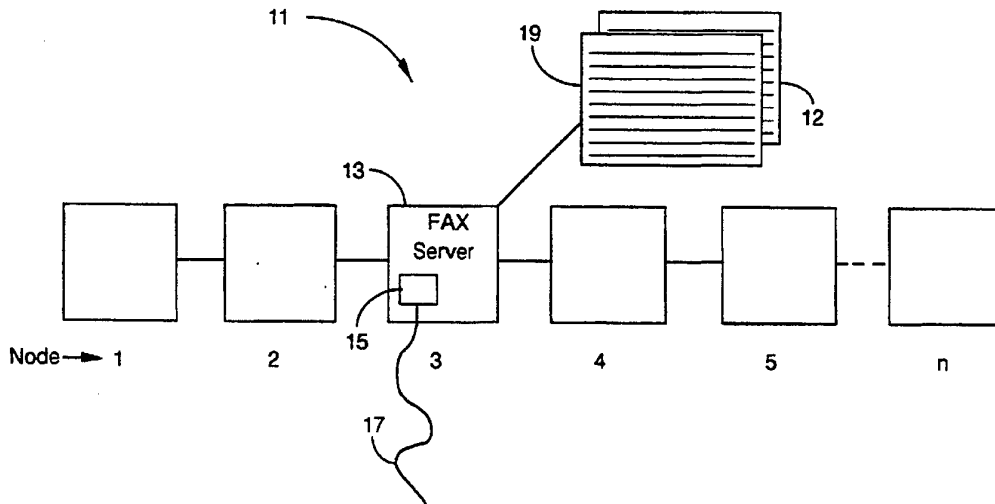




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US94/06813 (22) International Filing Date: 16 June 1994 (16.06.94) (30) Priority Data: 08/078,402 17 June 1993 (17.06.93) US (71) Applicant: OAKLEIGH SYSTEMS, INC. [US/US]; 810 East Arques Avenue, Sunnyvale, CA 94086 (US). (72) Inventor: KIKINIS, Dan; 20264 Ljepava Drive, Saratoga, CA 95070 (US). (74) Agent: BOYS, Donald, R.; P.O. Box 187, Aromas, CA 95004 (US).</p>		<p>(81) Designated States: CN, JP, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report.</p>

(54) Title: NETWORKING FAX SYSTEM



(57) Abstract

A system (11) for prioritizing and batching FAX transmissions uses sets of dummy telephone numbers. A set of dummy numbers is assigned to each regular correspondent and each dummy number in a set indicates a specific level of priority for transmission. Each FAX composed to go to one of the regular correspondents may be provided with one of the dummy numbers, which will cause the FAX message, when sent to a FAX modem (15) for transmission, to be stored by a control system configured according to the invention, for later retrieval to be transmitted at a pre-selected time chosen to be optimized to cost relative to the destination, and compatible with the level of priority assigned.

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Networking FAX System

Field of the Invention

The present invention is in the area of facsimile (FAX) transmission systems, and pertains in particular to a system for holding, collating and sending FAX messages from a group of computer users accessing a local area network (LAN).

Background of the Invention

Electronic FAX transmission is conventionally a means for transmitting hard copy documents over telephone lines. Hard copy documents are scanned, translated to bit map digital form, transmitted serially over telephone transmission equipment, and reassembled and copied as bit-mapped graphic documents at the receiving station. The final document is a facsimile of the original, hence the name.

The distribution of faxed documents on local area network computer systems utilizes a wide range of hardware and software solutions to varying degrees of cost, complexity, compatibility and efficiency. The management of these variables are what determines the successful use of the given hardware resources.

In conventional FAX systems, hard copy documents may be created in about any convenient manner, such as by typing or by composition on a word processor or a word processor application with a general-purpose computer, then printing the document. The hard copy is scanned in the FAX machine, and the scanned image is transmitted serially over telephone lines. At the receiving end, a compatible FAX machine receives the transmission, and prints another hard copy, a facsimile of the original, usually by thermal printing techniques.

In recent years, FAX modems have been developed for

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personal, general-purpose computers, to send and receive FAX transmissions. These systems are typically implemented in general-purpose computers as add-on bus cards. A computer with a FAX modem card can access files created typically by word processing applications on the host computer, and transmit the files over telephone lines as FAX transmissions to either a conventional FAX machine or to another FAX modem connected to a computer. Similarly, FAX modems can receive FAX transmissions from either conventional FAX machines or from other FAX modems.

