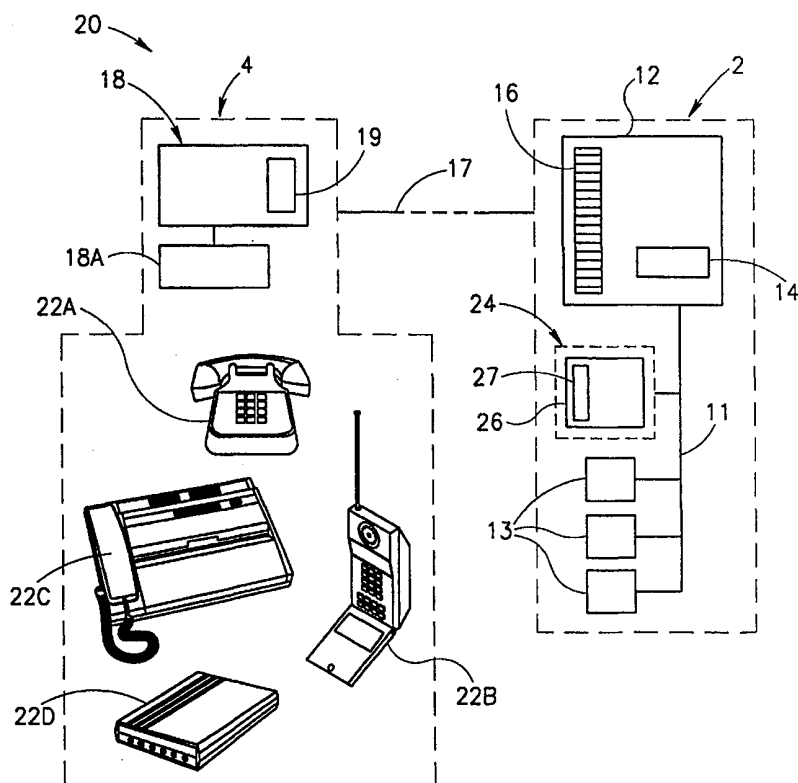


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(54) Title: SYSTEM AND METHOD FOR TRANSMITTING NOTIFICATIONS TO NETWORK USERS**(57) Abstract**

A system is presented for transmitting notifications from a first network node to a second network node through a communication link. The system comprises a processing means, associated with at least the first node, and a system transceiver. The processing means is adapted for generating an indication signal addressed to said second node, wherein the indication signal is indicative of a certain event which is defined by a preset protocol between the first and second nodes. The system transceiver is interconnected between the processing means and communication link so as to be responsive to the indication signal for transmitting it, in a predetermined manner, to at least one desired transceiver utility of the second node. The first and second nodes need not be continuously connected to each other.



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System and Method for Transmitting Notifications to Network Users

FIELD OF THE INVENTION

The present invention is in the field of communication techniques and relates to a method and a system for providing a network user with a specific notification. The notification comes from either another user or host
5 facility of the network.

BACKGROUND OF THE INVENTION

Computer networks are known systems that are widely used. It is not an exaggeration to say that almost every personal computer (PC) is the node of at least one computer network such as, for example, the "INTERNET" or
10 "INTRANET". Methods of providing a network user with automatic notifications from the network server are also known and used especially for notifying the user of the receipt of messages, which are addressed to him/her and stored in an electronic mail block of the server. Unfortunately, a successful notification requires that the user's PC be continuously
15 connected to the network server, i.e. be in a so-called "on-line" mode of operation.

As known, the "Internet" counts about 50 million users, 90% of whom operate via dial-up connections, owing to the fact that dedicated lines are prohibitively expensive for many of them. Dial-up lines require repeated sporadic connections to a corresponding Internet Server Provider (ISP) in order to check electronic mail, review Newsgroup changes, perform information searching, use the Internet phone, engage in Internet chats or the like "Internet events". These periodic connections are inconvenient and often unproductive. They waste users' time and money and tie up phone lines, while clogging the lines and modems of ISPs.

Such "on-line" connections to the network server result in the following two limitations for the user:

- 1) telephone bills derived according to the call tariff and duration of the call;
- 2) the availability of telephone lines is compromised because most users do not have a dedicated computer phone line and thus occupy the main home line during the connection.

Moreover, when using the Internet, an additional bill is issued by the ISP, which is also based on tariff and duration.

Another problem that exists today is the relatively complex set of operations a user has to perform to work on-line. Indeed, the user has to connect, operate the specific application to obtain the required information, and disconnect. All these operations are semi-manual in today's popular home operation systems such as, for example, MS-Windows. Novice users regard the on-line processes, for example, checking mail, as cumbersome and error prone because of busy lines, busy servers and/or slow response times, etc. Even advanced users regard the on-line processes as a nuisance and try to automate them as much as possible, for example, by using scripts, automatic dialers, etc.

It is often the case that a subscriber, even when in a so-called "off-line" mode of operation, needs to be automatically informed that the

network server has been updated with specific information of his/her interest since his/her last connection. This information may be supplied to the network server either by another subscriber or a specific information resource, commonly connected to the server. Alternatively, the case may be
5 such that one subscriber needs to be connected to another subscriber through one or more network servers. In this case, the other subscriber, who may not be currently connected ("on-line") to the corresponding server must be informed that the specific subscriber desires to contact him.

Users expecting a time sensitive event, those waiting for events from
10 places with time zone differences and those who wish to receive messages while traveling, either miss timing of the information, or are constantly checking for the arrival of messages. Users who do not receive messages frequently, often forget to check for messages and end up missing the important ones. In other words, it is desirable to forward the notification to
15 a specific external device so as to "follow a moving user".

European Publication No. EP 0 736 989 discloses a system for providing so-called "off-line" notifications. The system comprises a host computer and subscriber computers, wherein the subscriber computers are not connected to each other and/or to the host computer. Messages are sent
20 from a "sender" subscriber to a "recipient" subscriber via the host computer, which is adapted for storing mail addressed to subscribers in individual mailboxes. The host computer is capable of calling a phone associated with the recipient subscriber through a dialing unit whenever a new message arrives at the host computer. The dialing unit is connected through a
25 telephone line, or a public telephone network to a receiving unit located at the recipient's side. The receiving unit is a specific hardware unit, which either stands alone, or is a constructional part of the recipient's PC. Even in such a case where the recipient himself directly contacts the dialing unit through a conventional modem coupled to or installed in his PC,
30 notification arrives to the receiving unit all the same. More specifically,

notification enters a call intercept unit, which is integral with the receiving unit. The receiving unit identifies that the phone call has been sent by the dialing unit of the host computer. A dedicated display device must be associated with the receiving unit for indicating to the subscriber that a
5 notification has been received.

It is thus evident that the disclosed system requires, in addition to specific hardware accommodated at the host computer's side, the provision of additional hardware at each subscriber's side. Practically speaking, hardware solutions are unable to make actual connection themselves and are
10 very limited in features.

SUMMARY OF THE INVENTION

There is accordingly a need in the art to substantially improve the technique of the kind specified above by providing a novel method and system for transmitting notifications between network nodes.

15 It is a major object of the present invention to provide such a method that allows for safe and, if desired, free of charge notification to be successfully performed.

It is a further object of the present invention to provide such a system that allows for utilizing the user's own transceiver utility, which is either an
20 external device or integral with the user's personal computer, without the need for any additional hardware at the user's side.

It is a still further object of the present invention to provide such a system that can be associated with the network host facility, thereby eliminating the requirement for an additional service provider.

25 It is a still further object of the present invention to provide such a system that can be associated with a network node without affecting its own existing utilities.

There is thus provided according to one aspect of the present invention, a system for transmitting notifications from a first network node

to a second network node through a communication link, the system comprising:

- 5 (a) a processing means associated with at least the first node for generating an indication signal addressed to said second node, wherein said indication signal is indicative of a certain event which is defined by a preset protocol between the first and second nodes; and
- 10 (b) a system transceiver interconnected between said processing means and communication link so as to be responsive to said indication signal for transmitting it in a predetermined manner to at least one desired transceiver utility of said second node.

Thus, the main idea of the present invention is based on the following. The first network node may be constituted by either the network host facility (server) or one of the network subscribers, the second network node being a subscriber. The processing means may be integral with the first node, directly coupled thereto or installed as a part of a local area network (LAN) of the first node. A protocol is set between the first and second nodes, according to which the first node provides the second node with notifications indicative of the certain event. The event may be representative of:

- (1) Changes in certain database of the first node, for example subscriber-associated record in a bank server;
- 25 (2) Existence of predetermined data within a data stream either within the first node, or within the LAN. The predetermined data may either be a message generated by a certain subscriber, or specific information generated by or inputting the first node, etc.; or
- (3) A signal generated by the first node with certain time intervals.

If the event is defined in accordance with the features (1) and (2), the processing means comprises a detector utility that continuously checks the

certain database or the data stream and, upon detecting the existence of the event, generates the indication signal. The term "*utility*" used herein signifies appropriate software solutions. The indication signal may be generated each time such event is detected. Alternatively, the indication
5 signal may be generated in response to a query signal generated by the second node and transmitted through the transceiver utility of the second node.

Thus, the event is detected without intervention into the existing utilities of the first node, but providing it with the processing means
10 constituting a separate utility. What is actually transmitted is an indication signal, rather than the detected changes or predetermined data itself. Generally, this needs no connection between the first and second nodes to be established. To this end, at least the first node is provided with a time-out utility that allows the indication signal to be transmitted in a certain
15 predetermined manner, for example during a preset time period or by a certain number of signals and pauses. This time period is substantially short in order to prevent the connection between the first and second nodes.

The protocol between the first and second nodes may assume the presence of a user at the second node side, who, upon receiving the
20 notification (indication signal), may decide whether to perform a corresponding action at his side, for example, to initiate the connection with the first node or to run a specific application. In other words, the indication signal is indicative of the presence of the event, which may be indicative of a reason to perform a certain action at the second node.

