PTO/SB/05 (modified)

UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	47242-00027USC1
First Inventor	ALex Kurganov
Title	Robust Voice Browser System and Voice Activated Device Controller
Express Mail Label No.	EV 284714429 US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. ☒ Fee Transmittal Form (e.g., PTO/SB/17) *(Submit an original, and a duplicate for fee processing)*
2. ☒ Applicant claims small entity status. See 37 CRF 1.27.
3. ☒ Specification [*Total Pages* 34] *(preferred arrangement set forth below)*
   - Descriptive title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to sequence listing, a table, or a computer program listing appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings (*if filed*)
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
4. ☒ Drawing(s) *(35 USC 113)* [*Total Sheets* 4]
5. Oath or Declaration [*Total Sheets* 4]
   a. ☐ Newly executed (original or copy)
   b. ☒ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 18 completed)*
      i. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☐ Application Data Sheet. See 37 CFR 1.76

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7. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (*Appendix*)
8. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   a. ☐ Computer Reader Form (CRF)
   b. Specification Sequency Listing on:
      i. ☐ CD ROM or CD-R (2 copies); or
      ii. ☐ Paper
   c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. ☐ Assignment Papers (cover sheet & document(s))
10. ☐ 37 CFR 3.73(b) Statement *(when there is an assignee)* ☐ Power of Attorney
11. ☐ English Translation Document (*if applicable*)
12. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
13. ☐ Preliminary Amendment
14. ☐ Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
15. ☐ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
16. ☐ Nonpublication Request under 35 U.S.C. 122 (b)(2)(B)(i). Applicant must attach form PTO/SB/35 or its equivalent.
17. ☒ Other: Check for $335.00

18. If a CONTINUING APPLICATION, *check appropriate box and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: 09/776,996

Prior application information: *Examiner* Susan McFadden *Art Unit:* 2641

For CONTINUATION OF DIVISIONAL APPS only; The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted appplication parts.

19. CORRESPONDENCE ADDRESS

☒ *Customer Number or Bar Code Label* **30223** *(Insert Customer No. or Attach bar code label here)* OR ☐ *Correspondence address below*

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Name (Print/Type)	Russell J. Genet	*Registration No. (Attorney/Agent)*	42,571		
Signature	Russell J. Genet			*Date*	April 9, 2004

This collection of information is required by 37 CFR 1.53(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Mail Stop Patent Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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FEE TRANSMITTAL for FY 2004

Effective 01/01/2003. Patent fees are subject to annual revision.

☒ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 385.00

Complete if Known	
Application Number	Unknown
Filing Date	April 9, 2004
First Named Inventor	Alex Kurganov
Examiner Name	Unknown
Art Unit	Unknown
Attorney Docket No.	47242-00027USC1

METHOD OF PAYMENT *(check all that apply)*

☒ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☐ Deposit Account:

Deposit Account Number: **10-0447/47242-00027USC1**

Deposit Account Name: **Jenkens & Gilchrist**

The Commissioner is authorized to: *(check all that apply)*

☐ Charge fee(s) indicated below ☐ Credit any overpayments

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	770	2001	385	Utility filing fee	385.00
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($) 385.00

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims	Fee from below	Fee Paid
Total Claims	17	- 20** =	x	= 0.00
Independent Claims	1	- 3** =	x	= 0.00
Multiple Dependent				=

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0.00

***or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for ex *parte reexamination*	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37 CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify) _____

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($)

SUBMITTED BY				Complete (if applicable)	
Name (Print/Type)	Russell J. Genet	*Registration No. (Attorney/Agent)*	42,571	*Telephone*	312/425-8516
Signature				*Date*	APRIL 9, 2004

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Patent Application
Docket No.: 47242-00027USC1
Customer Number 30223

APPLICATION FOR UNITED STATES LETTERS PATENT

for

ROBUST VOICE BROWSER SYSTEM AND

VOICE ACTIVATED DEVICE CONTROLLER

INVENTORS:

Alexander Kurganov

Valery Zhukoff

EXPRESS MAIL MAILING LABEL

NUMBER: EV 284714429 US

DATE: April 9, 2004

I hereby certify that this paper or fee is being deposited with the United States Postal Service "EXPRESS MAIL POST OFFICE TO ADDRESSEE" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to: MS Patent Application, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Maureen Hammonds

Patent Application
Docket No.: 47242-00027USC1
Customer Number 30223

ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER

CROSS-REFERENCE TO RELATED APPLICATIONS

[001] This application is a continuation of U.S. Patent Application No. 09/776,996, filed February 5, 2001, now allowed, which claims priority to U.S. Provisional Application Serial No. 60/180,344, filed February 4, 2000 entitled "Voice-Activated Information Retrieval System" and U.S. Provisional Application Serial No. 60/233,068, filed September 15, 2000 entitled "Robust Voice Browser System and Voice Activated Device Controller" and these applications are incorporated by reference in their entirety into the present application.

FIELD OF THE INVENTION

[002] The present invention relates to a robust and highly reliable system that allows users to browse web sites and retrieve information by using conversational voice commands. Additionally, the present invention allows users to control and monitor other systems and devices that are connected the Internet or any other network by using voice commands.

BACKGROUND OF THE INVENTION

[003] Currently, three options exist for a user who wishes to gather information from a web site accessible over the Internet. The first option is to use a desktop or a laptop computer connected to a telephone line via a modem or connected to a network with Internet access. The second option is to use a Personal Digital Assistant (PDA) that has the capability of connecting to the Internet either through a modem or a wireless connection. The third option is to use one of the newly designed web-phones or web-pagers that are now being offered on the market. Although each of these options provide a user with access to the Internet to browse web sites, each of them have their own drawbacks.

[004] Desktop computers are very large and bulky and are difficult to transport. Laptop computers solve this inconvenience, but many are still quite heavy and are inconvenient to carry. Further, laptop computers cannot be carried and used everywhere a user travels. For instance, if a user wishes to obtain information from a remote location where no electricity or communication lines are installed, it would be nearly impossible to use a laptop computer. Oftentimes, information is needed on an immediate basis where a computer is

not accessible. Furthermore, the use of laptop or desktop computers to access the Internet requires either a direct or a dial-up connection tan an Internet Service Provider (ISP). Oftentimes, such connections are not available when a user desires to connect to the Internet to acquire information.

[005] The second option for remotely accessing web sites is the use of PDAs. These devices also have their own set of drawbacks. First, PDAs with the ability to connect to the Internet and access web sites are not readily available. As a result, these PDAs tend to be very expensive. Furthermore, users are usually required to pay a special service fee to enable the web browsing feature of the PDA. A further disadvantage of these PDAs is that web sites must be specifically designed to allow these devices to access information on the web site. Therefore, a limited number of web sites are available that are accessible by these web-enabled PDAs. Finally, it is very common today for users to carry cell phones, however, users must also carry a separate PDA if they require the ability to gather information from various web sites. Users are therefore subjected to added expenses since they must pay for both cellular telephone service and also for the web-enabling service for the PDA. This results in a very expensive alternative for the consumer.

[006] The third alternative mentioned above is the use of web-phones or web-pagers. These devices suffer many of the same drawbacks as PDAs. First, these devices are expensive to purchase. Further, the number of web sites accessible to these devices is limited since web sites must be specifically designed to allow access by these devices. Furthermore, users are often required to pay an additional fee in order to gain wireless web access. Again, this service is expensive. Another drawback of these web-phones or web-pagers is that as technology develops, the methods used by the various web sites to allow access by these devices may change. These changes may require users to purchase new web-phones or web-pagers or have the current device serviced in order to upgrade the firmware or operating system stored within the device. At the least, this would be inconvenient to users and may actually be quite expensive.

[007] Therefore, a need exists for a system that allows users to easily access and browse the Internet from any location. Such a system would only require users to have access to any type of telephone and would not require users to subscribe to multiple services.

[008] In the rapidly changing area of Internet applications, web sites change frequently. The design of the web site may change, the information required by the web site in order to

perform searches may change, and the method of reporting search results may change. Web browsing applications that submit search requests and interpret responses from these web sites based upon expected formats will produce errors and useless responses when such changes occur. Therefore, a need exists for a system that can detect modifications to web sites and adapt to such changes in order to quickly and accurately provide the information requested by a user through a voice enabled device, such as a telephone.

[009] When users access web sites using devices such as personal computers, delays in receiving responses are tolerated and are even expected, however, such delays are not expected when a user communicates with a telephone. Users expect communications over a telephone to occur immediately with a minimal amount of delay time. A user attempting to find information using a telephone expects immediate responses to his search requests. A system that introduces too much delay between the time a user makes a request and the time of response will not be tolerated by users and will lose its usefulness. Therefore, it is important that a voice browsing system that uses telephonic communications selects web sites that provide rapid responses since speed is an important factor for maintaining the system's desirability and usability. Therefore, a need exists for a system that accesses web sites based upon their speed of operation.

SUMMARY OF THE INVENTION

[0010] It is an object of an embodiment of the present invention to allow users to gather information from web sites by using voice enabled devices, such as wireline or wireless telephones.

[0011] An additional object of an embodiment of the present invention is to provide a system and method that allows the searching and retrieving of publicly available information by controlling a web browsing server using naturally spoken voice commands.

[0012] It is an object of another embodiment of the present invention to provide a robust voice browsing system that can obtain the same information from several web sites based upon a ranking order. The ranking order is automatically adjusted if the system detects that a given web site is not functioning, is too slow, or has been modified in such a way that the requested information cannot be retrieved any longer.

[0013] A still further object of an embodiment of the present invention is to allow users to gather information from web sites from any location where a telephonic connection can be

made.

[0014] Another object of an embodiment of the present invention is to allows users to browse web sites on the Internet using conversational voice commands spoken into wireless or wireline telephones or other voice enabled devices.

[0015] An additional object an embodiment of the present invention is to provide a system and method for using voice commands to control and monitor devices connected to a network.

[0016] It is an object of an embodiment of the present invention to provide a system and method which allows devices connected to a network to be controlled by conversational voice commands spoken into any voice enabled device interconnected with the same network.