FAX modem technology has been applied to computer systems in local area networks (LAN) systems as well. In these systems, one station (node) typically acts as a FAX server, with FAX modem circuitry connected to a telephone line. In these systems, applications available to users on the LAN allow the users to create computer files and to send these files to the FAX server for transmission as FAXes over telephone lines. These composition products use a fairly typical standard protocol for communications with the FAX transmission device (modem) in the FAX server. Within that protocol, the characters in the FAX file that indicate the destination telephone number to the FAX device (modem) are restricted to "telephone numbers". That is, the FAX device recognizes only numeric characters and certain alphanumeric codes in a field that has a certain minimum and maximum length, preceded by a field beginning delimiter (e.g., an open parentheses [(] character) and terminated by a field ending delimiter (e.g., the word FAX). The user can then send the file through the network's FAX server using the FAX server's modem. The FAX modem and associated software saves the tedious steps of printing the document, feeding into an available FAX machine, and dialing the recipient's telephone number.

The sending of FAXes is initiated by any (LAN) node

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and administrated by the FAX server using administrative control routines. Typically, the sender's requests must be within the standard numeric protocol and be a "deliverable" FAX, meaning having an acceptable telephone number destination, such as for example, within the company's PBX telephone system.

In most business organizations, a large number of FAXes are sent to the same set of regular correspondents. These FAXes are typically sent by different individuals and at different times. The telephone line usage fees vary widely during a 24 hour period, depending in part on the destination, which may be in another part of the world in a radically different time zone. Moreover, several short calls are charged more than just one long call, taking into consideration the connect time needed to establish modem to modem protocol and other factors. Also, the management of multiple communications both as a sender and receiver is time consuming. Ideally, a managed system of batch faxing could be fashioned and used to save both money and time.

What is needed is a system that coordinates economic facsimile batch transmissions to regular correspondents on a prioritizing basis. This system would be compatible with typical company environments such as an organization's internal telephone system and LAN array.

Summary of the Invention

In an embodiment of the invention a FAX transmission system for sending a FAX message to a remote destination via a telephone connection is provided, comprising a FAX modem for dialing the remote destination and transmitting the FAX message over the telephone connection, a digital control system configured to operate the FAX modem, the control system including a memory means, sorting means for

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intercepting the FAX message sent to the FAX modem to be transmitted and comparing recipient's phone number associated with the FAX message with a list of dummy numbers assigned to regular correspondents, the dummy numbers indicating pre-selected priority, and batch management means for storing the FAX message in the memory means according to the pre-selected priority associated with one of the dummy numbers matching the recipient's phone number, retrieving the FAX message at a preselected time associated with the pre-selected priority, and providing the FAX message with recipient's actual telephone number to the FAX modem for transmission.

The invention has particular application in a preferred embodiment to a LAN with a FAX server node having a FAX modem, and in one embodiment comprises a set of control routines at the FAX server operating transparently to a user at a separate node, where the user may compose a FAX message and associate a dummy number with the FAX message, the dummy number associated with a regular correspondent and indicating a specific level of priority. The control routines operating at the FAX server intercept all FAX messages sent from nodes for transmission and store those associated with dummy numbers in directories associated with the correspondent and the priority level.

The control routines retrieve batches of FAX messages at specific optimal times for transmission, provide the recipients real phone number, and forward the batch to the FAX modem for transmission. In a preferred embodiment an administrator has access to the control routines to edit the dummy number tables and the specific times and other characteristics for transmission.

A big advantage for embodiments of the present invention is that it operates completely transparently to existing and conventional FAX composition and transmission

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routines, and requires no hardware alteration or user retraining in implementation.

Brief Description of the Drawings

Fig. 1 is a diagram of a local area network according to an embodiment of the present invention.

Fig. 2 is a block diagram depicting control routines of an embodiment of the invention with existing control routines.

Fig. 3 is a step diagram illustrating sequential steps in operation for one embodiment of the present invention.

Fig. 4 is a logic flow diagram for operation of one embodiment of the present invention.

Description of Preferred Embodiments

In the present invention, means are provided to accomplish a manageable flow of collating, prioritizing and sending FAXes within an existing LAN system. Fig. 1 shows a LAN system 11 with a dedicated FAX server 13 configured according to the present invention. The FAX server controls the flow of all facsimile transmissions via a FAX modem 15 and connecting telephone lines 17. In an embodiment of the invention, control routines 19 of the Networking FAX System of the embodiment "piggy-back" on to the existing FAX server's control routines 12 to consider all FAX requests from any node on the LAN. By utilizing established protocols within the network faxing control routines and the standard internal telephone exchange system, such as a PBX system, the invention interfaces to provide a cost effective tool to manage company wide FAX requirements.

Typically, within each established company PBX (or

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other closely related technology) system there exists a bundle of extra internal telephone extensions. These are usually in place already and easily "turned on " from the telephone carrier's main offices or within the physical confines of the client company's property location. These unused extensions provide for easy communication expansion due to normal company growth.