25 The system transceiver operates like a known modem device for transmitting and receiving call signals. Thus, the system transceiver transmits the indication signal in the form of an outgoing call signal. The system transceiver may either be an external modem coupled to the processing means, or be integral with the processing means, being for
30 example an electronic card.

The transceiver utility of the second node may also be a modem device. It is responsive to the outgoing call signal for generating an incoming signal, for example a call signal. The transceiver utility may be associated with an external device, for example a personal computer.

- 5 The second node may also be provided with a time-out utility, which is either integral with or coupled to the transceiver utility. The provision of the time-out utility at the second node side enables a query signal to be generated by the second node and transmitted to the first node.

- 10 Preferably, the system transceiver (at the first node side) has an identification means (so-called "Caller ID feature") for identifying the second node. The transceiver utility of the second node may also have similar identification means. In this case, the transceiver utility, when identifying the first node, may present a visual message representative of the identification code (e.g. phone number) of the first node. Alternatively, the
15 transceiver utility may generate a specific signal (ringing) indicating that the call comes from the first node.

- 20 Preferably, the system also comprises a destination utility having a database, which presents various transceiver utilities and associated external devices of the second node in accordance with the preferences defined by the protocol. By one embodiment of the invention, the destination utility is associated with the first node, being a constructional part of either the processing means or a separate processor coupled to the processing means. The destination utility, in response to the indication signal, selects the desired transceiver utility to which the indication signal is to be transmitted.
25 By another embodiment of the invention, the system comprises, instead of or in addition to the destination utility of the first node, a similar destination utility associated with the second node.

According to another aspect of the present invention, there is provided a method for transmitting a notification from a first network node

to a second network node through a communication link, the method comprising the steps of:

- 5 (i) generating by said first node an indication signal addressed to said second node, wherein said indication signal is indicative of a certain event which is defined by a preset protocol between the first and second nodes;
- 10 (ii) transmitting a signal representative of said indication signal through said communication link to at least one desired transceiver utility of the second node, wherein said transmitting is carried out in a predetermined manner defined by said protocol.

According to yet another aspect of the invention there is provided a method for transmitting notifications between a first network node and a second network node through a communication link, the method comprising
15 the steps of:

at the second node side:

- 20 - generating by the second node a query signal addressed to the first node, wherein said query signal is indicative of that the second node is waiting for an indication signal indicative of a certain event defined by a preset protocol between the first and second nodes;
- transmitting the query signal through said communication link in a predetermined manner defined by said protocol;
- 25 - initiating a certain effect depending on that said indication signal is received or not by the second node within a predetermined time period after the transmission of the query signal, wherein said effect is defined by said protocol;

at the first node side:

- upon receiving the query signal generated by the second node, initiating a certain action defined by the protocol so as to detect whether said event exists; and
- if the existence of the event is detected, generating an indication signal addressed to said second node and transmitting a signal representative of said indication signal through the communication link to at least one desired transceiver utility of the second node, wherein said transmitting is carried out in a predetermined manner defined by said protocol.

More specifically the present invention is used with the Internet and is, therefore, described below with respect to this application. The term "Internet" used herein signifies also an "Intranet".

BRIEF DESCRIPTION OF THE DRAWINGS

In order to understand the invention and to see how the same may be carried out in practice, several preferred embodiments will now be described, by way of non-limited example only, with reference to the accompanying drawings, in which:

Fig. 1 is a block diagram illustrating the main components of a conventional computer network;

Fig. 2 is a block diagram illustrating the main components of a notification system, according to one embodiment of the invention;

Fig. 3 is a block diagram illustrating the main components of a processor unit of the system of Fig. 2;

Figs. 4 to 8 are block diagram illustrating the main components of notification systems, constructed according to five more embodiments of the invention, respectively;

Figs. 9a to 9c are flow diagrams illustrating different examples of operation of the system of Fig. 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In order to more clearly illustrate unique features of the present invention, it would be reasonable to consider a conventional computer network shown in Fig. 1 and generally designated 1. The network 1 comprises a host facility side, generally at 2, which is interconnected between a plurality of subscribers' sides at different remote locations, of which one subscriber side 4 is specifically shown and the other subscribers' sides are generally denoted 6. In the case of such a network as the "INTERNET", the host facility side 2, so-called Internet Service Provider (ISP), is connected to a database, or plurality of such information resources, generally at 8, and/or another plurality of similar remote located ISPs, generally at 10. The ISPs 10 connect the ISP 2 to various databases and subscribers' sides (not shown) for receiving various kinds of information and transmitting them to the subscribers in reply to their inquiries.

The ISP side 2 is typically in the form of a local area network (LAN) 11 that interconnects a server 12 with other devices, for example, other servers, generally at 13. The server 12 is provided *inter alia* with a memory 14 for storing a reference data representative of all registered subscribers, including their electronic mail addresses, and with a conventional modem 16. The modem 16 is connected to a communication link 17, such as, for example, public or private telephone networks, through a multi-channel communication port, which is not specifically shown, so as to provide for automatic call distribution. The modem 16 receives and transmits incoming and outgoing calls, respectively. All these functional parts of the conventional ISP side are known *per se* and, therefore, need not be more specifically described.

The subscriber side 4 typically comprises a personal computer (PC) 18 having a display 18a, and a modem device 19, which may be of any

known kind. In order to receive information such as, for example, a signal indicating the existence of a message addressed to the subscriber 4, the latter should contact the ISP 2 in a conventional manner, namely through the telephone communication link 17 in accordance with a previously established protocol between the ISP and the specific subscriber. To this end, the PC 18 is conventionally provided with a software program, so-called "Client", to be executed for contacting the ISP "on-line" and obtaining required data therefrom in accordance with the protocol. Upon initiating such an "on-line" connection, the subscriber immediately receives a notification of the receipt of messages, if any, which usually appears as a visual message on the display 18a. Obviously, a vocal message may be additionally provided. It is appreciated that the notification relates to those messages, which have been received by the server 12 since the last connection with the subscriber 4. The subscriber unit 4, in turn, executes a similar procedure in order to connect to the other subscriber side 6 for sending a message thereto. All these functional features of the subscriber sides are also well known *per se*.

Fig. 2 illustrates a system, generally designated 20, which is constructed and operated in accordance with one preferred embodiment of the invention. The same reference numbers indicate those components, which are identical in the systems 1 and 20, in order to facilitate understanding. The system 20 presents connection between the ISP 2 (constituting a first network node) and the subscriber side 4 (constituting a second network node) through a telephone communication link 17.

The subscriber side 4 is typically provided with a modem 19 (constituting a transceiver utility) associated with a personal computer 18 (constituting an external device). Additionally, the subscriber side 4 comprises several external devices such as, a telephone 22a, a cellular phone 22b, a facsimile machine 22c and an external modem 22d,

accommodated at different remote locations. It is understood, although not specifically shown, that each of the external devices 22a-22c is equipped with its own transceiver utility functioning like a modem device.

The essential feature of the present invention is the provision of a
5 sub-system 24 installed at the ISP side 2 so as to be one of the stations of LAN 11. The sub-system 24 represents a processor, generally at 26, formed by one or more computer devices and provided with a modem 27 (constituting a system transceiver). It should be noted, although not specifically shown here, that the modem 27 may be an external modem
10 coupled to the processor 26. The system modem 27 is of the so-called "MODEM POOL" type, i.e. comprises a lot of modems having a Caller ID detection feature, so as to identify the subscriber who has generated an incoming call.

Turning now to Fig. 3, there is more specifically illustrated that the
15 processor 26 comprises a detector utility 28, a memory 30, a signaling utility 31, a destination utility 32 and a time-out utility 34. The processor 26 and the PC 18 (or the subscriber modem 19) are operated by suitable software executing a specific protocol between them. This protocol *inter alia* allows the user at the subscriber side 4 to define the following:

- 20 - Certain information (constituting predetermined data) of the subscriber's interest. The predetermined data may be representative of a specific matter or any information coming from a specific subscriber, etc. The existence of this data in the LAN 11 is to be detected by the detector utility 28;
- 25 - A certain method of transmitting the indication signals. The "method of transmission" signifies a certain time period, or certain number and order of signals and pauses. This is kept in the database of the signaling utility 31 and is operated by the time-out utility 34;

- Preferences regarding the transceiver utilities to which the indication signal is to be transmitted. This is kept in the database of the destination utility 32;
- Presence of a user (a so-called "man in the loop") at the subscriber side 4, who is responsive to the indication signals

5 The detector utility 28 operates similar to known "sniffer means" or like filtering means to continuously track a data stream proceeding in the LAN towards the server 12 and detect any existing data representative of the information of interest. The existence of such data signifies a so-called
10 "event" for the detector utility 28 to generate an indication signal in response to the "event". It is important to note that, if the host facility side 2 is designed such that multiple servers are associated with different LAN segments, the processor unit 26 comprises a plurality of detector utilities, each associated with a corresponding one of the servers.

15 The detector utility 28 is capable of detecting the "event", generating the indication signal, storing it in the memory 30 and actuating the signaling utility 31, time-out utility 34 and destination utility 32. Each of the utilities 28, 30 and 32, as well as the system modem 27, may either be a stand-alone unit coupled to the processor 26 or be integral with the processor 26.
20 According to the present example, the signaling and time-out utilities 31 and 34 are the constructional parts of the modem 27. The time-out utility 34 is a known means that can easily be installed in a computer of any known configuration or a modem of any known kind. It controls the process of dialing the other side, i.e. transmitting an outgoing call generated by the
25 system modem 27 to the subscriber side 4. To this end, the time-out utility 34 waits a preset period of time, or a preset order of rings and pauses, and then hangs-up. Optionally, the time-out utility 34 may also control the receipt of an incoming call in a similar manner. The time-out utility 34 is thus adapted for disabling the ISP side 2 at preset time after the outgoing or

incoming call has been generated by the system modem 27. The preset time period is set to be sufficiently short so as to prevent the connection between the ISP and the subscriber being effected. This will be described more specifically further below. It is understood that the provision of the signaling utility 31 is optional applied in such cases when a certain order of rings and pauses is desired for the indication signal.