[0017] The present invention relates to a system for acquiring information from sources on a network, such as the Internet. A voice browsing system maintains a database containing a list of information sources, such as web sites, connected to a network. Each of the information sources is assigned a rank number which is listed in the database along with the record for the information source. In response to a speech command received from a user, a network interface system accesses the information source with the highest rank number in order to retrieve information requested by the user.

[0018] The a preferred embodiment of the present invention allows users to access and browse web sites when they do not have access to computers with Internet access. This is accomplished by providing a voice browsing system and method that allows users to browse web sites using conversational voice commands spoken into any type of voice enabled device (i.e., any type of wireline or wireless telephone, IP phone, wireless PDA, or other wireless device). These spoken commands are then converted into data messages by a speech recognition software engine running on a user interface system. These data messages are then sent to and processed by a network interface system. This network interface system then generates the proper requests that are transmitted to the desired web site over the Internet. Responses sent from the web site are received and processed by the network interface system and then converted into an audio message via a speech synthesis engine or a pre-recorded audio concatenation application and finally transmitted to the user's voice enabled device.

[0019] A preferred embodiment of the voice browser system and method uses a web site

polling and ranking methodology that allows the system to detect changes in web sites and adapt to those changes in real-time. This enables the voice browser system of a preferred embodiment to deliver highly reliable information to users over any voice enabled device. This ranking system also enables the present invention to provide rapid responses to user requests. Long delays before receiving responses to requests are not tolerated by users of voice-based systems, such as telephones. When a user speaks into a telephone, an almost immediate response is expected. This expectation does not exist for non-voice communications, such as email transmissions or accessing a web site using a personal computer. In such situations, a reasonable amount of transmission delay is acceptable. The ranking system of implemented by a preferred embodiment of the present invention ensures users will always receive the fastest possible response to their request.

[0020] An alternative embodiment of the present invention allows users to control and monitor the operation of a variety of household devices connected to a network using speech commands spoken into a voice enabled device.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] FIG. 1 is a depiction of the voice browsing system of the first embodiment of the present invention;

[0022] FIG. 2 is a block diagram of a database record used by the first preferred embodiment of the present invention;

[0023] FIG. 3 is a block diagram of a media server used by the preferred embodiment;

[0024] FIG. 4 is a block diagram of a web browsing server used by the preferred embodiment; and

[0025] FIG. 5 is a depiction of the device browsing system of the second embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0026] A first embodiment of the present invention is a system and method for allowing users to browse information sources, such as web sites, by using naturally spoken, conversational voice commands spoken into a voice enabled device. Users are not required to learn a

special language or command set in order to communicate with the voice browsing system of the present invention. Common and ordinary commands and phrases are all that is required for a user to operate the voice browsing system. The voice browsing system recognizes naturally spoken voice commands and is speaker-independent; it does not have to be trained to recognize the voice patterns of each individual user. Such speech recognition systems use phonemes to recognize spoken words and not predefined voice patterns.

[0027] The first embodiment allows users to select from various categories of information and to search those categories for desired data by using conversational voice commands. The voice browsing system of the first preferred embodiment includes a user interface system referred to as a media server. The media server contains a speech recognition software engine. This speech recognition engine is used to recognize natural, conversational voice commands spoken by the user and converts them into data messages based on the available recognition grammar. These data messages are then sent to a network interface system. In the first preferred embodiment, the network interface system is referred to as a web browsing server. The web browsing server then accesses the appropriate information source, such as a web site, to gather information requested by the user.

[0028] Responses received from the information sources are then transferred to the media server where speech synthesis engine converts the responses into audio messages that are transmitted to the user. A more detailed description of this embodiment will now be provided.

[0029] Referring to FIG. 1, a database 100 designed by Webley Systems Incorporated is connected to one or more web browsing servers 102 as well as to one or more media servers 106. The database may store information on magnetic media, such as a hard disk drive, or it may store information via other widely acceptable methods for storing data, such as optical disks. The database 100 contains a separate set of records for each web site accessible by the system. An example of a web site record is shown in FIG. 2. Each web site record 200 contains the rank number of the web site 202, the associated Uniform Resource Locator (URL) 204, and a command that enables the appropriate "extraction agent" 206 that is required in order to generate proper requests sent to and to format data received from the web site. The database record 200 also contains the timestamp 208

indicating the last time the web site was accessed. The extraction agent is described in more detail below. The database 100 categorizes each database record 200 according to the type of information provided by each web site. For instance, a first category of database records 200 may correspond to web sites that provide "weather" information. The database 100 may also contain a second category of records 200 for web sites that provide "stock" information. These categories may be further divided into subcategories. For instance, the "weather" category may contain subcategories depending upon type of weather information available to a user, such as "current weather" or "extended forecast". Within the "extended forecast" subcategory, a list of web site records may be stored that provide weather information for multiple days. The use of subcategories may allow the web browsing feature to provide more accurate, relevant, and up-to-date information to the user by accessing the most relevant web site. The number of records contained in each category or subcategory is not limited. In the preferred embodiment, three web site records are provided for each category.

[0030] Table 1 below depicts two database records 200 that are used with the preferred embodiment. These records also contain a field indicating the "category" of the record, which is "weather" in each of these examples.

TABLE 1

```
category:   weather
URL:  URL=http://cgi.cnn.com/cgi-
bin/weather/redirect?zip=_zip
rank:   1
command:    web_dispatch.pl weather_cnn
browsingServer:  wportal1
browsingServerBackup:   wportal2
dateTime:  Dec 21 2000  2:15PM


category: weather
URL:  URL=http://weather.lycos.com/wcfiveday.asp?city=zip
rank:       2
command:  web_dispatch.pl weather_lycos
browsingServer:  wportal1
browsingServerBackup:   wportal2
dateTime:  Dec 21 2000  1:45PM
```

[0031] The database also contains a listing of pre-recorded audio files used to create

concatenated phrases and sentences. Further, database 100 may contain customer profile information, system activity reports, and any other data or software servers necessary for the testing or administration of the voice browsing system.

[0032] The operation of the media servers 106 will now be discussed in relation to FIG. 3. The media servers 106 function as user interface systems. In the preferred embodiment, the media servers 106 contain a speech recognition engine 300, a speech synthesis engine 302, an Interactive Voice Response (IVR) application 304, a call processing system 306, and telephony and voice hardware 308 required to communicate with the Public Switched Telephone Network (PSTN) 116. In the preferred embodiment, each media server is based upon Intel's Dual Pentium III 730 MHz microprocessor system.

[0033] The speech recognition function is performed by a speech recognition engine 300 that converts voice commands received from the user's voice enabled device 112 (i.e., any type of wireline or wireless telephone, Internet Protocol (IP) phones, or other special wireless units) into data messages. In the preferred embodiment, voice commands and audio messages are transmitted using the PSTN 116 and data is transmitted using the TCP/IP communications protocol. However, one skilled in the art would recognize that other transmission protocols may be used for either voice or data. Other possible transmission protocols would include SIP/VoIP (Session Initiation Protocol/Voice over IP), Asynchronous Transfer Mode (ATM) and Frame Relay. A preferred speech recognition engine is developed by Nuance Communications of 1380 Willow Road, Menlo Park, California 94025 (www.nuance.com). The Nuance engine capacity is measured in recognition units based on CPU type as defined in the vendor specification. The natural speech recognition grammars (i.e., what a user can say that will be recognized by the speech recognition engine) were developed by Webley Systems.

[0034] Table 2 below provides a partial source code listing of the recognition grammars used by the speech recognition engine of the preferred embodiment for obtaining weather information.

TABLE 2

```
?WHAT_IS ?the weather ?[info information report conditions]
                ? ( (?like in )
                [
```

```
UScities:n
                {<param1 $n.zip> <param2  $n.city> <param3
                $n.state>}
                ( (area code) AREA_CODE:n ) {<param1 $n>}
                ( AREA_CODE:n (area code) ) {<param1 $n>}
                ( (zip ?code)  ZIP_CODE:n )  {<param1 $n>}
                ( ZIP_CODE:n (zip ?code) )  {<param1 $n>}
                ]
                )

                                ) {<menu 194>}
```

[0035] The media server 106 uses recognition results generated by the speech recognition engine 300 to retrieve a web site record 200 stored in the database 100 that can provide the information requested by the user. The media server 106 processes the recognition result data identifying keywords that are used to search the web site records 200 contained in the database 100 For instance, if the user's request was "What is the weather in Chicago?", the keywords "weather" and "Chicago" would be recognized. A web site record 200 with the highest rank number from the "weather" category within the database 100 would then be selected and transmitted to the web browsing server 102 along with an identifier indicating that Chicago weather is being requested.

[0036] The media servers 106 also contain a speech synthesis engine 302 that converts the data retrieved by the web browsing servers 102 into audio messags that are transmitted to the user's voice enabled device 112. A preferred speech synthesis engine is developed by Lernout and Hauspie Speech Products, 52 Third Avenue, Burlington, Massachusetts 01803 (www.lhsl.com).

[0037] A further description of the web browsing server 102 will be provided in relation to FIG. 4. The web browsing servers 102 provide access to any computer network such as the Internet 110. These servers are also capable of accessing databases stored on Local Area Networks (LANs) or Wide Area Networks (WANs). The web browsing servers receive responses from web sites and extract the data requested by the user. This task is also known as "content extraction." The web browsing servers 102 also perform the task of periodically polling or "pinging" various web sites and modifying the ranking numbers of these web sites depending upon their response and speed. This polling feature is further discussed below. The web browsing server 102 is comprised of a content

extraction agent 400, a content fetcher 402, a polling and ranking agent 404, and the content descriptor files 406. Each of these are software applications and will be discussed below.

[0038] Upon receiving a web site record 200 from the database 100 in response to a user request, the web browsing server 102 invokes the "content extraction agent" command 206 contained in the record 200. The content extraction agent 400 allows the web browsing server 102 to properly format requests and read responses provided by the web site 114 identified in the URL field 204 of the web site record 200. Each content extraction agent command 206 invokes the content extraction agent and identifies a content description file associated with the web page identified by the URL 204. This content description the directs the extraction agent where to extract data from the accessed web page and how to format a response to the user utilizing that data. For example, the content description for a web page providing weather information would indicate where to insert the "city" name or ZIP code in order to retrieve Chicago weather information. Additionally, the content description file for each supported URL indicates the location on the web page where the response information is provided. The extraction agent 400 uses this information to properly extract from the web page the information requested by the user.