In an embodiment of the present invention unused extensions within the company may be assigned to establish a link to individual regular correspondents. In this scheme each regular correspondent is assigned one or more internal telephone extensions from the list of unused company-wide extensions. Using these assigned extension dummy numbers assures that there are no system-wide defaults within the existing FAX server's control routines. The extension numbering also guarantees a nonconflicting methodology of assignment. The purpose of more than one assigned dummy extension is to provide for prioritizing transmissions and for sending batch transmissions at the most appropriate time.

One fashion of prioritizing FAXes might include, for example, a set of 3 digit extensions such as 300, 301 and 302, which could refer to company X in Taiwan and signify the prioritized assignment of low, medium, and high priority status respectively. It will be apparent to those with skill in the art that there may be any number of pre-stored dummy extensions to refer to numerous priorities and/or custom designed batch files. It is convenient to use pre-existing extensions as the dummy numbers, but not required for the invention. Arbitrary dummy numbers may be assigned.

Fig. 2 is a block diagram of the LAN FAX server with the Networking FAX System interface of this embodiment of the invention. The Networking FAX System control routines 19 work in the "background" in conjunction with the

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conventional faxing control routines 12. When a FAX request comes to the FAX server on LAN connection 61, it is intercepted by control routines 19 of the present embodiment of the invention, including a sorting means 60, which cross-references from a look-up table 62 of dummy numbers assigned to direct correspondents, and optimized cost-effective dialing times assigned to the dummy numbers. If the number for the document is not in the look-up table, the system passes the document on to the conventional system routines to send the FAX in the conventional manner.

If the received document has one of the dummy numbers in the look-up table, control routines 64 determine the priority and the routing. If the priority is "high", the document may be passed directly through for immediate transmission (if that is the programmed protocol for high priority). Otherwise, the document is directed to a sub-directory assigned to that company and priority, and stored there for later transmission.

When the pre-arranged time arrives to send a batch file, the fully expanded correct telephone number associated with the dummy numbers for the correspondent is passed to the existing FAX control routines 12. FAX modem 15 then dials the number and sends all documents in the batch via the attached telephone line 17.

The present embodiment of the invention provides a network FAX administrator featuring customizing of batch FAX file transfers as well as a network-wide accessible comprehensive log of activities including but not limited to sender's names, sender's locations, extension and or numbers; length of individual FAXes, times of requests, chosen priority, receiver's batch files times, lengths, number of re-dials, and current and past status logs.

Fig. 3 is a simple flow diagram illustrating steps in preparing a facsimile file or hard copy document for

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FAX transmission according to the present embodiment, wherein a dummy extension is used to prioritize out-bound FAXes into batch files for the most economical and effective manner of transmission.

In Fig. 3, at function 16, a user opens a conventional word processor, such as Word Perfect 5.1. The document to be transmitted is composed at function 18. At function 20 the user prepares to send a FAX by opening the appropriate print/FAX driver utility from within the word processing or other composition application. This is a typical operation in most application programs. At function 20 the conventional FAX control routines open to prompt the user for such inputs as recipient's name, telephone number, preferred resolution, cover letter editing and additional file attachments. Many conventional systems also include an address book which may be edited to contain a complete list of assigned company dummy extensions, related priorities and names of regular correspondents. A notebook of this sort can also be accomplished in another embodiment of the invention by installation at the time the controls of the embodiment of the present invention are installed. In addition, in other embodiments, convenient features may be installed such as an ability to run from a command line at a network node to select previously stored files from batch file directories displayed in a convenient form, such as a filename "tree". Other optional features include an ability to override the batch send sequencing to send a batch of files from a directory to a destination at an arbitrary time.

At function 22, after completing all editing processes within the original application program, the user enters an appropriate dummy priority extension and selects SEND. The conventional networking FAX control routines recognize the dummy number as a working assigned

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telephone number and send the FAX file the FAX server.

At function 24, the control routines of the present embodiment at the FAX server intercept the FAX file. The dummy extension is compared to a look-up table of established "dummy extensions" linked to all relative information on the priority and the background of the regular company correspondent not limited to such things as: correspondents name and address, company products, personal contacts, divisions, locations, times of different priority faxing times, current and past activity, senders names and extensions.

The user is alerted to his or her request at function 26 in current mode on the system monitor at the sending node, and is asked for a verification or modification. The user enters the verification, and at function 28 the control routines save the document to a sub-directory dedicated to the recipient and priority. Instructions are attached to the newly created file to link it intrinsically for later retrieval by a batch scheduler routine. The manner of fulfilling linkage is flexible within the design, in that it is accessible and modifiable by a system administrator.

At function 30 the FAX driver "closes". The user is returned to his or her word processor application or other composition application. The control routines of the present embodiment of the invention can work with all user-familiar network faxing software that typically can send FAXes directly from other applications. There is no need to retrain personnel or re-configure the LAN network in either software or hardware other than installing the control routines of the embodiment of the present invention. Operation of the new control routines is transparent to the user.