The system 20 operates in the following manner. The sub-system 24 is installed in the LAN 11. The protocol between the ISP and subscriber sides 2 and 4 is set. The detector utility 28 continuously tracks the data stream within the LAN 11 and, upon detecting the existence of the predetermined data, generates the indication signal and stores it in the memory 30. In response to the indication signal, the signaling utility 31 and destination utility 32, select the desired transmission of the indication signal and the desired transceiver utility (e.g. modem 19), respectively, and actuate the time-out utility 34 and the system modem 27. The system modem 27 transmits the indication signal in the desired manner to the desired transceiver utility.

Thus, the indication signal generated by the processor 26 is representative of the "event". The indication signal, while being transmitted to the subscriber side through its transceiver utility (modem 19) indicates to the subscriber at the side 4 a reason for performing a certain action, such as:

- establishing the connection with the ISP side; or
- running a specific application installed in PC 18.

It is evident that the subscriber "off-line" is informed and responsive to various Internet events of his choice.

Referring to Fig. 4, there is illustrated another example of a notification system, generally designated 120. Similarly, in order to facilitate understanding, the same reference numbers are used for identifying those components, which are identical in the systems 20 and

120. The system 120 presents the connection between the ISP side 2 and subscriber side 4a. Here, in distinction to the system 20, the protocol between the sides 2 and 4a defines the following additional feature:

- certain application(s) to be activated in the external device (PC 118) at the subscriber side 4a, in response to the indication signal.

In other words, the presence of "a man in the loop" is not expected. To this end, the PC 118 comprises a time-out utility 134, a connection utility 135 and optionally a signaling utility 131. The signaling and time-out utilities 131 and 134 operate similar to those of the processor unit 26, with respect to receiving signals coming from the ISP side 2, in accordance with the subscriber's choice. As to the connection utility 135, it is typically a programming means (suitable software) which is responsive to the indication signal for actuating a specific application installed in the PC 118, i.e. running a specific program (e.g. electronic mail downloading), operating a certain file-transfer protocol (FTP) or the like effects.

Referring now to Fig. 5, there is illustrated a system, generally designated 220, constructed according to yet another embodiment of the invention. As shown, the system 220 is generally similar to the system 120, but has a somewhat different design with respect to the subscriber side, designated 4b. The subscriber side 4b is provided with a destination utility 132 functioning similar to that of the sub-system 24. The destination utility 132, in response to the indication signal, actuates the modem 19 for transmitting the indication signal to another external device. Alternatively, in response to the indication signal, the destination and connection utilities 132 and 135, respectively, may operate together so as to, activate a certain effect in the PC 218 and transmit the results thereof to another external device. For example, the connection utility 135 activates a certain program for downloading the predetermined data, which is subject to the indication

signal, and transmits it in the form of a message to the answering machine 22c. It is understood that the provision of the destination utility 132 assists the user at the subscriber side 4b to make timely changes with respect to his/her preferences regarding the external devices without intervention into the protocol, if desired.

According to the present examples, the modem 19, signaling utility 131 and time-out utility 134 are integral with the PC 18. It is important to note that, generally, the signaling and time-out utilities can be constructional parts of the transceiver utility at the subscriber side. As to the external device, its provision is optional, providing the following conditions are present:

- the transceiver utility at the subscriber side has indication means, such as ringing, that allows for indicating without establishing the connection between the transmitting and receiving sides;
- the notification is to be transmitted off-line to a user at the subscriber side, whose presence is expected there.

In the above-described examples the sub-system 24 presents the connection between the ISP and subscriber side. In other words, the first node is constituted by the ISP. Alternatively, although not specifically shown, the host facility side 2 may be associated with a bank server or like database application. In this connection and in accordance with the protocol, the processor unit 26 detects any changes that have occurred in the subscriber-associated bank record and notifies the subscriber. For this purpose, the processor unit is preferably integral with the bank server, rather than being a part of the LAN, and the data stream to be checked is replaced by a certain database. The transmission of the notification (indication signal) is initiated either by the processor unit 26, immediately after detecting the changes in the database, or by the subscriber who periodically

generates a query signal addressed to the host facility 2, as will be described more specifically further below.

Reference is made to Fig. 6, illustrating a notification system 320 constructed according to yet another example of the present invention. The system 320 is a so-called "security system" presenting the connection between a detector device 302 (constituting a first node) and a subscriber side 4 (constituting a second node). Here, the protocol between the detector 302 and subscriber side 4 states that the detector device 302 has to periodically indicate to the subscriber side 4 that the detector 302 and the connection between the detector and the subscriber side are in good working order. The detector 302 is provided with a processing means, generally at 326, generally constructed similar to the processor unit 26 of the previously described examples, but distinguished in that the provision of the detector utility 28 is unnecessary. The indication signal is to be generated by the processing means at certain time intervals (controlled by the time-out utility 34) and transmitted to the subscriber side through the modem 27 in the above-described manner. The absence of the timely received indication signal at the subscriber side 4 (which is controlled by the time-out utility 134) indicates that no "event" occurs, i.e. that something is wrong either with the detector or with the communication link. If a "man in the loop" is expected at the subscriber side 4, the indication signal is transmitted off-line, and the "man" is responsive to the presence and absence of the indication signal to operate accordingly. Otherwise, the connection utility 135 is responsive to the absence and presence of the indication signal for activating certain effects, defined by the protocol.

Fig. 7 illustrates a system, generally designated 420, presenting the connection between two subscriber sides 4a and 4c through a telephone communication link 17. In the present example, the subscriber side 4c constitutes a first node. A personal computer 418 at the subscriber side 4c

operates similar to the sub-system 24. As shown, the processor 26 is associated with the PC 418, being integral with the PC 418 in the present example. Obviously, the processor 26 may be a separate unit coupled to the PC 418. The processor 26 operates in accordance with a protocol between
5 the subscriber sides 4c and 4a for transmitting indication signals from side 4c to side 4a. The indication signal is indicative of the existence of certain data, which is either generated at the subscriber side 4c or arrives thereto through its LAN (not shown).

Turning now to Fig. 8, there is illustrated yet another example of a
10 notification system, generally designated 520, which, in distinction to the previously exemplified systems, provides the connection between two host facility sides 2 and 502. Here, both servers 12 and 512 are equipped with similar processing means 26 and 526, respectively, and a protocol is set between them.

15 It is understood that, should the processor unit be associated with any host facility, it would preferably be a separate unit installed in the LAN at the host facility side, rather than being integral with its server. However, when the connection between two host facility sides is desired, no "man in the loop" is implied at least at either side 2 or 502. Therefore, the protocol
20 between the servers supposes any applications or effects to be effected at least at one side in response to the indication signal coming from the other side. In this specific example of Fig. 8, the processing means 526 is integral with the server 512 and is provided with the connection utility 135.

Reference is made to Figs. 9a-9c illustrating different examples of
25 the main principles of operation of a notification system according to the invention, for example the systems 120 (Fig. 4). Fig. 9a exemplifies the so-called "Server Notification Mode". The processor unit 26 continuously checks a data stream in the LAN 11 (step 36) and upon detecting the existence of any "event" (step 38), generates an indication signal (step 40).

It is clear that the protocol may state that such a "search for the predetermined data" is implemented by the processor unit 26 periodically, with certain time intervals. Preferably, the indication signal is also indicative of the kind of event detected, the so-called "subject" that can be presented by the transceiver utility or associated external device.

The detector utility 28 stores a record representative of the indication signal in the memory 30 (step 42) and concurrently actuates the destination utility 32 and optionally the signaling utility (steps 44 and 46). The utilities 31 and 32 select the desired signaling and desired transceiver utility (constituting the subscriber identification code), respectively. Then, the system modem 27 generates an outgoing call signal and transmits it through the communication link (step 50).

It should be noted that, depending on the selected external device, the indication signal is transmitted either "on-line" (i.e. through continuous connection between the ISP and subscriber sides) or "off-line". Indeed, should such external device as a facsimile, printer or pager be selected, the on-line connection is required.

If the external device to which the indication signal has to be transmitted is a personal computer, telephone or cellular phone, the "off-line" (i.e. free of charge) transmission is preferred. In this case, the sub-system 24, whilst transmitting the indication signal to the system modem 27, concurrently actuates the time-out utility 34 (step 52). The time-out utility 34 allows the outgoing call signal to be continuously transmitted, for example, for the duration of two rings, and then stops the transmission (step 53). It is appreciated that this preset number of rings may be desirably adjusted, being long enough for successfully accessing the remote location of the subscriber side 4, but not sufficiently long to allow connection between the ISP side 2 and the subscriber side 4.

The subscriber modem 19 receives this call signal (step 54) and generates an incoming call signal at the subscriber side 4, indicating thereby to the user at the subscriber side 4 whose presence is expected that the event has been detected (step 56). The external device may be appropriately provided with an indication means (visual or vocal) for presenting the event's subject, for the user's convenience, as defined by the protocol. The user at the subscriber side 4 himself decides whether or not to execute the "Client" software for "on-line" connecting to the ISP side 2, and operates his/her personal computer 18 accordingly.

Turning now to Fig. 9b, if the subscriber side 4 is provided with the time-out utility 134, the latter, upon being activated (step 58) by the modem 19 in response to the received call signal and detecting that the outgoing call was interrupted after the preset number of rings (step 60), operates in a manner to receive a confirmation that the call comes from the sub-system 24. The time-out utility 134 actuates the signaling utility 131 and modem 19 (step 62) for generating an outgoing call signal (step 64) addressed to the processor unit 26, and allows its transmission during a preset time period (or number of rings) (step 66). The system modem 27 receives this call (step 68) and, upon identifying the subscriber side 4 (step 70), generates an incoming call indicative of a query signal coming from the subscriber side 4 (step 72). The detector utility 28 of the processor 26, in response to the incoming call, checks the memory 30 and the data stream in the LAN 11 for detecting the event (step 74).