[0039] Table 3 below contains source code for a content extraction agent 400 used by the preferred embodiment.

TABLE 3

```
#!/usr/local/www/bin/sybperl5
#$Header:
/usr/local/cvsroot/webley/agents/service/web_dispatch.pl,v
1.6
# Dispatches all web requests

#http://wcorp.itn.net/cgi/flstat?carrier=ua&flight_no=155&mo
n_abbr=jul&date=
6&stamp=OhLN~PdbuuE*itn/ord,itn/cb/sprint_hd
#http://cgi.cnnfn.com/flightview/rlm?airline=amt&number=300

require "config_tmp.pl";

# check parameters
die "Usage: $0 service [params]\n" if $#ARGV < 1;
#print STDERR @ARGV;
```

```
# get parameters
my ( $service, @param ) = @ARGV;

# check service
my %Services = (
                    weather_cnn => 'webget.pl weather_cnn',
                    weather_lycos => 'webget.pl
weather_lycos',
                    weather_weather => 'webget.pl
weather_weather',
                    weather_snap => 'webget.pl
weather_snap',
                    weather_infospace => 'webget.pl
weather_infospace',
                    stockQuote_yahoo => 'webget.pl stock',
                    flightStatus_itn => 'webget.pl
flight_delay',
                    yellowPages_yahoo => 'yp_data.pl',
                    yellowPages_yahoo => 'yp_data.pl',
                    newsHeaders_newsreal => 'news.pl',
                    newsArticle_newsreal => 'news.pl',
                    );
# test param
my $date = `date`;
chop( $date );
my ( $short_date ) = $date =~ /\s+(\w{3}\s+\d{1,2})\s+/;
my %Test = (
                    weather_cnn => '60053',
                    weather_lycos => '60053',
                    weather_weather => '60053',
                    weather_snap => '60053',
                    weather_infospace => '60053',
                    stockQuote_yahoo => 'msft',
                    flightStatus_itn => 'ua 155 ' .
$short_date,
                    yellowPages_yahoo => 'tires 60015',
                    newsHeaders_newsreal => '1',
                    newsArticle_newsreal => '1 1',
                    );
die "$date: $0: error: no such service: $service (check this
script)\n"
unless $Services{$service };

# prepare absolute path to run other scripts
my ( $path, $script ) = $0 =~ m|^(.*/)([^/]*)|;

# store the service to compare against datatable
my $service_stored = $service;
```

```
# run service
while( !( $response = '$path$Services{$service }@param' ) )
{
     # response failed
     # check with test parameters
     $response = '$path$Services{$service }$Test{$service
}';
#    print "test: $path$Services{$service }$Test{$service
}";
     if ( $response ) {
          $service = &switch_service( $service );
#         print "Wrong parameter values were supplied:
$service -
@param\n";
#         die "$date: $0: error: wrong parameters: $service
-
@param\n";
     }
     else {
          # change priority and notify
          $service = &increase_attempt( $service );
     }
}

# output the response
print $response;

sub increase_attempt {
     my ( $service ) = @_;
     my ( $service_name ) = split( /_/, $service );
     print STDERR "$date: $0: attn: changing priority for
service:
$service\n";
     # update priority
     &db_query( "update mcServiceRoute "
                    . "set priority = ( select max( priority )
from
mcServiceRoute "
                    . "where service = '$service_name' ) + 1,
"
                    . "date = getdate(), "
                    . "attempt = attempt + 1 "
                    . "where route = '$script $service'" );
#    print "---$route===\n";
     # find new route
     my $route = @{&db_query( "select route from
mcServiceRoute "
                                        . "where service =
'$service_name' "
                                        . "and attempt < 5
```

```
"
                                        . "order by
priority ")
                        }-> [ 0 ]{route };
     &db_query( "update mcServiceRoute "
                  . "set attempt = 0 "
                  . "where route = '$script $service'" )
          if ( $route eq "$script $service"
                or $route eq "$script $service_stored" );
     ( $service_name, $service ) = split( /\s+/, $route );
     die "$date: $0: error: no route for the service:
$service (add
more)\n"
          unless $service;
     return $service;
}
sub switch_service {
     my ( $service ) = @_;
     my ( $service_name ) = split( /_/, $service );
     print STDERR "$date: $0: attn: changing priority for
service:
$service\n";
     # update priority
     &db_query( "update mcServiceRoute "
                  . "set priority = ( select max( priority )
from
mcServiceRoute "
                  . "where service = '$service_name' ) + 1,
"
                  . "date = getdate() "
                  . "where route = '$script $service'" );
#    print "---$route===\n";
     # find new route
     my $route = @{&db_query( "select route from
mcServiceRoute "
                                        . "where service =
'$service_name' "
                                        . "and attempt < 5
"
                                        . "order by
priority ")
                        }-> [ 0 ]{route };
     die "$date: $0: error: there is the only service:
$route (add
more)\n"
          if ( $route eq "$script $service"
                or $route eq "$script $service_stored" );
     ( $service_name, $service ) = split( /\s+/, $route );
     die "$date: $0: error: no route for the service:
$service (add
```

```
more)\n"
          unless $service;
     return $service;
}     _
```

[0074] Table 4 below contains source code of the content fetcher 402 used with the content extraction agent 400 to retrieve information from a web site.

TABLE 4

```
#!/usr/local/www/bin/sybperl5
#-T
# -w
# $Header:
/usr/local/cvsroot/webley/agents/service/webget.pl,v 1.4
# Agent to get info from the web.
# Parameters: service_name [service_parameters], i.e. stock
msft or weather
60645
# Configuration stored in files service_name.ini
# if this file is absent the configuration is received from
mcServices table
# This script provides autoupdate to datatable if the .ini
file is newer.

$debug = 1;
use URI::URL;
use LWP::UserAgent;
use HTTP::Request::Common;
use Vail::VarList;
use Sybase::CTlib;
use HTTP::Cookies;
#print "Sybase::CTlib $DB_USR, $DB_PWD, $DB_SRV;";
open( STDERR, ">>$0.log" ) if $debug;
#open( STDERR, ">&STDOUT" );
$log = `date`;
#$response = `./url.pl
"http://cgi.cnn.com/cgi-bin/weather/redirect?zip=60605"`;
#$response = `pwd`;
#print STDERR "pwd = $response\n";
#$response = `ls`;
#print STDERR "ls = $response\n";
chop( $log );
$log .= "pwd=" . `pwd`;
chop( $log );

#$debug2 = 1;
```

```
my $service = shift;
$log .= " $service: ". join( ':', @ARGV ) . "\n";
print STDERR $log if $debug;
#$response = `./url.pl
"http://cgi.cnn.com/cgi-bin/weather/redirect?zip=60605"`;
my @ini = &read_ini( $service );
chop( @ini );
my $section = "";
do {$section = &process_section( $section ) }while $section;
#$response = `./url.pl
"http://cgi.cnn.com/cgi-bin/weather/redirect?zip=60605"`;
exit;
############################################################
sub read_ini {
     my ( $service ) = @_;
     my @ini = ();
     # first, try to read file
     $0 =~ m|^(.*/)[^/]*|;
     $service = $1 . $service;
     if ( open( INI, "$service.ini" ) ) {
          @ini = ( <INI> );
          return @ini unless ( $DB_SRV );
          # update datatable
          my $file_time = time - int( ( -M "$service.ini" )
* 24 *
3600 );
#         print "time $file_time\n";
          my $dbh = new Sybase::CTlib $DB_USR, $DB_PWD,
$DB_SRV;
          unless ( $dbh ) {
               print STDERR "webget.pl: Cannot connect to
dataserver $DB_SRV:$DB_USR:$DB_PWD\n";
               return @ini;
          }
          my @row_refs = $dbh->ct_sql( "select lastUpdate
from
mcServices where service = '$service'", undef, 1 );
          if ( $dbh->{RC }== CS_FAIL ) {
               print STDERR "webget.pl: DB select from
mcServices
failed\n";
               return @ini;
          }
          unless ( defined @row_refs ) {
               # have to insert
               my ( @ini_escaped ) = map {
                    ( my $x = $_ ) =~ s/\'/\'\'/g;
                    $x;
               }@ini;
               $dbh->ct_sql( "insert mcServices values(
```

```
'$service',
'@ini_escaped', $file_time )" );
                if ( $dbh->{RC }== CS_FAIL ) {
                     print STDERR "webget.pl: DB insert to
mcServices failed\n";
                }
                return @ini;
           }
#          print "time $file_time:".$row_refs[ 0 ]-
>{'lastUpdate'
}."\n";
           if ( $file_time > $row_refs[ 0 ]->{'lastUpdate' })
{
                # have to update
                my ( @ini_escaped ) = map {
                     ( my $x = $_ ) =~ s/\'/\'\'/g;
                     $x;
                }@ini;
                $dbh->ct_sql( "update mcServices set config =
'@ini_escaped', lastUpdate = $file_time where service =
'$service'" );
                if ( $dbh->{RC }== CS_FAIL ) {
                     print STDERR "webget.pl: DB update to
mcServices failed\n";
                }
           }
           return @ini;
     }
     else {
           print STDERR "$0: WARNING: $service.ini n/a in " .
`pwd`
                . "Try to read DB\n";
     }
     # then try to read datatable
     die "webget.pl: Unable to find service $service\n"
unless ( $DB_SRV
);
     my $dbh = new Sybase::CTlib $DB_USR, $DB_PWD, $DB_SRV;
     die "webget.pl: Cannot connect to dataserver
$DB_SRV:$DB_USR:$DB_PWD\n" unless ( $dbh );
     my @row_refs = $dbh->ct_sql( "select config from
mcServices where
service = '$service'", undef, 1 );
     die "webget.pl: DB select from mcServices failed\n" if
$dbh->{RC }
== CS_FAIL;
     die "webget.pl: Unable to find service $service\n"
unless ( defined
@row_refs );
     $row_refs[ 0 ]->{'config' }=~ s/\n /\n\r/g;
```

```
     @ini = split( /\r/, $row_refs[ 0 ]->{'config' });
     return @ini;
}    -
##########################################################
sub process_section {
     my ( $prev_section ) = @_;
     my ( $section, $output, $content );
     my %Param;
     my %Content;
#    print"##################################\n";
     foreach ( @ini ) {
#         print;
#         chop;
          s/\s+$//;
          s/^\s+//;
          # get section name
          if ( /^\[(.*)\]/ ) {
#              print "$_: $section:$prev_section\n";
               last if $section;
               next if $1 eq "print";
#              next if $prev_section ne "" and $prev_section
ne $1;
               if ( $prev_section eq $1 ) {
                    $prev_section = "";
                    next;
               }
               $section = $1;
          }
          # get parameters
          push( @{$Param{$1 }}, $2 ) if $section and
/([^=]+)=(.*)/;
     }
#    print"++++++++++++++++++++++++++++++++\n";
     return 0 unless $section;
#    print "section $section\n";
     # substitute parameters with values
     map {$Param{URL }->[ 0 ] =~ s/$Param{Input }->[ $_
]/$ARGV[ $_
]/g
     }0 .. $#{$Param{Input }};

     # get page content
     ( $Content{'TIME' }, $content ) = &get_url_content(
${$Param{URL
}}[ 0 ] );

     # filter it
     map {
          if ( /\"([^\"]+)\"([^\"]*)\"/ or
/\/([^\/]+)\/([^\/]*)\// )
```

```
{
                my $out = $2; $content =~ s/$1/$out/g;
          }
     }@{$Param{"Pre-filter" }};

#print STDERR $content;
     # do main regular expression
     unless( @values = $content =~
/${$Param{Regular_expression }}[ 0
]/ ) {
          &die_hard( ${$Param{Regular_expression }}[ 0 ],
$content
);
          return $section;
     }

     %Content = map {( $Param{Output }->[ $_ ], $values[ $_
] )
     }0 .. $#{$Param{Output }};

     # filter it
     map {
          if ( /([^\"]+)\"([^\"]+)\"([^\"]*)\"/
               or /([^\/]+)\/([^\/]+)\/([^\/]*)\// ) {
                my $out = $3;
               $Content{$1 }=~ s/$2/$out/g;
          }
     }@{$Param{"Post-filter" }};

     # calculate it
     map {
          if ( /([^=]+)=(.*)/ ) {
               my $eval = $2;
               map {$eval =~ s/$_/$Content{$_ }/g
               }keys %Content;
            $Content{$1 }= eval( $eval );
          }

     }@{$Param{Calculate }};

     # read section [print]
    foreach $i ( 0 .. $#ini ) {
          next unless $ini[ $i ] =~ /^\[print\]/;
          foreach ( $i + 1 ..  $#ini ) {
             last if $ini[ $_ ] =~ /^\[.+\]/;
            $output .= $ini[ $_ ] . "\n";
          }
          last;
     }
```

```
     # prepare output
     map {$output =~ s/$_/$Content{$_ }/g
     }keys %Content;
     print $output;
     return 0;
}
##########################################################
sub get_url_content {
     my ( $url ) = @_;
     print STDERR $url if $debug;
#    $response = `./url.pl '$url'`;
     $response = `./url.pl '$url'`;
     return( $time - time, $response );
     my $ua = LWP::UserAgent->new;
     $ua->agent( 'Mozilla/4.0 [en] (X11; I; FreeBSD 2.2.8-
STABLE i386)'
);
#    $ua->proxy( ['http', 'https'],
'http://proxy.webley:3128/' );
#    $ua->no_proxy( 'webley', 'vail' );
     my $cookie = HTTP::Cookies->new;
     $ua->cookie_jar( $cookie );
     $url = url $url;
     print "$url\n" if $debug2;
     my $time = time;
     my $res = $ua->request( GET $url );
     print "Response: " . ( time - $time ) . "sec\n" if
$debug2;
     return( $time - time, $res->content );
}
##########################################################
sub die_hard {
     my( $re, $content ) = @_;
     my ( $re_end, $pattern );
     while( $content !~ /$re/ ) {
          if ( $re =~ s/(\([^\(\)]+\)[^\(\)]*$)// ) {
               $re_end = $1 . $re_end;
          }
          else {
               $re_end = $re;
               last;
          }
     }
     $content =~ /$re/;
     print STDERR "The regular expression did not match:\n
$re\n
Possible misuse:
$re_end:\n
Matched:
$&\n
```

```
Mismatched:
$'\n
" if $debug;
          if ( $debug ) {
               print STDERR "Content:\n $content\n" unless
$';
          }
}

#########################################################
```