At junction 32 the batch routines activate at a pre-determined time according to the batch faxing scheduler

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which remains active at all times. All FAX files sent to a particular dummy extension and stored in a corresponding sub-directory are retrieved and collated to a predetermined order from within the FAX server's sub-directories. The predetermined order as well as times of transmissions are selected at setup within the FAX server on the LAN, and are accessible to an administrator to be amended and otherwise updated as determined to be desirable. In a further refinement, the operation of the system is configured to redial FAXes of higher priority more often and for longer ring periods than for FAXes of lower priority. An example is a priority FAX transmission of "medium priority" configured previously for company X in Taiwan as dummy extension 301. From the setup procedure the FAX administrator may, for example, assign a calling frequency for every hour on the hour. Through subtle and numerous priority configurations an administrator can customize the system and adjust it as need changes.

Another embodiment of the present invention takes into account that some long distance telephone carriers impose line usage charges for repeat call attempts within a specified timeframe. This would fall most likely under high priority. To avoid such charges, the operation could be configured to, for example, make three attempts in succession; then wait one hour and again try three times.

Sending most FAXes of a routine daily nature accounts for a large percentage of a typical company's faxing requirements. The ability to initiate a prioritizing methodology using the established LAN computer system and the present system wide internal telephone configuration can save costs in long distance telephone services. Sending most FAXes during low-rate hours, and sending groups of files in one telephone call can result in appreciable savings. Another advantage of

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prioritized batch faxing is a reduced probability of a FAX message being overlooked. An organization that regularly receives large numbers of FAXes at a certain time each day will expect them and be prepared to handle them efficiently. If there is a failure, and the batch transmission is not sent, the receiving organization will be much more likely to notify the sending organization that the FAXes were not received.

In a further embodiment, when handling batch FAX files of a "low" priority, the system, upon getting a busy signal throughout the night at a particular regular correspondent's FAX line (due to "out of paper" for example) would notify the sender of the delay. The system would wait for 24 hours and try the transmission again.

At function 34 the invention in a pop-up window or equivalent method notifies the sender of the FAX transmission status on the node's computer monitor within the network system. This feature completes the "loop" so effective management can proceed. The feature would require recognition from the original sender, possibly with a code or password in order to turn the message off.

It is emphasized that the flow diagram of Fig. 1 is loosely constructed. That is, this is an example of the steps in facsimile transmission according to one particular embodiment of the invention. The steps are not rigidly fixed for other embodiments.

Fig. 4 is a logic flow diagram of operation according to a preferred embodiment of the invention generally as described above. Once a FAX send request is initiated at function 21, the existing FAX control routines scan the telephone number for acceptable format and destination. That destination parameter can be a telephone extension within the PBX system, in which case the number is verified. Using a dummy extension eliminates any defaults and passes the request on (23).

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The Networking FAX System then scans for prioritized numbers (25) by accessing a look-up table 27. At decision point 29, if the number is not in the table, control is passed to function 31, and the FAX is transmitted immediately.

If a dummy number is found (in the table), its priority is checked at decision points 33 and 37, and the document is stored in a sub-directory for low priority (43) or medium priority (39) for later transmission. The timing of later transmissions for different priorities is, as explained above, amendable by a system administrator. In Fig. 4, as an example, the timing is shown as set for medium priority at "on the hour" (41), and for low priority as once in 24 hours (45).

If a number is not found in the look-up table control is sent at decision 29 to function 31, and the FAX is transmitted immediately.

FAXes retrieved by the batch scheduler to be sent to a destination at either function 41 or 45 are provided with an "expanded" telephone number by access to a look-up table 36, then passed to function 31 for transmission.

Further embodiments of the present invention may incorporate established standards of LAN system software that make use of automatic routing such as: dual tone multi-frequency (DTMF), Optical Character Recognition (OCR), and Direct Inward Dialing (DID). For example, a salesman for the home company wants to FAX company X in Taiwan while on the road. Through the use of one of the above automatic routing techniques incorporated in commercial FAX networking applications presently available (e.g., Castele FaxPress version 3.0, Calera FaxGrabber) the salesman could call in and access the dummy extension. A FAX server version using voice prompts completes the FAX transmission on a manual basis. The voice prompting could include a simple menu selection of regular correspondents

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and their priority extensions. The only number to memorize is the extension of the FAX file server for outside sales calls.

It will be apparent to one with skill in the art that there are many changes that might be made without departing from the spirit and scope of the invention. Some of these alternatives have already been described, such as the multiple methods of accessing dummy extensions and flexibility in setting up multiple priorities in batch operations. The range of such functions is essentially the range of command functions that can be performed by receiving computerized equipment. It is also possible to implement the invention in control routines dictated by the LAN FAX file Administrator and or by the file server in a variety of ways, as it is well known in the art that different programmers have individual preferences in higher level languages and programming techniques.