It is understood that, if the event is detected, the processor 26 operates in the manner described above with reference to Fig. 9a for generating and transmitting the indication signal to the subscriber side 4. If the subscriber side 4 is provided with the destination utility 132, the user may select the external device to "follow" him each time, if desired. In this case, upon receiving the specifically transmitted (or interrupted after a

preset time period) call signal, the modem 19 promotes the transmission of the indication signal to the selected external device.

As further shown in Fig. 9b, when the query signal is transmitted through the modem 19, the time-out utility 134 is again actuated (step 76).

5 The absence of a reply from the ISP side 2 within a preset time period (steps 78 and 79), indicates to the user that no event has occurred and the "interrupted" call is not associated with the ISP side 2 (step 80). The receipt of the reply from the ISP side 2 within the preset period of time, confirms that the event takes place (step 81).

10 Alternatively, the subscriber modem 19 may have the "Caller ID" feature. In this case, the modem 19, upon identifying the processor unit 26, provides a specific ring, indicative that the call signal comes from the processor unit 26.

Fig. 9c illustrates the main steps of operation of the system 120 according to another example, so-called "Bi-Directional Polling Mode". The protocol between the nodes 2 and 4 operates the node 4 to periodically (with certain time intervals) check over events with the first node. Similarly, although not specifically shown, the processor unit 26 continuously (or periodically, as the case may be) checks a data stream in the LAN and, upon
15 detecting the existence of any "event", generates an indication signal and stores a record representative thereof in the memory 30. In this case, the node 4 periodically (with certain time intervals) generates a query signal (step 82) and transmits it in the form of an outgoing call signal from the subscriber modem 19 (step 84) to the system modem 27 associated with the
20 processor unit 26. Thus, the generation of the query signal at the subscriber side 4 is operated by the time-out utility 134 in accordance with the protocol.

Hence, the time-out utility 134 is actuated (step 86) and operates in the above-described manner (steps 88 and 90) to prevent the connection

between the subscriber and ISP sides. It is important to note that the protocol may set that the transmission of the query signal is indicative of the identification code of the subscriber side 4. For example, the identification code is "345" and the timing of the outgoing call transmitted through the modem 19 is as follows: one-second-ring, three-seconds-pause, one-second-ring, four-seconds-pause, one-second-ring and five-seconds-pause. Additionally, the dialing mode from the subscriber side may utilize a so-called "Dual Tone Multiplexed Frequency" (DTMF) feature. The main principles of this feature are known *per se* and therefore need not be described in detail, except to note that it presents tones one might have heard while "pressing" the keys on his/her telephone.

The system modem 27 receives the call signal (step 92) and, upon identifying the subscriber side 4 (step 94), actuates the detector utility 28 (step 96) of the processor 26 for checking the memory 30 and the data stream in the LAN. If the existence of any "event" is detected, the processor 26 operates as described above. The presence or absence of a reply from the ISP side 2 within the preset time period indicates to the user that the "event" occurs or not, respectively (steps 98 to 101).

It will be readily understood that the provision of the sub-system 24, operated by the specific protocol between the ISP side 2 and subscriber 4, enables additional costs associated with the "on-line" connection, to be avoided, at least at the stage of checking whether or not there exists any reason for such connection.

It should be specifically noted, that should an undesirable ringing at the subscriber side 4 be avoided, especially in a case when the subscriber side polls the sub-system 24 automatically, i.e. periodically, it may be of benefit to the user to perform a so-called "Uni-Directional Polling Mode" of the system's operation. To this end, the user at the subscriber side 4 dials the sub-system 24 through a communication line such as the so-called "toll

free lines" or like "call-back mechanism". Upon detecting the existence of the "event" at the ISP side 2, the sub-system 24 picks up on the subscriber's ring so as to indicate the same to the user. If the subscriber computer 18 detects the pick up from the sub-system 24 within the preset time period by means of the time-out utility 134, it acts accordingly. Otherwise, the protocol assumes that no "event" exists.

It should also be noted that the protocol between the first and second nodes could be designed such that the connection is established automatically, upon detecting the existence of any relevant event.

In order to more clearly demonstrate the advantages of the present invention, the following situation may be considered. The first user at the subscriber side associated with his "local" ISP, needs to contact a second user associated with another "remote" ISP. The simplest example of such a situation is that a user (constituting the first subscriber side) is located far from his own PC (constituting the second subscriber side) and needs to access a software application kept therein. This is achievable under the following conditions:

- The PC (i.e. external device having its own transceiver utility) is a registered subscriber of a certain ISP;
- The PC is equipped with the signaling utility 131, time-out utility 132, destination utility 134 and connection means 135;
- ISP is provided with the sub-system 24.

All these utilities operate in the above-described manner to indicate to the PC (relevant utilities installed therein) at the second subscriber side that there exists a reason for establishing the connection between the first and second sides. The PC (its relevant utilities) at the second side, in response to this notification, activates preset applications installed therein.

Those skilled in the art will readily appreciate that many modifications and changes may be applied to the invention as hereinbefore

exemplified without departing from its scope defined in and by the appended claims. In the method claims, which follow, characters that are used to designate claim steps are provided for convenience only and do not apply to any particular order of performing the steps.

CLAIMS:

1. A system for transmitting notifications from a first network node to a second network node through a communication link, the system comprising:

- 5 (a) a processing means associated with at least the first node for generating an indication signal addressed to said second node, wherein said indication signal is indicative of a certain event which is defined by a preset protocol between the first and second nodes; and
- 10 (b) a system transceiver interconnected between said processing means and communication link so as to be responsive to said indication signal for transmitting it in a predetermined manner to at least one desired transceiver utility of said second node.

2. The system according to Claim 1, wherein said first node
15 comprises a predetermined database, said event being representative of a certain change in the database.

3. The system according to Claim 1, wherein said first node is associated with a local area network through which a data stream proceeds, said event being representative of the existence of predetermined data
20 within said data stream.

4. The system according to Claim 1, wherein the processing means comprises a signaling utility.

5. The system according to Claim 4, wherein said signaling utility is capable of generating said indication signal.

25 6. The system according to Claim 4, wherein said signaling utility is capable of selecting the predetermined manner of transmission of the indication signal.

7. The system according to Claim 1, wherein the processing means comprises:

- at least one detector utility capable of detecting the existence of said certain event and generating the indication signal;
- at least one memory means for storing the indication signal.

8. The system according to Claim 1, and also comprising a time-out utility associated with the system transceiver, the time-out utility being responsive to the indication signal for operating the system transceiver to transmit the indication signal in said predetermined manner.

9. The system according to Claim 8, wherein said time-out utility disables the system transceiver a certain time period after the indication signal was transmitted, the time period being insufficiently long so as to prevent the connection between the first and second nodes to be effected.

10. The system according to Claim 6, and also comprising a time-out utility coupled to the signaling utility and associated with the system transceiver for operating it to transmit the indication signal in the selected manner.

11. The system according to Claim 1, and also comprising a destination utility provided with a database representative of the transceiver utilities of the second node, the destination utility being capable of selecting at least one transceiver utility to which the indication signal is to be transmitted.

12. The system according to Claim 11, wherein said destination utility is associated with the first node.

13. The system according to Claim 11, wherein said destination utility is associated with the second node.

14. The system according to Claim 1, wherein said system transceiver has identification means for identifying the transceiver utility of the second node.

15. The system according to Claim 1, wherein said transceiver utility of the second node has identification means for identifying said system transceiver.

16. The system according to Claim 1, wherein said at least one
5 desired transceiver utility of the second node comprises an indication means for indicating to a user the receipt of the indication signal.

17. The system according to Claim 1, and also comprising at least one external device associated with said at least one transceiver utility.

18. The system according to Claim 1, wherein said at least one
10 external device has a programming connection utility responsive to said indication signal transmitted through the transceiver utility to activate a certain action or effect defined by said protocol.

19. The system according to Claim 1, wherein said second node
15 comprises a signaling utility and a time-out utility associated with the transceiver utility and responsive to the indication signal for operating the transceiver utility to transmit a signal in a predetermined manner.

20. The system according to Claim 19, wherein said time-out utility is capable of disabling the transceiver utility a preset time period after the signal was transmitted therethrough.

21. The system according to Claim 20, wherein the transmitted
20 signal is said indication signal generated by the processing means.

22. The system according to Claim 20, wherein said transmitted signal is a query signal generated at the second node.

23. The system according to Claim 1, wherein said first node is a
25 host facility of a network and said second node is a subscriber of the network.

24. The system according to Claim 1, wherein said first and second nodes are two different host facilities of a network.

25. The system according to Claim 1, wherein said first and second nodes are two different subscribers of a network.

26. The system according to Claim 1, and also comprising an additional processing means associated with the second node for generating
5 an indication signal addressed to said first node, said indication signal being indicative of a certain event defined by a preset protocol between the first and second nodes.

27. The system according to Claim 3, wherein the processing means is a separate unit installed as a part of the local area network of the first
10 node.

28. A method for transmitting a notification from a first network node to a second network node through a communication link, the method comprising the steps of:

- 15 - generating by said first node an indication signal addressed to said second node, wherein said indication signal is indicative of a certain event which is defined by a preset protocol between the first and second nodes;
- transmitting a signal representative of said indication signal through said communication link to at least one desired
20 transceiver utility of the second node, wherein said transmitting is carried out in a predetermined manner defined by said protocol.

29. The method according to Claim 28, wherein the step of generating the indication signal comprises:

- 25 - tracking and analyzing a data stream within the first node, so as to detect the existence of predetermined data.

30. The method according to Claim 28, wherein the step of generating the indication signal comprises:

- analyzing a certain database within the first node, so as to detect any changes therein.

- 29 -

31. The method according to Claim 28, wherein said signal is transmitted during a preset time period which is insufficiently long so as to prevent the connection between the first and second nodes to be effected.

32. The method according to Claim 28, and also comprising the step
5 of:

- selecting said at least one desired transceiver utility to which the outgoing call is to be transmitted.

33. The method according to Claim 28 and also comprising the step
of:

- 10 - selecting the predetermined transmission of the indication signal.