[0075] Table 5 below contains the content descriptor file source code for obtaining weather information from the web site www.cnn.com that is used by the extraction agent 400 of the preferred embodiment.

TABLE 5

```
[cnn]
Input=_zip

URL=http://cgi.cnn.com/cgi-bin/weather/redirect?zip=_zip

Pre-filter="\n" "
Pre-filter="<[^<>]+>""
Pre-filter=/\s+/ /
Pre-filter="[\(\)\|]"!"

Output=_location
Output=first_day_name
Output=first_day_weather
Output=first_day_high_F
Output=first_day_high_C
Output=first_day_low_F
Output=first_day_low_C
Output=second_day_name
Output=second_day_weather
Output=second_day_high_F
Output=second_day_high_C
Output=second_day_low_F
Output=second_day_low_C
Output=third_day_name
Output=third_day_weather
Output=third_day_high_F
Output=third_day_high_C
Output=third_day_low_F
Output=third_day_low_C
Output=fourth_day_name
Output=fourth_day_weather
```

```
Output=fourth_day_high_F
Output=fourth_day_high_C
Output=fourth_day_low_F
Output=fourth_day_low_C
Output=undef
Output=_current_time
Output=_current_month
Output=_current_day
Output=_current_weather
Output=_current_temperature_F
Output=_current_temperature_C
Output=_humidity
Output=_wind
Output=_pressure
Output=_sunrise
Output=_sunset

Regular_expression=Author   (.+) Four Day Forecast
(\S+) (\S+) HIGH
(\S+) F (\S+) C LOW (\S+) F (\S+) C (\S+) (\S+) HIGH (\S+) F
(\S+) C LOW
(\S+) F (\S+) C (\S+) (\S+) HIGH (\S+) F (\S+) C LOW (\S+) F
(\S+) C (\S+)
(\S+) HIGH (\S+) F (\S+) C LOW (\S+) F (\S+) C (.+) Current
Conditions(.+)
!local!, (\S+) (\S+) (.+) Temp: (\S+) F, (\S+) C Rel.
Humidity: (\S+) Wind:
(.+) Pressure: (.+) Sunrise: (.+) Sunset: (.+) Related Links

Post-filter=_current_weather"p/"partly "
Post-filter=_current_weather"l/"little "
Post-filter=_current_weather"m/"mostly "
Post-filter=_current_weather"t-/"thunder "
Post-filter=_wind"N"North "
Post-filter=_wind"E"East "
Post-filter=_wind"S"South "
Post-filter=_wind"W"West "
Post-filter=_wind/mph/miles per hour/
Post-filter=_wind/kph!/kilometers per hour/
Post-filter=_wind"\s+!", "

[print]
Current weather in _location is _current_weather.
Temperature is _current_temperature_F Fahrenheit,
_current_temperature_C
Celsium.
Humidity is _humidity.
Wind from the _wind.
```

[0076] Table 6 below contains the content descriptor file source code for obtaining weather information from the web site www.lycos.com that is used by the extraction agent 400 of the preferred embodiment.

TABLE 6

```
[lycos]

Input=zip
Input=_city

URL=http://weather.lycos.com/wcfiveday.asp?city=zip

Pre-filter="\n" "
Pre-filter="</TD>"td"
Pre-filter="<!.*?->""
Pre-filter="<br>"_br_"
Pre-filter=/alt="/>alt=/
Pre-filter="<[^<>]+>""
Pre-filter=" " "
Pre-filter=/\s+/ /

Output=_location
Output=_current_weather
Output=_current_temperature_F
Output=_humidity
Output=_winddir
Output=_windspeed
Output=_windmeasure
Output=_pressure
Output=first_day_name
Output=second_day_name
Output=third_day_name
Output=fourth_day_name
Output=fifth_day_name
Output=first_day_weather
Output=second_day_weather
Output=third_day_weather
Output=fourth_day_weather
Output=fifth_day_weather
Output=first_day_high_F
Output=first_day_low_F
Output=second_day_high_F
Output=second_day_low_F
Output=third_day_high_F
Output=third_day_low_F
Output=fourth_day_high_F
Output=fourth_day_low_F
```

```
Output=fifth_day_high_F
Output=fifth_day_low_F
Output=_windkmh

Regular_expression=Guide My Lycos (.+) Click image to
enlarge
alt=([^"]+)"(?:.+) Temp: (\d+)(?:.+)F _br_ Humidity:
(\S+)(?:.+) Wind: (.+?)
_br_


Output=_current_temperature_C

Post-filter=_location"_br_""
Post-filter=_current_weather"p/"partly "
Post-filter=_current_weather"m/"mostly "
Post-filter=_current_weather"t-/"thunder "
Post-filter=_winddir"@" at "
Post-filter=_winddir/mph/miles per hour/
Post-filter=_wind/kph!/kilometers per hour/

Calculate=_current_temperature_C=int((_current_temperature_F
-32)*5/9)
Calculate=_windkmh=int(_windspeed*1.6)

[print]
The current weather in _location is _current_weather.
The current temperature is _current_temperature_F Farenheit
_current_temperature_C Celcius.
Humidity is _humidity.

Winds _winddir.
```

[0077] Once the web browsing server 102 accesses the web site specified in the URL 204 and retrieves the requested information, the information is forwarded to the media server 106. The media server uses the speech synthesis engine 302 to create an audio message that is then transmitted to the user's voice enabled device 112. In the preferred embodiment, each web browsing server 102 is based upon Intel's Dual Pentium III 730 MHz microprocessor system.