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What is claimed is:

1. A FAX transmission system for sending a FAX message to a remote destination via a telephone connection, comprising:

a FAX modem for dialing said remote destination and transmitting said FAX message over said telephone connection;

a digital control system configured to operate said FAX modem, said control system including a memory means;

sorting means for intercepting said FAX message sent to said FAX modem to be transmitted and comparing recipient's phone number associated with said FAX message with a list of dummy numbers assigned to regular correspondents, the dummy numbers indicating pre-selected priority; and

batch management means for storing said FAX message in said memory means according to said pre-selected priority associated with one of said dummy numbers matching said recipient's phone number, retrieving said FAX message at a preselected time associated with said pre-selected priority, and providing said FAX message with recipient's actual telephone number to said FAX modem for transmission.

2. A FAX transmission system as in claim 1 wherein said digital control system comprises a FAX server node on a local area network (LAN) and wherein said FAX messages are composed at nodes on the LAN and sent to said FAX server for processing.

3. A FAX transmission system as in claim 1 wherein said pre-selected priority comprises a system of three dummy numbers assigned to each said regular correspondent, a

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first dummy number for high priority, a second dummy number for medium priority, and a third dummy number for low priority, and wherein high priority messages are transmitted immediately, medium priority messages are transmitted once per hour, and low priority messages are transmitted once in 24 hours.

4. A FAX transmission system as in claim 1 further comprising a programming interface whereby an administrator may amend priority levels and transmission times, and may also amend assignment of dummy numbers.

5. A control system for a FAX server having a FAX modem on a LAN comprising:

 sorting means for intercepting FAX messages sent to said FAX server to be transmitted by said FAX modem and comparing recipient's phone number associated with said FAX messages with a list of dummy numbers assigned to regular correspondents, the dummy numbers indicating pre-selected priority; and

 batch management means for storing said FAX messages in a memory means according to said pre-selected priority associated with said dummy numbers matching said recipient's phone number, retrieving said FAX messages at a preselected time associated with said pre-selected priority, and providing said FAX messages with recipient's actual telephone number to said FAX modem for transmission.

6. A control system as in claim 5 wherein said pre-selected priority comprises a system of three dummy numbers assigned to each one of said regular correspondents, a first dummy number for high priority, a second dummy number for medium priority, and a third dummy number for low priority, and wherein high priority

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messages are transmitted immediately, medium priority messages are transmitted once per hour, and low priority messages are transmitted once in 24 hours.

7. A control system as in claim 5 further comprising a programming interface whereby an administrator may amend priority levels and transmission times, and may also amend assignment of dummy numbers.

8. A method of sending FAX messages in prioritized batches to regular correspondents at pre-selected times associated with specific levels of priority, comprising steps of:

assigning dummy telephone numbers to each of said regular correspondents, said dummy telephone numbers indicating specific levels of priority;

composing a FAX message on a composition program and assigning one of said dummy telephone numbers to the FAX message;

sending said FAX message to a FAX modem for transmission;

intercepting said FAX message before transmission and storing said FAX message in a digital storage location assigned for said dummy number;

retrieving said FAX message from said digital storage location at said pre-selected time associated with said specific level of priority;

substituting the real telephone number of said regular correspondent for said dummy telephone number; and transmitting said FAX message by said FAX modem.

9. The method of claim 8 wherein said FAX modem is associated with a FAX server node on a LAN and said FAX message is composed at another node on the LAN.