34. The method according to Claim 28, and also comprising the step
of:

- generating by the second node a query signal and transmitting it to the first node through said communication link.

15 35. The method according to Claim 34, wherein said query signal is generated in response to said indication signal transmitted through the transceiver utility.

36. A method for transmitting notifications between a first network node and a second network node through a communication link,
20 the method comprising the steps of:

at the second node side:

- 1) generating by the second node a query signal addressed to the first node, wherein said query signal is indicative of that the second node is waiting for an indication signal indicative of a certain event defined by a preset
25 protocol between the first and second nodes;
- 2) transmitting the query signal through said communication link in a predetermined manner defined by said protocol;
- 3) initiating a certain effect depending on that said indication signal is received or not by the second node within a predetermined time period

- 30 -

after the transmission of the query signal, wherein said effect is defined by said protocol;

at the first node side:

- 4) upon receiving the query signal generated by the second node, initiating
5 a certain action defined by the protocol so as to detect whether said event exists; and
- 5) if the existence of the event is detected, generating an indication signal addressed to said second node and transmitting a signal representative of said indication signal through the communication link to at least one
10 desired transceiver utility of the second node, wherein said transmitting is carried out in a predetermined manner defined by said protocol.

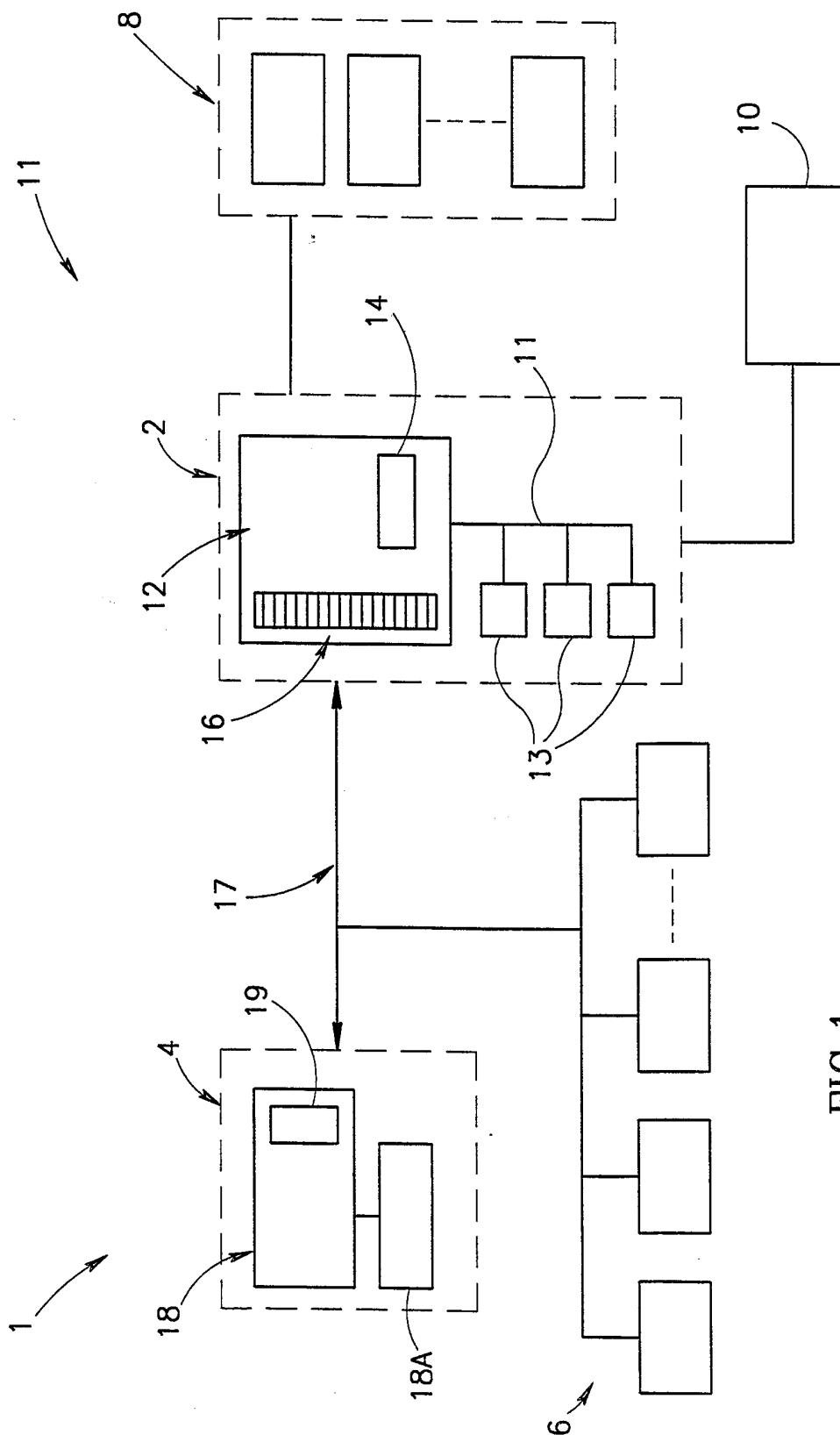
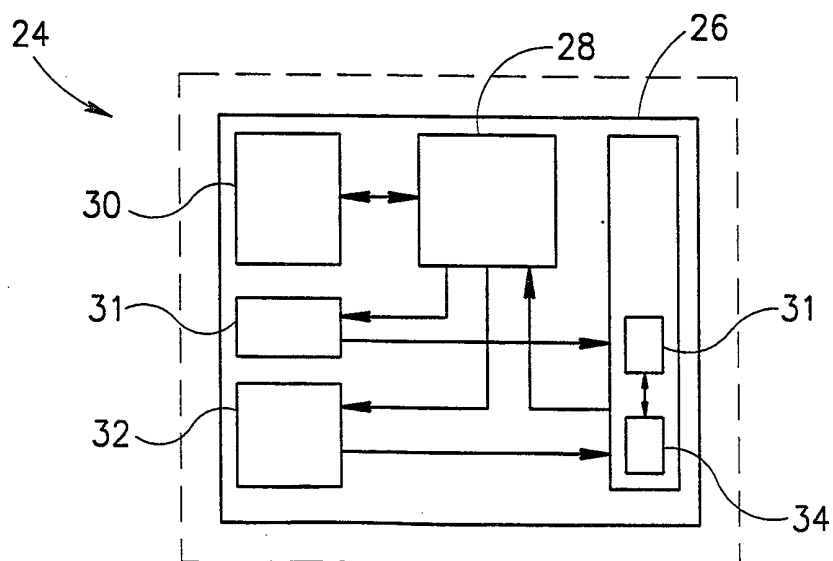
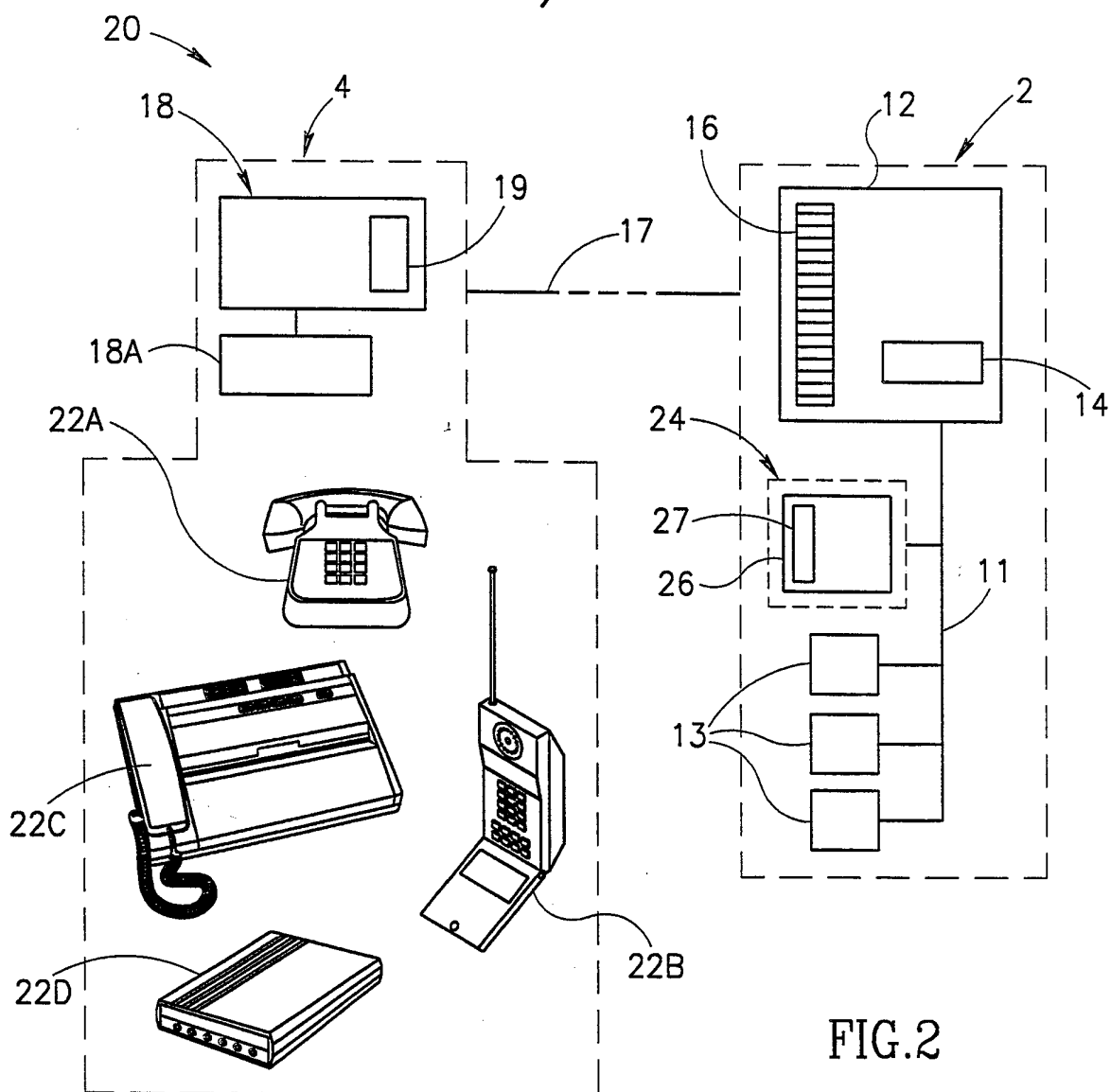