[0078] Referring to FIG. 1, the operation of the robust voice browser system will be described. A user establishes a connection between his voice enabled device 112 and a media server 106. This may be done using the Public Switched Telephone Network

(PSTN) 116 by calling a telephone number associated with the voice browsing system 118. Once the connection is established, the media server 106 initiates an interactive voice response (IVR) application 304. The IVR application plays audio messages to the user presenting a list of options, such as, "stock quotes", "flight status", "yellow pages", "weather", and "news". These options are based upon the available web site categories and may be modified as desired. The user selects the desired option by speaking the name of the option into the voice enabled device 112.

[0079] As an example, if a user wishes to obtain restaurant information, he may speak into his telephone the phrase "yellow pages". The IVR application would then ask the user what he would like to find and the user may respond by stating "restaurants". The user may then be provided with further options related to searching for the desired restaurant. For instance, the user may be provided with the following restaurant options, "Mexican Restaurants", "Italian Restaurants", or "American Restaurants". The user then speaks into the telephone 112 the restaurant type of interest. The IVR application running on the media server 106 may also request additional information limiting the geographic scope of the restaurants to be reported to the user. For instance, the IVR application may ask the user to identify the zip code of the area where the restaurant should be located. The media server 106 uses the speech recognition engine 300 to interpret the speech commands received from the user. Based upon these commands, the media server 106 retrieves the appropriate web site record 200 from the database 100. This record and any additional data, which may include other necessary parameters needed to perform the user's request, are transmitted to a web browsing server 102. A firewall 104 may be provided that separates the web browsing server 102 from the database 100 and media server 106. The firewall provides protection to the media server and database by preventing unauthorized access in the event the firewall for web browsing server 108 fails or is compromised. Any type of firewall protection technique commonly known to one skilled in the art could be used, including packet filter, proxy server, application gateway, or circuit-level gateway techniques.

[0080] The web browsing server 102 then uses the web site record and any additional data and executes the extraction agent 400 and relevant content descriptor file 406 to retrieve the requested information.

[0081] The information received from the responding web site 114 is then processed by

the web browsing server 102 according to the content descriptor file 406 retrieval by the extraction agent. This processed response is then transmitted to the media server 106 for conversion into audio messages using either the speech synthesis software 302 or selecting among a database of prerecorded voice responses contained within the database 100.

[0082] As mentioned above, each web site record contains a rank number 202 as shown in FIG. 2. For each category searchable by a user, the database 100 may list several web sites, each with a different rank number 202. As an example, three different web sites may be listed as searchable under the category of "restaurants". Each of those web sites will be assigned a rank number such as 1, 2, or 3. The site with the highest rank (i.e., rank = 1) will be the first web site accessed by a web browsing server 102. If the information requested by the user cannot be found at this first web site, then the web browsing server 102 will search the second ranked web site and so forth down the line until the requested information is retrieved or no more web sites left to check.

[0083] The web site ranking method and system of the present invention provides robustness to the voice browser system and enables it to adapt to changes that may occur as web sites evolve. For instance, the information required by a web site 114 to perform a search or the format of the reported response data may change. Without the ability to adequately monitor and detect these changes, a search requested by a user may provide an incomplete response, no response, or an error. Such useless responses may result from incomplete data being provided to the web site 114 or the web browsing server 102 being unable to recognize the response data messages received from the searched web site 114.

[0084] The robustness and reliability of the voice browsing system of the present invention is further improved by the addition of a polling mechanism. This polling mechanism continually polls or "pings" each of the sites listed in the database 100. During this polling function, a web browsing server 102 sends brief data requests or "polling digital data" to each web site listed in database 100. The web browsing server 102 monitors the response received from each web site and determines whether it is a complete response and whether the response is in the expected format specified by the content descriptor file 406 used by the extraction agent 400. The polled web sites that provide complete responses in the format expected by the extraction agent 400 have their ranking established based on their "response time". That is, web sites with faster

response times will be will be assigned higher rankings than those with slower response times. If the web browsing server 102 receives no response from the polled web site or if the response received is not in the expected format, then the rank of that web site is lowered. Additionally, the web browsing server contains a warning mechanism that generates a warning message or alarm for the system administrator indicating that the specified web site has been modified or is not responsive and requires further review.

[0085] Since the web browsing servers 102 access web sites based upon their ranking number, only those web sites that produce useful and error-free responses will be used by the voice browser system to gather information requested by the user. Further, since the ranking numbers are also based upon the speed of a web site in providing responses, only the most time efficient sites are accessed. This system assures that users will get complete, timely, and relevant responses to their requests. Without this feature, users may be provided with information that is not relevant to their request or may not get any information at all. The constant polling and re-ranking of the web sites used within each category allows the voice browser of the present invention to operate efficiently. Finally, it allows the voice browser system of the present invention to dynamically adapt to changes in the rapidly evolving web sites that exist on the Internet.

[0086] It should be noted that the web sites accessible by the voice browser of the preferred embodiment may use any type of mark-up language, including Extensible Markup Language (XML), Wireless Markup Language (WML), Handheld Device Markup Language (HDML), Hyper Text Markup Language (HTML), or any variation of these languages.

[0087] A second embodiment of the present invention is depicted in FIG. 5. This embodiment provides a system and method for controlling a variety of devices 500 connected to a network 502 by using conversational speech commands spoken into a voice enabled device 504 (i.e., wireline or wireless telephones, Internet Protocol (IP) phones, or other special wireless units). The networked devices may include various household devices. For instance, voice commands may be used to control household security systems, VCRs, TVs, outdoor or indoor lighting, sprinklers, or heating and air conditioning systems.

[0088] Each of these devices 500 is connected to a network 502. These devices 500 may contain embedded microprocessors or may be connected to other computer equipment

that allow the device 500 to communicate with network 502. In the preferred embodiment, the devices 500 appear as "web sites" connected to the network 502. This allows a network interface system, such as a device browsing server 506, a database 508, and a user interface system, such as a media server 510, to operate similar to the web browsing server 102, database 100 and media server 106 described in the first preferred embodiment above. A network 502 interfaces with one or more network interface systems, which are shown as device browsing servers 506 in FIG. 5. The device browsing servers perform many of the same functions and operate in much the same way as the web browsing servers 102 discuss above in the first preferred embodiment. The device browsing servers 506 are also connected to a database 508.

[0089] Database 508 lists all devices that are connected to the network 502. For each device 500, the database 508 contains a record similar to that shown in FIG. 2. Each record will contain at least a device identifier, which may be in the form of a URL, and a command to "content extraction agent" contained in the device browsing server 506. Database 508 may also include any other data or software necessary to test and administer the device browsing system.

[0090] The content extraction agent operates similarly to that described in the first embodiment. A device descriptor file contains a listing of the options and functions available for each of the devices 500 connected on the network 502. Furthermore, the device descriptor file contains the information necessary to properly communicate with the networked devices 500. Such information would include, for example, communication protocols, message formatting requirements, and required operating parameters.

[0091] The device browsing server 506 receives messages from the various networked devices 500, appropriately formats those messages and transmits them to one or more media servers 510 which are part of the device browsing system. The user's voice enabled devices 504 can access the device browsing system by calling into a media server 510 via the Public Switched Telephone Network (PSTN) 512. In the preferred embodiment, the device browsing server is based upon Intel's Dual Pentium III 730 MHz microprocessor system.

[0092] The media servers 510 act as user interface systems and perform the functions of natural speech recognition, speech synthesis, data processing, and call handling. The

media server 510 operates similarly to the media server 106 depicted in FIG. 3. When data is received from the device browser server 506, the media server 510 will convert the data into audio messages via a speech synthesis engine that are then transmitted to the voice enabled device of the user 504. Speech commands received from the voice enabled device of the user 504 are converted into data messages via a speech recognition engine running on the media server 510. A preferred speech recognition engine is developed by Nuance Communications of 1380 Willow Road, Menlo Park, California 94025 (www.nuance.com). A preferred speech synthesis engine is developed by Lernout and Hauspie Speech Products, 52 Third Avenue, Burlington, Massachusetts 01803 (www.lhsl.com). The media servers 510 of the preferred embodiment are based on Intel's Dual Pentium III 730 MHz microprocessor system. A specific example for using the system and method of this embodiment of the invention will now be given.

[0093] First, a user may call into a media server 510 by dialing a telephone number associated with an established device browsing system. Once the user is connected, the IUR application of the media server 510 will provide the user with a list of available systems that may be monitored or controlled based upon information contained in database 508.

[0094] For example, the user may be provided with the option to select "Home Systems" or "Office Systems". The user may then speak the command "access home systems". The media server 510 would then access the database 508 and provide the user with a listing of the home subsystems or devices 500 available on the network 502 for the user to monitor and control. For instance, the user may be given a listing of subsystems such as "Outdoor Lighting System", "Indoor Lighting System", "Security System", or "Heating and Air Conditioning System". The user may then select the indoor lighting subsystem by speaking the command "Indoor Lighting System". The IUR application would then provide the user with a set of options related to the indoor lighting system. For instance the media server 510 may then provide a listing such as "Dining Room", "Living Room", "Kitchen", or "Bedroom". After selecting the desired room, the IUR application would provide the user with the options to hear the "status" of the lighting in that room or to "turn on", "turn off", or "dim" the lighting in the desired room. These commands are provided by the user by speaking the desired command into the users voice enabled device 504. The media server 510 receives this command and translates it into a data

message. This data message is then forwarded to the device browsing server 506 which routes the message to the appropriate device 500.

[0095] The device browsing system 514 of this embodiment of the present invention also provides the same robustness and reliability features described in the first embodiment. The device browsing system 514 has the ability to detect whether new devices have been added to the system or whether current devices are out-of-service. This robustness is achieved by periodically polling or "pinging" all devices 500 listed in database 508. The device browsing server 506 periodically polls each device 500 and monitors the response. If the device browsing server 506 receives a recognized and expected response from the polled device, then the device is categorized as being recognized and in-service. However, if the device browsing server 506 does not receive a response from the polled device 500 or receives an unexpected response, then the device 500 is marked as being either new or out-of-service. A warning message or a report may then be generated for the user indicating that a new device has been detected or that an existing device is experiencing trouble.