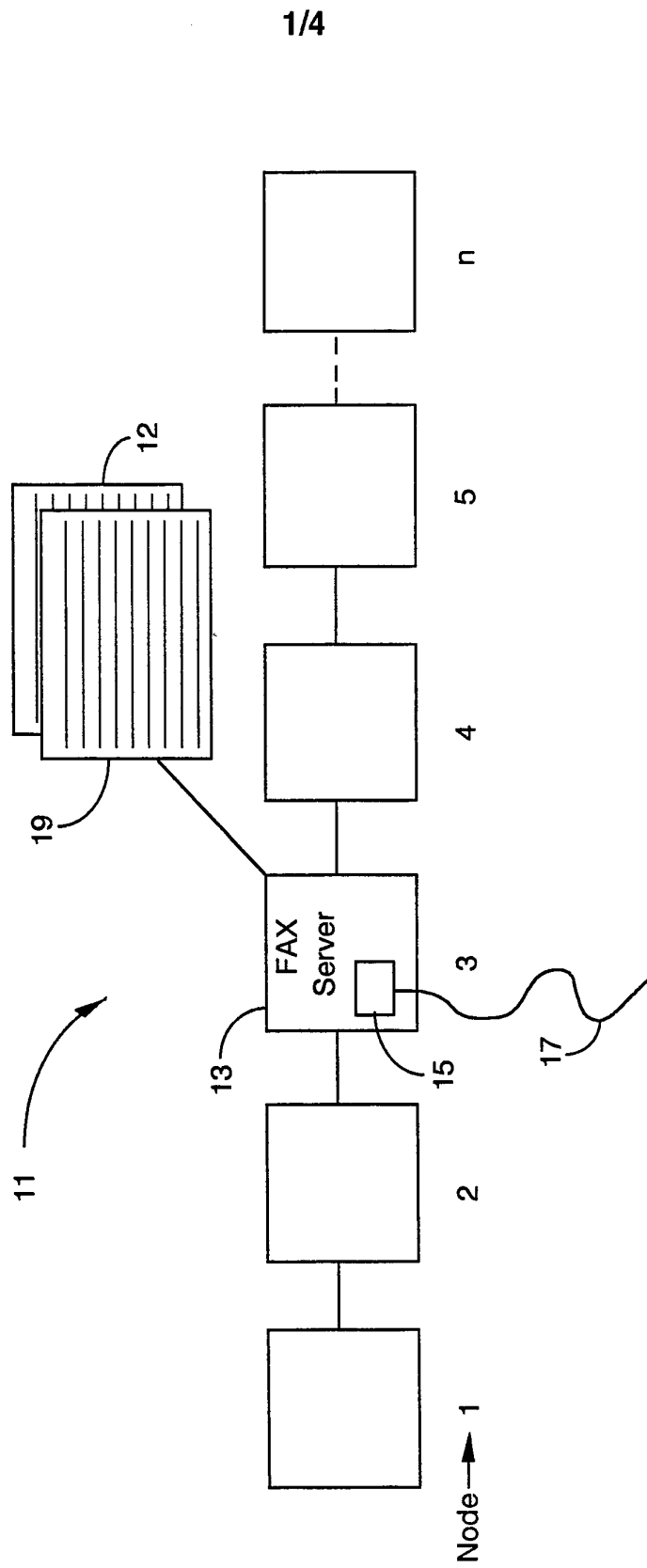


Fig. 1

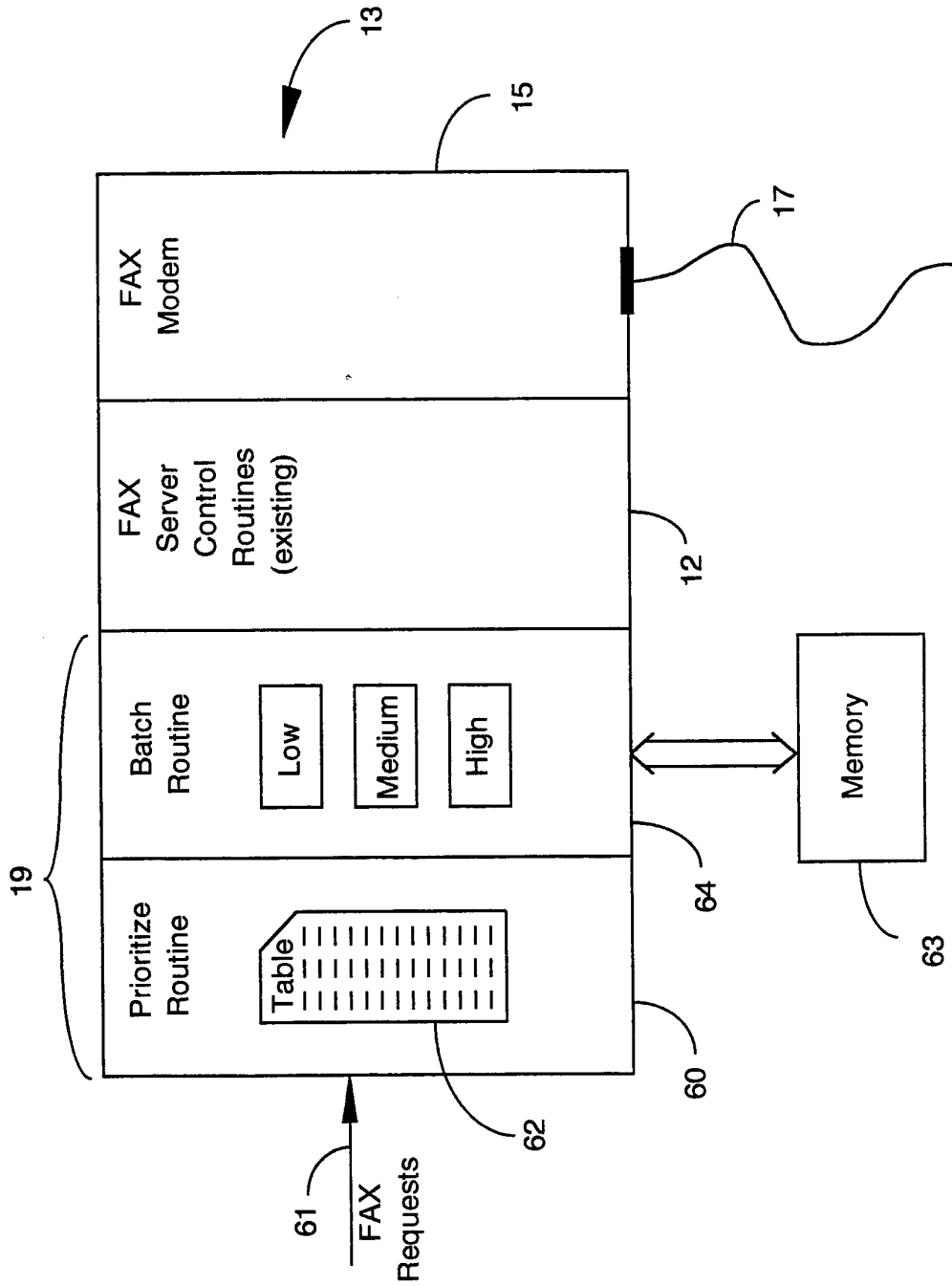


Fig. 2