FIG. 1
PRIOR ART



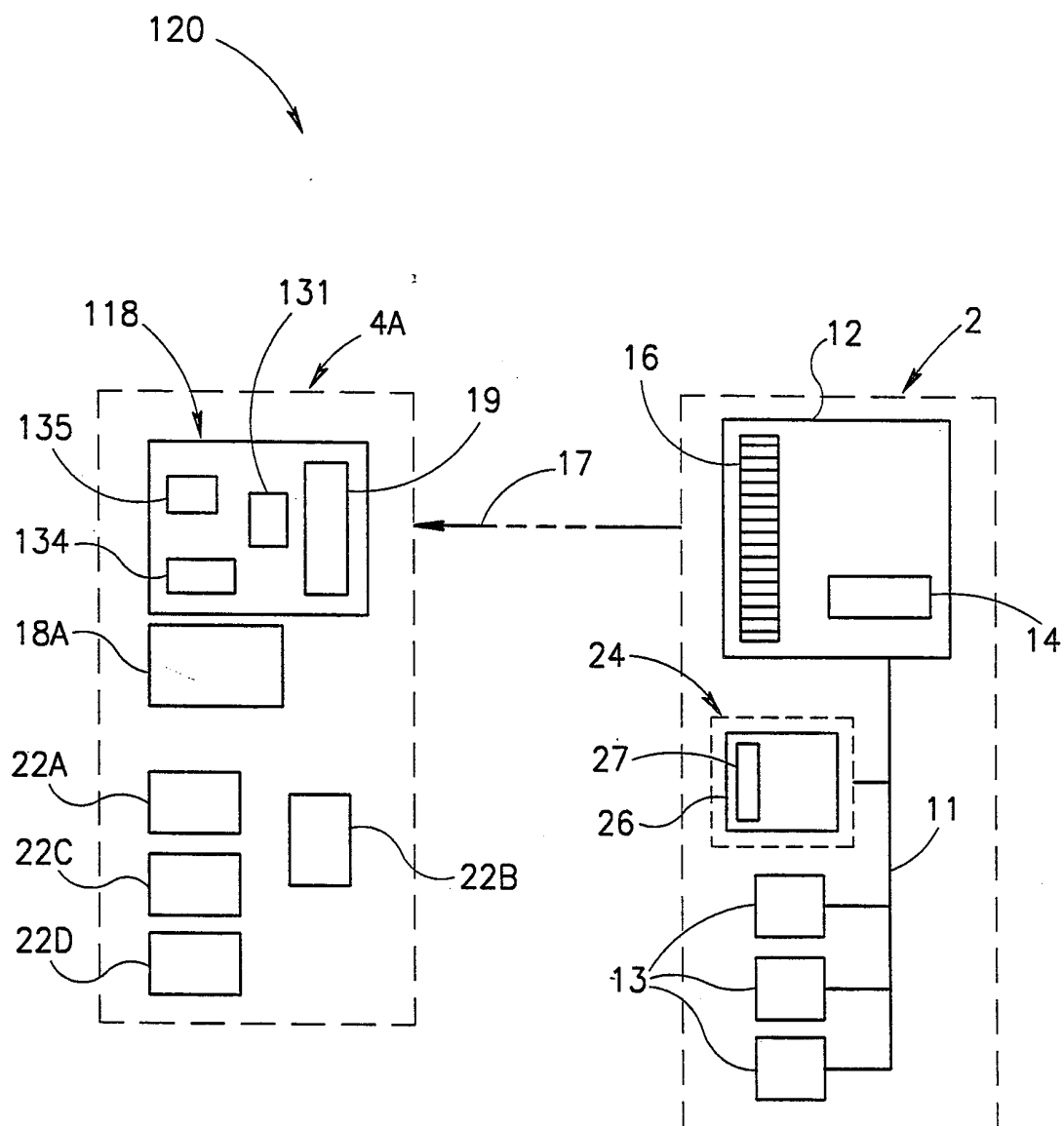
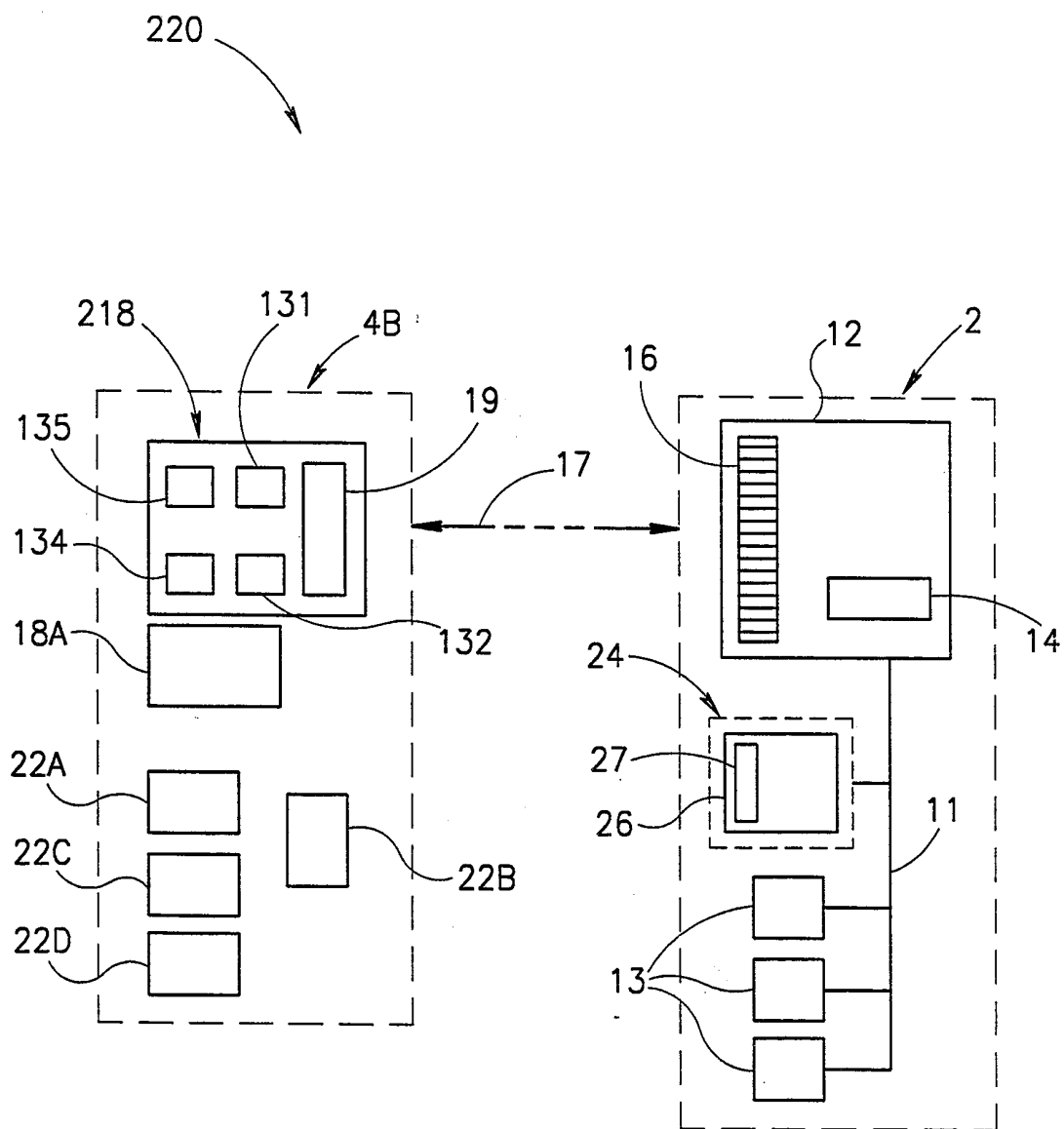
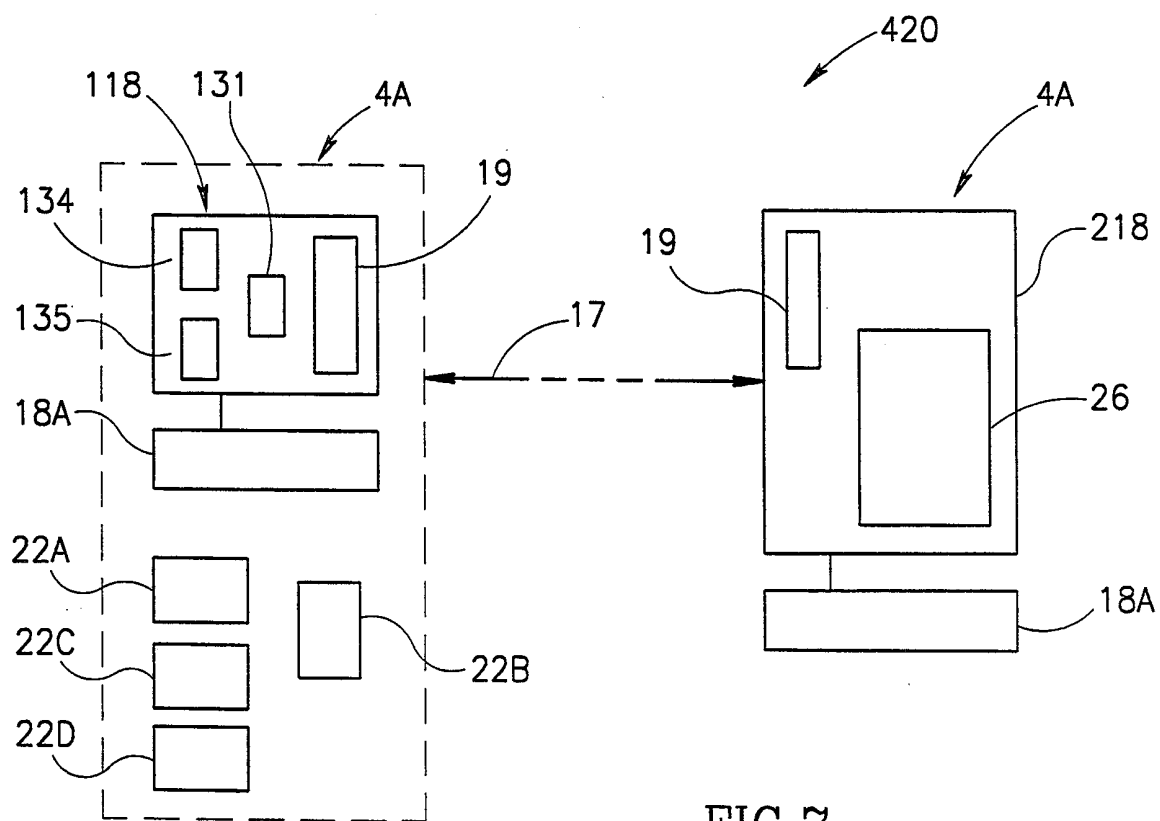
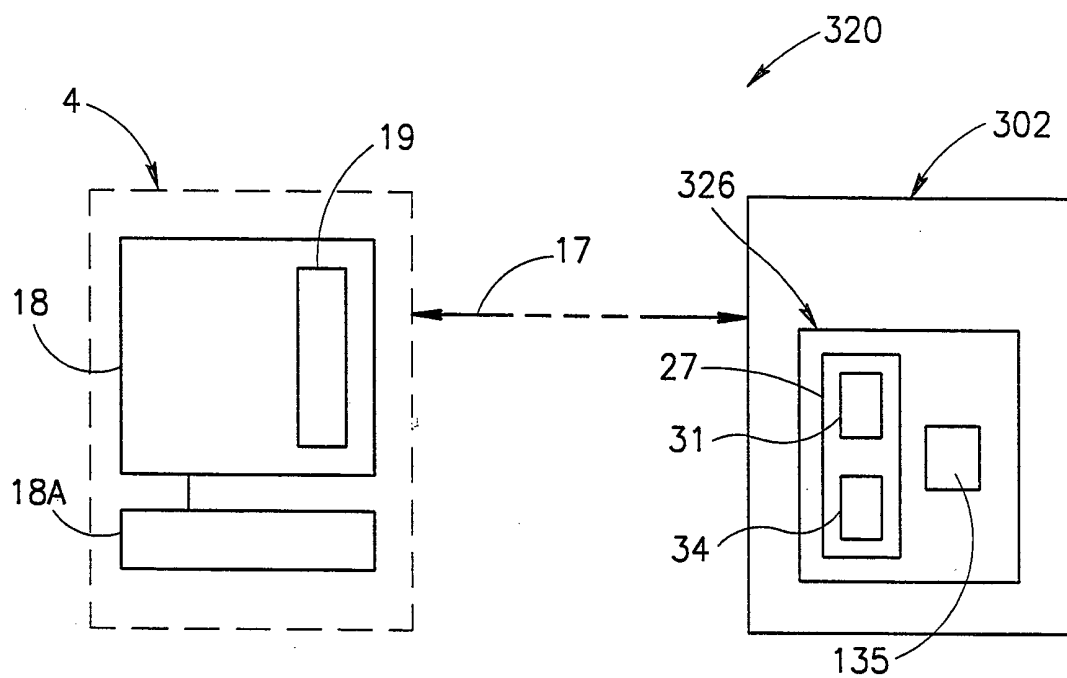