[0096] Therefore, this embodiment allows users to remotely monitor and control any devices that are connected to a network, such as devices within a home or office. Furthermore, no special telecommunications equipment is required for users to remotely access the device browser system. Users may use any type of voice enabled device (i.e., wireline or wireless telephones, IP phones, or other wireless units) available to them. Furthermore, a user may perform these functions from anywhere without having to subscribe to additional services. Therefore, no additional expenses are incurred by the user.

[0097] The descriptions of the preferred embodiments described above are set forth for illustrative purposes and are not intended to limit the present invention in any manner. Equivalent approaches are intended to be included within the scope of the present invention. While the present invention has been described with reference to the particular embodiments illustrated, those skilled in the art will recognize that many changes and variations may be made thereto without departing from the spirit and scope of the present invention. These embodiments and obvious variations thereof are contemplated as falling within the scope and spirit of the claimed invention.

CLAIMS

1. A system for gathering information from information sources connected to a network by using speech commands indicating specific actions to be performed, said system comprising:

a voice enabled device employed by users to communicate speech commands indicating specific actions to be performed;

said speech commands comprising information requests selectable by the user;

a database operatively connected with a computer said database containing stored digital-form commands for operating said system;

a speaker-independent speech recognition device for receiving from users said speech commands indicating specific actions to be performed, said speaker-independent speech recognition device configured to convert said speech commands to data messages;

a computer operatively connected with said database and said speech recognition device and configured to match said data messages with said stored digital-form commands and configured to carry out the specific actions indicated by said speech commands;

said computer further configured to search information sources connected to a network to gather information from said information sources connected to said network in response to said information requests.

2. The system of claim 1 wherein said network is the Internet.

3. The system of claim 1 wherein said information sources are web sites.

4. The system of claim 1 wherein the said voice enabled device is a standard telephone, an IP telephone, a cellular phone, a PDA, a personal computer, a DVD player, a television or other video display device, a CD player, a MP3 player, or any other device capable of audio playing an audio signal.

5. The system of claim 1 wherein said speaker-independent speech recognition device analyzes phonemes to recognize said speech commands.

6. The system of claim 1 wherein said speaker-independent speech recognition device recognizes naturally spoken speech commands.

7. The system of claim 1 wherein said database contains a stored list of said information sources connected to said network.

8. The system of claim 7 wherein said computer is further configured to periodically search said information sources contained in said stored list and also configured to assign ranks to said information sources to reflect the results of said periodic search.

9. The system of claim 7 wherein said computer is further configured to periodically search said network to identify new information sources and to add said new information sources to said stored list.

10. The system of claim 9 wherein said computer is further configured to periodically search said information sources contained in said stored list and also configured to assign ranks to said information sources to reflect the results of said periodic search.

11. The system of claim 8 wherein said ranks are established or modified based upon utility considerations of said information sources.

12. The system of claim 11 wherein said utility considerations comprise one or more of the following list: functionality of said information sources, speed of said information sources, or changes to said information sources that lower its utility for a specific information request.

13. The system in claim 8 wherein said computer searches said information sources with the highest rank in order to retrieve said information requested by said user.

14. The system of claim 1 wherein said information gathered by said system from said information sources in response to said information requests is stored by said

database and processed by said computer into a message, said system further configured to transmit said message to said voice enabled device or such other destination as designated by said user.

15. The system of claim 14 wherein said message is an audio message.

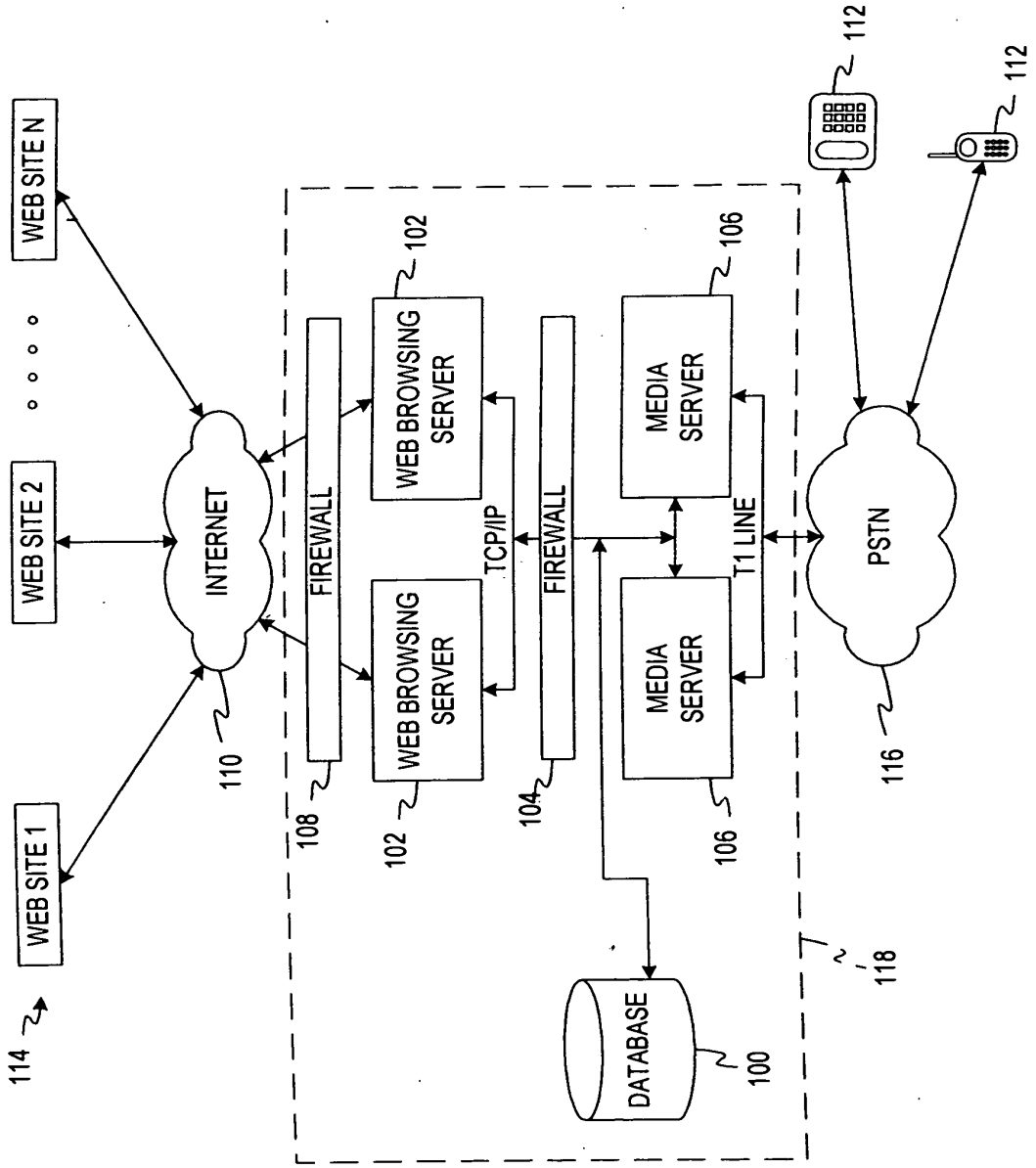
16. The system of claim 15 further comprising a speech synthesis engine configured to create said audio message.

17. The system of claim 15 further comprising a pre-recorded audio concatenation application configured to create said audio message.

ABSTRACT OF THE DISCLOSURE

The present invention relates to a system for acquiring information from sources on a network, such as the Internet. A voice browsing system maintains a database containing a list of information sources, such as web sites, connected to a network. Each of the information sources is assigned a rank number which is listed in the database along with the record for the information source. In response to a speech command received from a user, a network interface system accesses the information source with the highest rank number in order to retrieve information requested by the user.

FIG. 1


WEB SITE N
WEB SITE 2
WEB SITE 1
INTERNET
FIREWALL
WEB BROWSING SERVER
WEB BROWSING SERVER
TCP/IP
FIREWALL
MEDIA SERVER
MEDIA SERVER
T1 LINE
PSTN
DATABASE
110
108
102
102
104
106
106
112
112
116
118
100
114

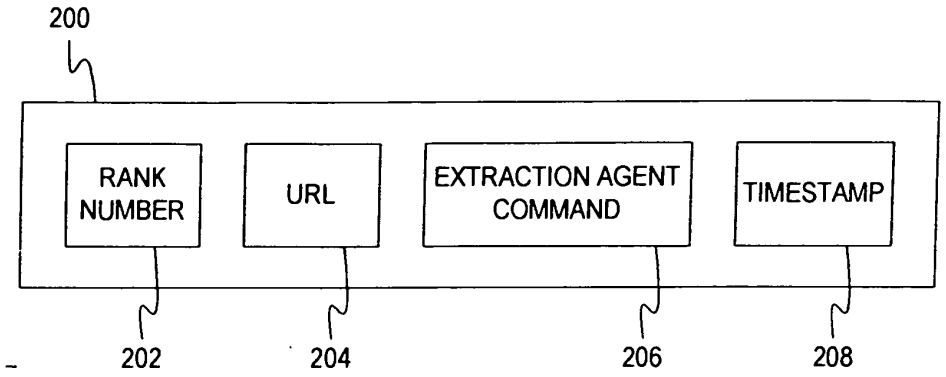

200
RANK NUMBER
URL
EXTRACTION AGENT COMMAND
TIMESTAMP
202
204
206
208

FIG. 2

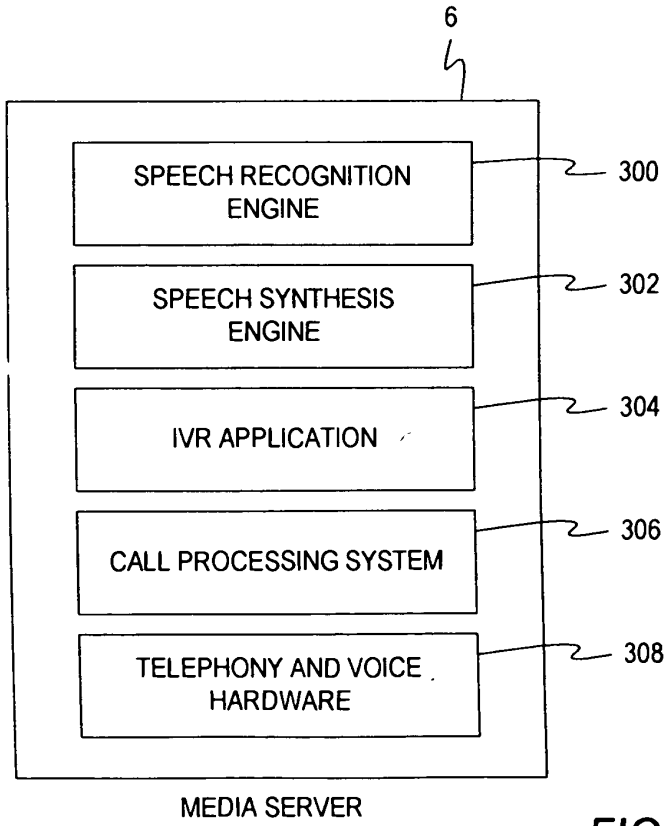

6
SPEECH RECOGNITION ENGINE
300
SPEECH SYNTHESIS ENGINE
302
IVR APPLICATION
304
CALL PROCESSING SYSTEM
306
TELEPHONY AND VOICE HARDWARE
308
MEDIA SERVER