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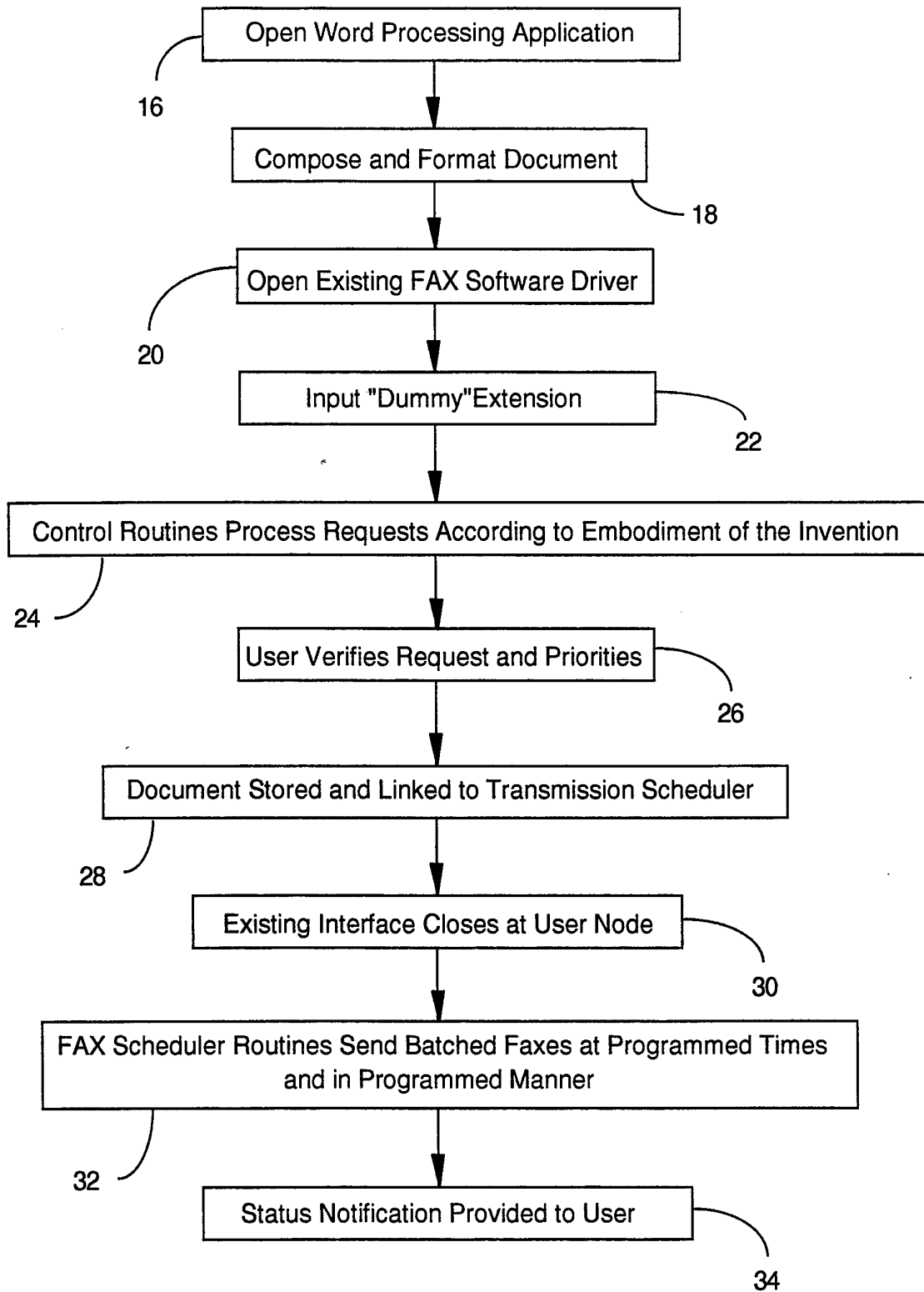