FIG.4



5/9



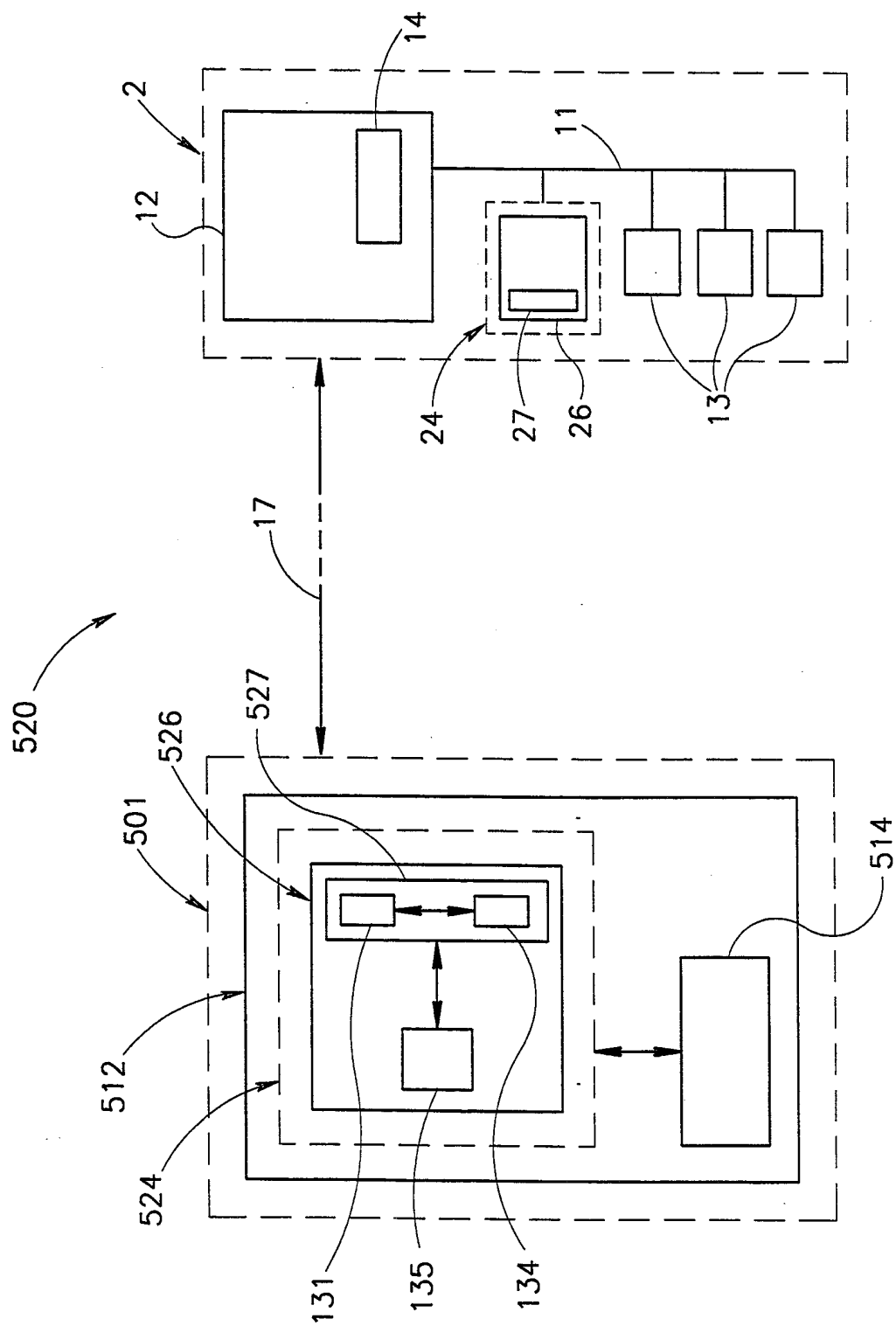
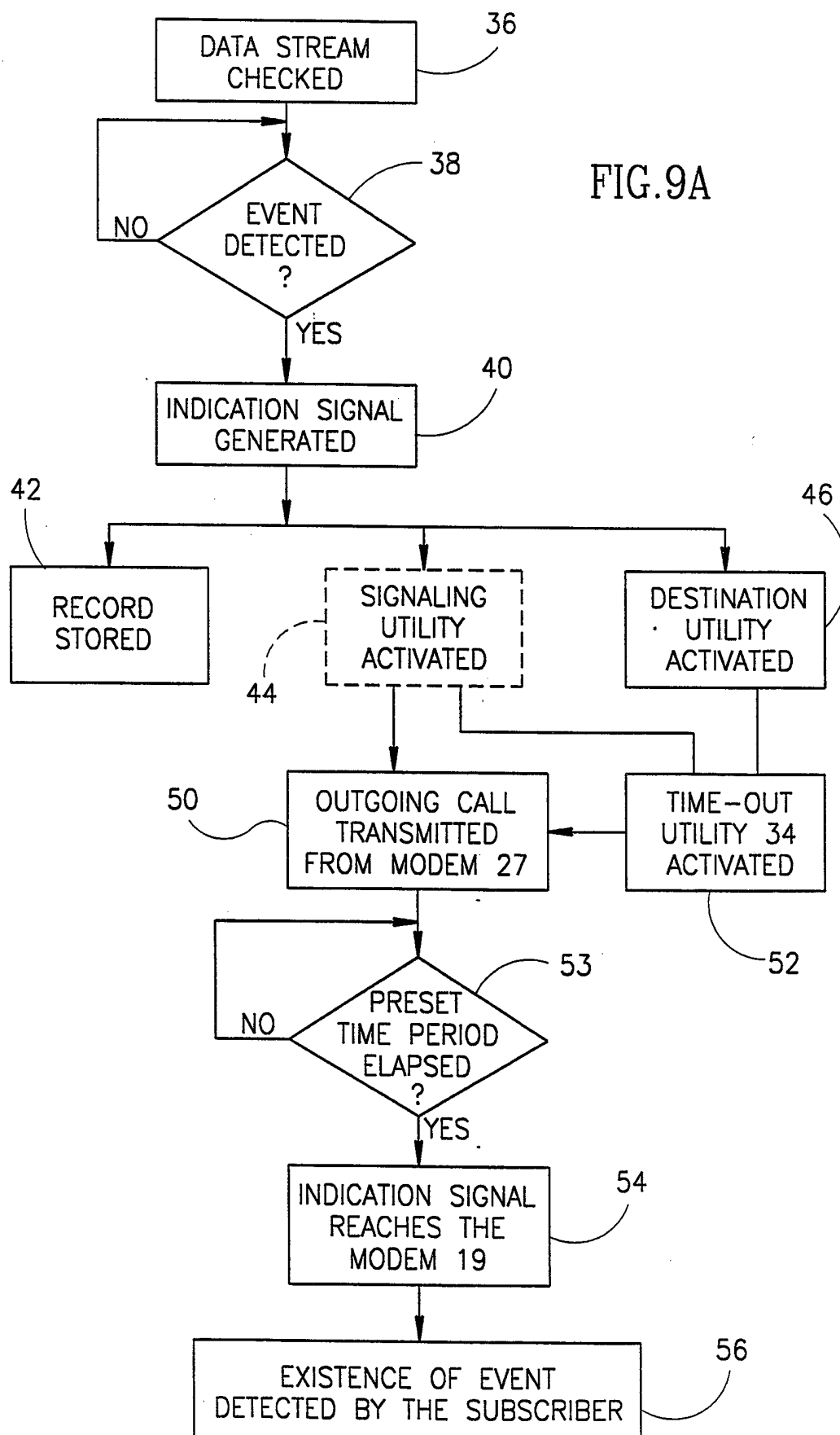