FIG. 3

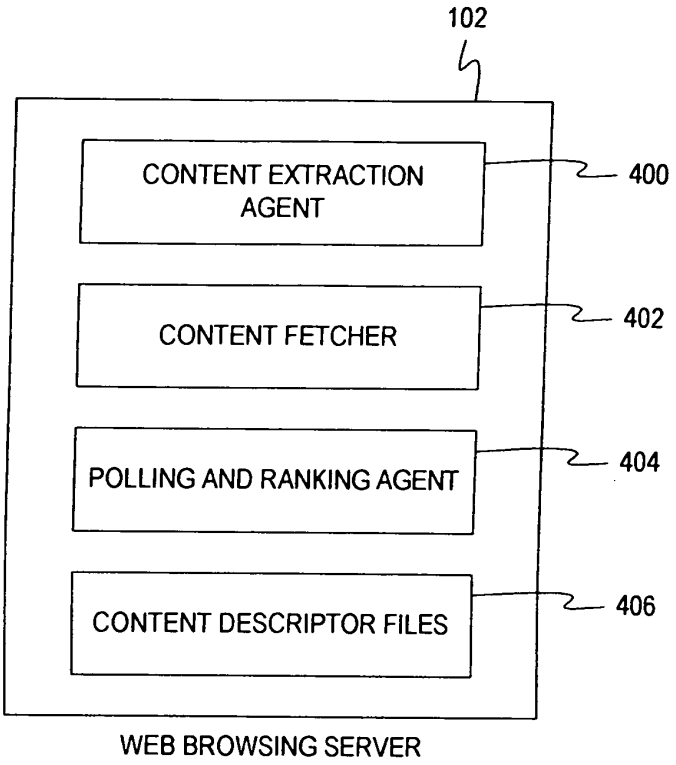

102
CONTENT EXTRACTION AGENT
400
CONTENT FETCHER
402
POLLING AND RANKING AGENT
404
CONTENT DESCRIPTOR FILES
406
WEB BROWSING SERVER

FIG. 4

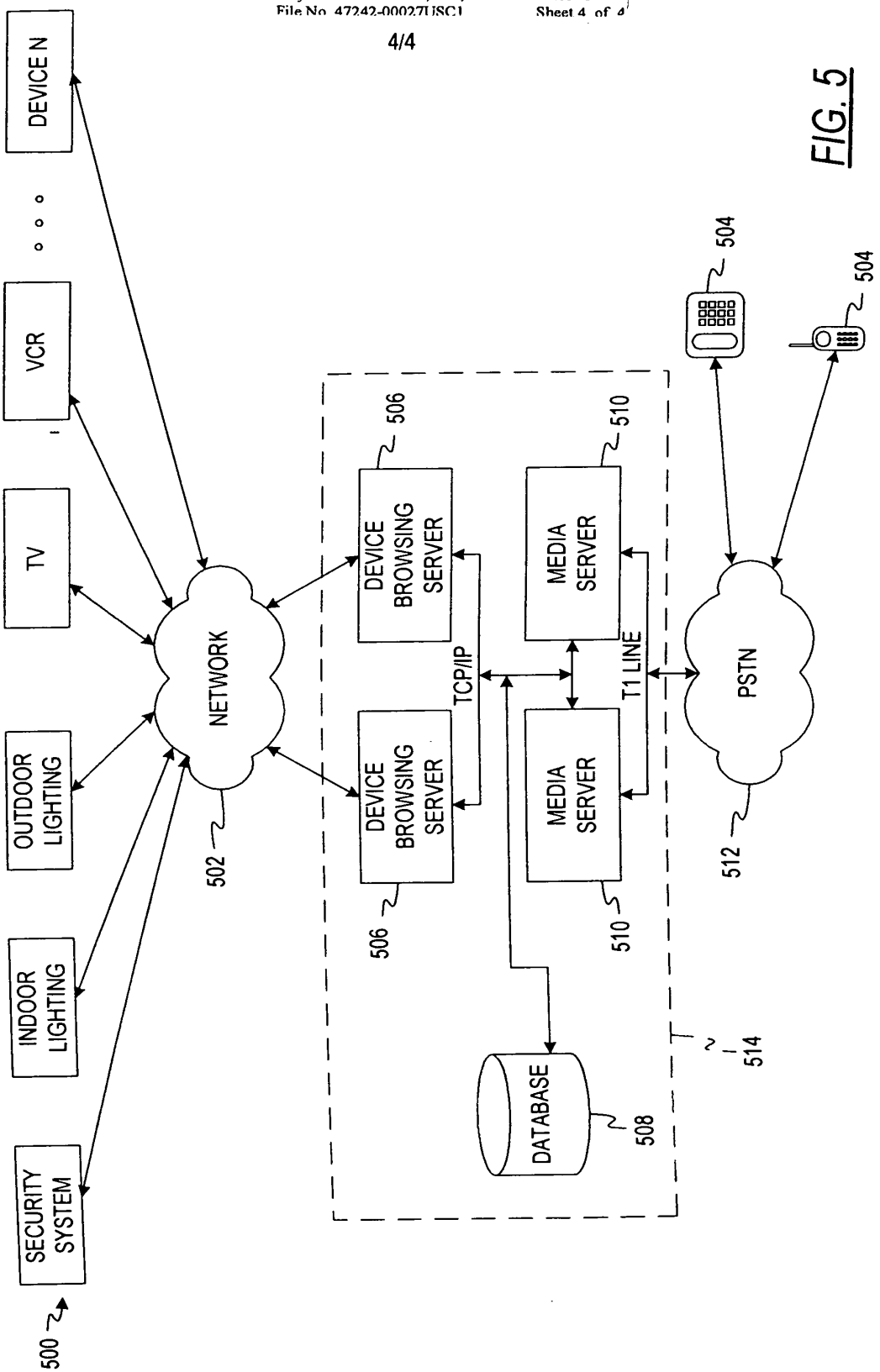

DEVICE N
VCR
TV
OUTDOOR LIGHTING
INDOOR LIGHTING
SECURITY SYSTEM
500
NETWORK
502
DEVICE BROWSING SERVER
DEVICE BROWSING SERVER
506
506
TCP/IP
MEDIA SERVER
MEDIA SERVER
510
510
T1 LINE
DATABASE
508
514
PSTN
512
504
504

FIG. 5

PATENT APPLICATION
DOCKET NO. 47242-00027USPT
Customer No. 23932

RULES 63 AND 67 (37 C.F.R. 1.63 and 1.67)
DECLARATION AND POWER OF ATTORNEY

FOR UTILITY/DESIGN/CIP/PCT NATIONAL APPLICATIONS

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; and

I believe that I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: **ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER**, the specification of which: (mark only one)

___ (a) is attached hereto.
_X_ (b) was filed on February 5, 2001 as Application Serial No. **09/776,996** and was amended on _____ (if applicable)
___ (c) was filed as PCT International Application No. PCT/_____ on ____ and was amended on _____ (if applicable).
___ (d) was filed on ___ as Application Serial No. ___ and was issued a Notice of Allowance on ___.
___ (e) was filed on ___ and bearing attorney docket number ___

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above or as allowed as indicated above.

I acknowledge the duty to disclose all information known to me to be material to the patentability of this application as defined in 37 CFR § 1.56. If this is a continuation-in-part (CIP) application, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the Office all information known to me to be material to patentability of the application as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

I hereby claim foreign priority benefits under 35 U.S.C. § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by me or my assignee

disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which my priority is claimed or, (2) if no priority is claimed, before the filing date of this application:

PRIOR FOREIGN PATENTS

Number	Country	Month/Day/Year Filed	Date first laid-open or Published	Date patented or Granted	Priority Claimed Yes	No
NONE						

I hereby claim the benefit under 35 U.S.C. § 120/365 of any United States application(s) listed below and PCT international applications listed above or below:

PRIOR U.S. OR PCT APPLICATIONS

Application No. (series code/serial no.)	Month/Day/Year Filed	Status(pending, abandoned, patented)
60/180,344	February 4, 2000	Pending
60/233,068	September 15, 2000	Pending

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whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct them in writing to the contrary.

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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2	Valery Zhukoff **Full Name**	**Inventor's Signature**	**Date** 5/4/2001
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PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

04/13/2004 EAREGAY1 00000049 10821690

01 FC:2001 385.00 OP

PTO-1556
(5/87)

*U.S. Government Printing Office: 2001 — 481-697/59173

PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2003

Application or Docket Number: 10821690

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	17	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	17 minus 20=	* 0
INDEPENDENT CLAIMS	1 minus 3 =	* 1
MULTIPLE DEPENDENT CLAIM PRESENT		☐

* If the difference in column 1 is less than zero, enter "0" in column 2

SMALL ENTITY TYPE ☐		OR	OTHER THAN SMALL ENTITY	
RATE	FEE		RATE	FEE
BASIC FEE	385.00	OR	BASIC FEE	770.00
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL	385	OR	TOTAL	

CLAIMS AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

1,

SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA
Total	*	Minus	**	=
Independent	*	Minus	***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM				☐

RATE	ADDITIONAL FEE		RATE	ADDITIONAL FEE
X$ 9=		OR	X$18=	
X43=		OR	X86=	
+145=		OR	+290=	
TOTAL ADDIT. FEE		OR	TOTAL ADDIT. FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

IFW

PTO/SB/122 (09-03)
Approved for use through 11/30/2005. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

CHANGE OF CORRESPONDENCE ADDRESS
Application

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Alexandria, VA 22313-1450.