Fig. 3

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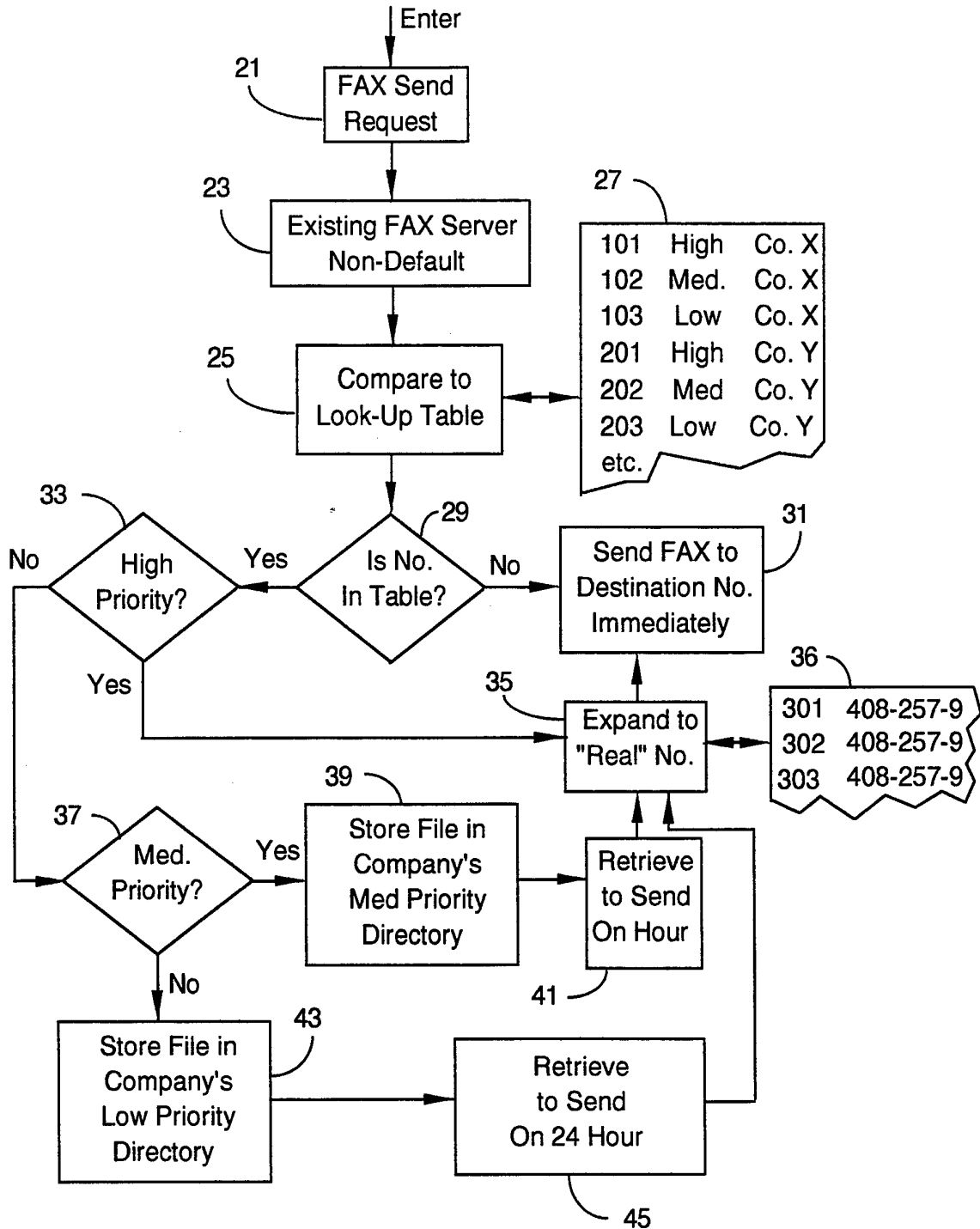


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US94/06813

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :H04M 11/00; H04N 1/32.
US CL : 379/100.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/93,94,96-100, 67,88,89,208; 358/400,402,403,407,434,438,440,442,468; 370/61.

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP, A, 0 527 502 (OKADA et al) 17 February 1993, see entire document.	1-9
Y	US, A, 4,994,926 (GORDON et al) 19 February 1991, see col. 11, lines 35-49.	1-9
Y	US, A, 5,027,386 (HISANO) 25 June 1991, see abstract.	2,5,9

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

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