FIG.8

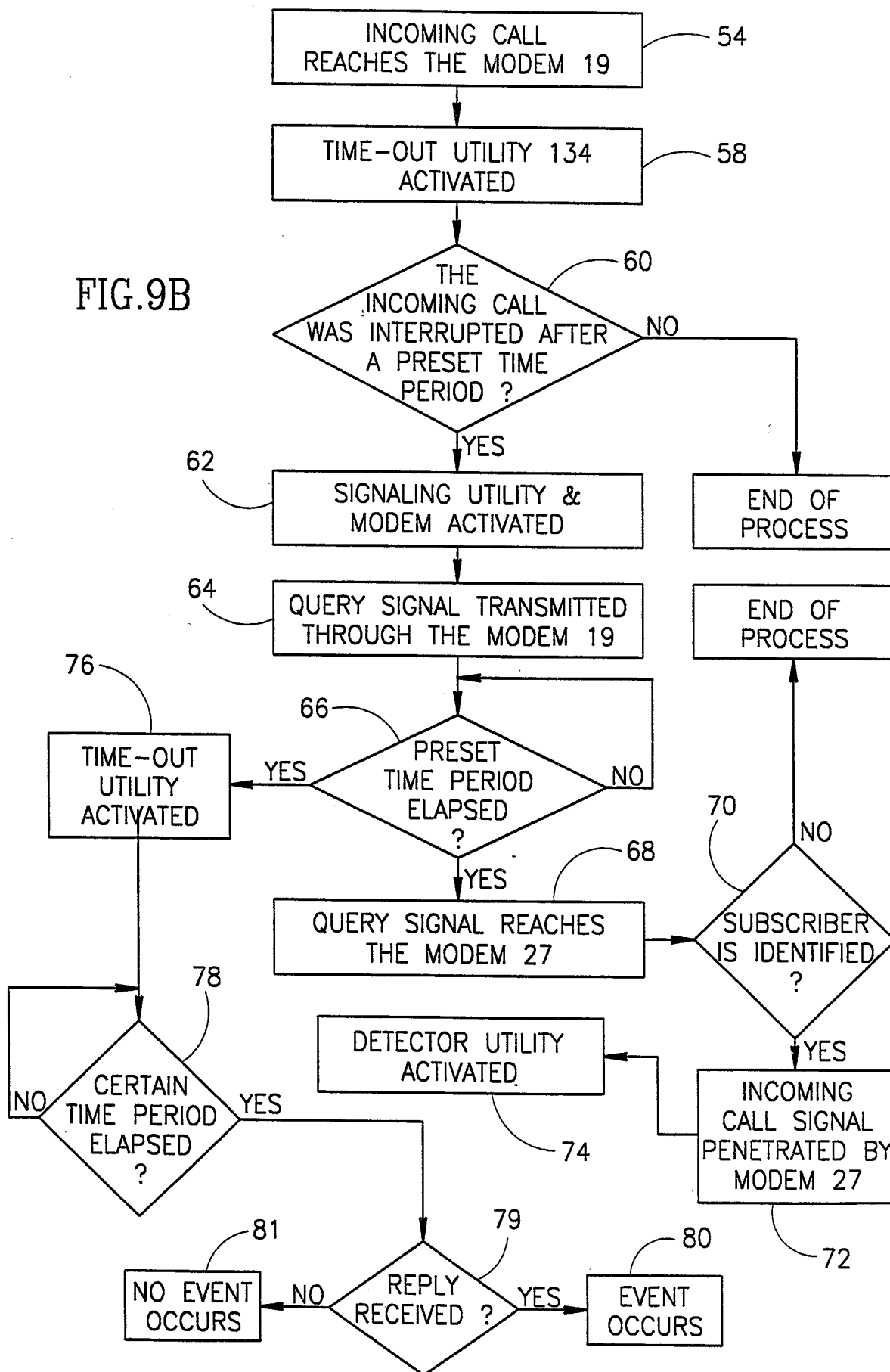
7/9

FIG.9A



8/9

FIG.9B



9/9

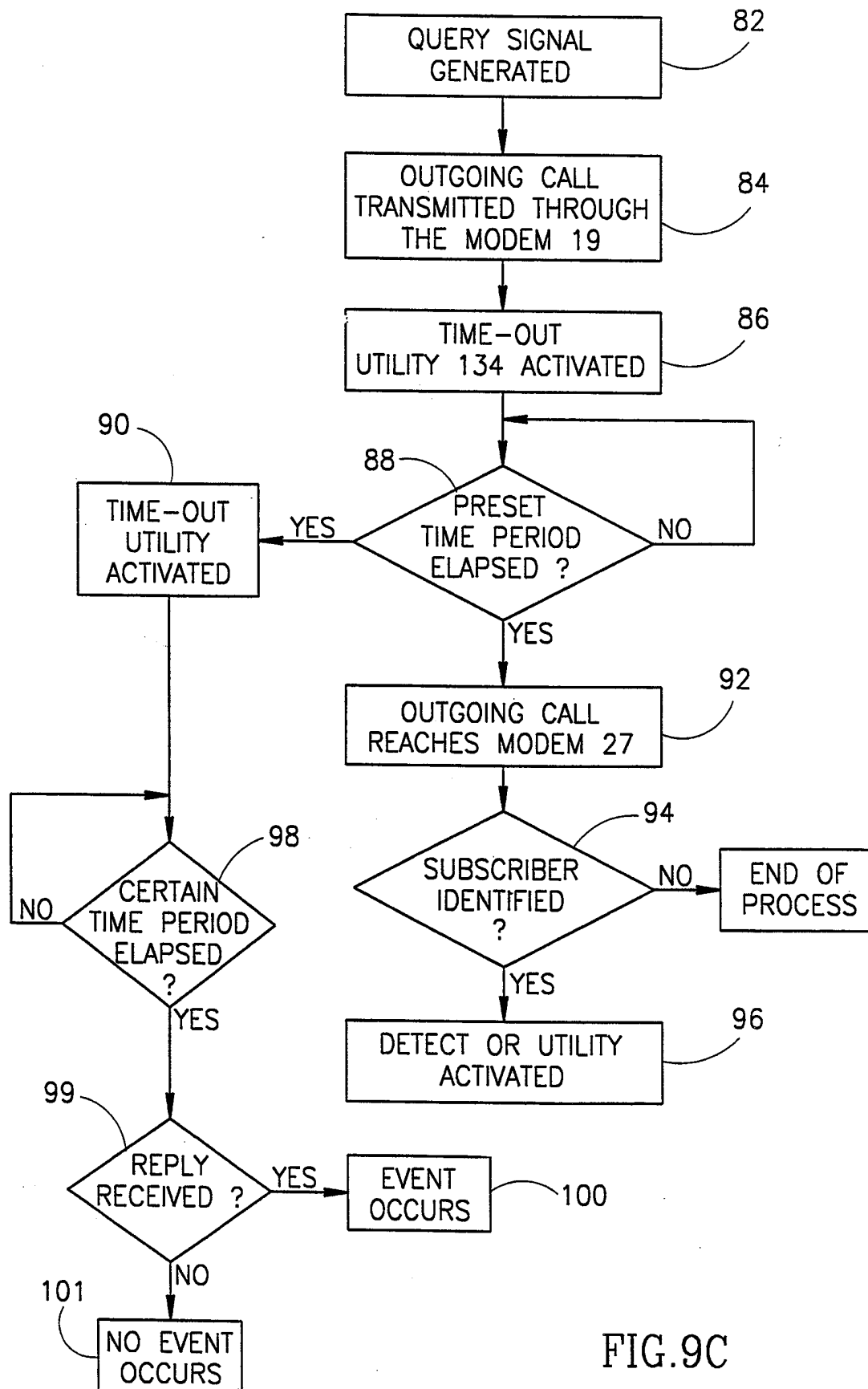


FIG. 9C

INTERNATIONAL SEARCH REPORT

Interr 1st Application No
PCT/IL 98/00334

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 0 836 301 A (AT & T CORP) 15 April 1998 see column 2, line 8 - column 3, line 34 see column 6, line 13 - column 7, line 33 see column 7, line 55 - column 9, line 25 see figure 2	1,2,4-7, 11-18, 24,26, 28,30, 32-35 3,8-10, 19-23, 25,27, 29,31,36
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/IL 98/00334

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 736 989 A (ROOSTER LTD) 9 October 1996 cited in the application see abstract see column 2, line 50 - column 6, line 18 see column 7, line 10 - column 8, line 53 see column 9, line 9-12 -----	1,2,4-8, 10-12, 16-18, 23,28, 30,32,33

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