Application Number	10/821,690
Filing Date	April 9, 2004
First Named Inventor	Alex Kurganov
Art Unit	2641
Examiner Name	Unknown
Attorney Docket Number	47242-00027USC1

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☐ Assignee of record of the entire interest.
Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).

☑ Attorney or Agent of record. Registration Number 27,957.

☐ Registered practitioner named in the application transmittal letter in an application without an executed oath or declaration. See 37 CFR 1.33(a)(1). Registration Number_____.

Typed or Printed Name Steve Z. Szczepanski

Signature

Date July 1, 2004 Telephone 312-857-7070

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☑ *Total of 1 forms are submitted.

JFW

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Kurganov et al.		Atty Docket:	47242-00027USC1
Serial No.:	10/821,690	Group Art:	Unknown
Filed:	April 9, 2004	Examiner:	Unknown
Title:	ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER		

INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §§1.97 and 1.98

CERTIFICATE OF MAILING
37 C.F.R. 1.8

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9-16-04 _____
Date Signature

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Commissioner for Patents
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Alexandria, VA 22313-1450

Dear Commissioner:

In compliance with the duty of disclosure under 37 C.F.R. §1.56, it is respectfully requested that this Information Disclosure Statement be entered and the reference(s) listed on attached Forms PTO/SB/08A and PTO/SB/08B be considered by the Examiner and made of record.

In accordance with 37 C.F.R. § 1.98(d), copies are enclosed only of those references not already of record or cited by the Examiner in a prior related application.

The applicant would like to make the Examiner aware of the following applications that are being pursued by the assignee of the present application:

Application No.	Date Filed	Title
10/877,366	06/25/04	Computer, Internet and Telecommunications Based Network
10/877,367	06/25/04	Computer, Internet and Telecommunications Based Network

Application No.	Date Filed	Title
09/260,279	03/02/99	Computer, Internet and Telecommunications Based Network
09/777,406	02/06/01	Personal Voice-Based Information Retrieval System

In accordance with 37 C.F.R. § 1.98(a)(2)(iii), copies of the specification and claims of the above-referenced U.S. Patent Application Serial Nos. 09/777,406, 10/877,366, 10/877,367, and 09/260,279 are enclosed. As Serial Nos. 10/877,366, 10/877,367, and 09/260,279 share a common specification, one copy of the specification related thereto is enclosed.

In accordance with 37 C.F.R. §§ 1.97(g),(h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to be an admission that the information disclosed is, or is considered to be, prior art with respect to the present application or material to patentability as defined in 37 C.F.R. §§ 1.56.

The present Information Disclosure Statement is being filed prior to the receipt of a first Official Action reflecting an examination on the merits and hence is believed to be timely in accordance with 37 C.F.R. § 1.97(b). Accordingly, no fees are believed to be due in connection with the filing of this Information Disclosure Statement. However, should any fees be deemed necessary (except payment of the issue fee), the Commissioner is authorized to charge any deficiency or to credit any over payment to Kelley Drye & Warren Deposit Account No. 11-0404/015749.0015.

Respectfully submitted,

September 16, 2004
Date

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PTO/SB/08A (08-03)
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 3,728,486	04-17-1973	Kraus	
		US- 4,058,838	11-15-1997	Crager	
		US- 4,313,035	01/26/1982	Jordan	
		US- 4,327,251	04-27-1987	Fomenko	
		US- 4,340,783	07-20-1982	Sugiyama	
		US- 4,371,752	02-01-1983	Matthews	
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		US- 4,513,390	04-23-1985	Walter	
		US- 4,523,055	06-11-1985	Hohl	
		US- 4,549,047	10-22-1985	Brian	
		US- 4,584,434	04-22-1986	Hashimoto	
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		US- 4,596,900	06-24-1986	Jackson	
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		US- 4,635,253	01-06-1987	Urui	
		US- 4,652,700	03-24-1987	Matthews	
		US- 4,696,028	09-22-1987	Morganstein	

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		GB 2211698	07-05-1989			
		GB 2240693	08-07-1991			
		JP 1-258526	10-16-1989			✓
		WO 9107838	05-30-1991			
		WO 9118466	11-28-1991			
		CA 1329852	05-24-94			

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Sheet 2 of 13

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		US- 4,713,837	12-15-1987	Gordon	
		US- 4,748,656	05-31-1988	Gibbs	
		US- 4,757,525	07-12-1988	Matthews	
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		US- 4,905,273	02-27-1990	Gordon	
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		WO 9609710	03-28-1996			
		WO 9823058	05-28-1998			

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Sheet 4 of 13

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		US- 5,095,445	03-10-1992	Sekiguchi	
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		US- 5,325,421	06-01-1994	Hou	
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		US- 5,327,529	07-01-1994	Fults	
		US- 5,329,578	07-12-1994	Brennan	

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Sheet 5 of 13

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Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
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		US- 5,333,266	07-26-1994	Boaz	
		US- 5,347,574	09-13-1994	Morganstein	
		US- 5,355,403	10-11-1994	Richardson, Jr.	
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		US- 5,436,963	07-25-1995	Fitzpatrick	
		US- 5,459,584	10-17-1995	Gordon	
		US- 5,463,684	10-31-1995	Morduch	
		US- 5,475,791	12-01-1995	Schalk	
		US- 5,495,484	02-27-1996	Self	
		US- 5,497,373	03-05-1996	Hulen	
		US- 5,499,288	03-01-1996	Hunt	
		US- 5,517,558	05-01-1996	Schalk	
		US- 5,555,100	09-01-1996	Bloomfield	
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		US- 5,603,031	02-11-1997	White	
		US- 5,608,786	03-01-1997	Gordon	
		US- 5,610,970	03-01-1997	Fuller	
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		US- 5,652,789	07-29-1997	Miner	
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		US- 5,819,306	10-06-1998	Goldman	
		US- 5,822,727	10-13-1998	Garberg	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 8 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

U. S. PATENT DOCUMENTS

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		US- 6,067,516	05-01-2000	Levay	
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Sheet 9 of 13

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Sheet 10 of 13

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Sheet 11 of 13

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First Named Inventor	Kurganov
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Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

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Sheet 12 of 13

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		Internet web page, "Wildfire Communications, Inc.", November 5, 1997, including the following URL addresses:	
		http://www.wildfire.com (1 pg);	
		http://www.wildfire.com/consumerhome.html (2 pgs.);	
		http://www.wildfire.com/106.html (2pgs.);	
		http://www.wildfire.com/carrierhome.html (2pgs.);	
		http://www.wildfire.com/sfandb.html (3 pgs.);	
		http://www.wildfire.com/about.html (1 pg.);	
		http://www.wildfire.com/abtmgmt.html (3 pgs.);	
		http://www.wildfire.com/scoop.html (2 pgs.); and	

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		http://www.wildfire.com/intel.html (1 pg.); and	
		http://www.wildfire.com/msft.html (2 pgs.).	

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(21) 612,217

(22) 1989/09/21

(45) 1994/05/24

(52) 379-4
C.L. CR. 350-11

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DROITS D'AUTEUR
DESSINS INDUSTRIELS
TOPOGRAPHIES DE CIRCUITS INTÉGRÉS

(51) INTL.CL.[5] H04N-001/32; H04N-001/44; H04N-001/21; H04M-011/00

(19)(CA) **CANADIAN PATENT** (12)

PATENTS
TRADE-MARKS
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INDUSTRIAL DESIGN
INTEGRATED CIRCUIT TOPOGRAPHY

(54) Facsimile Telecommunications System and Method

(72) Gordon, Richard J. , U.S.A.
Kennedy, James R. , U.S.A.

(73) Audiofax, Inc. , U.S.A.

(30) (US) U.S.A. 248,798 1988/09/22

(57) 32 Claims

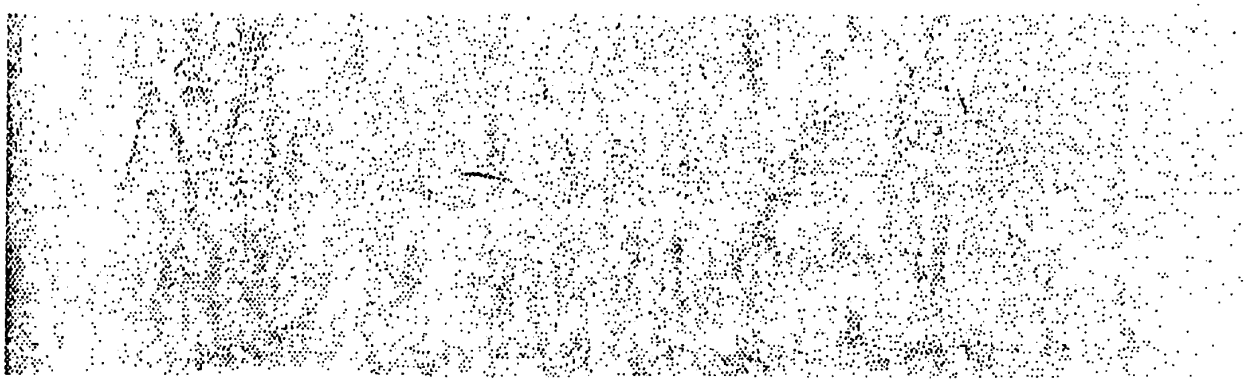
Consommation et Affaires commerciales Canada
Consumer and Corporate Affairs Canada

3469 Canada

612217

Abstract of The Disclosure

A system and method for facilitating facsimile transmissions has one or more store and forward facilities, each associated with a plurality of subscriber facsimile machines, typically coupled over the switched telephone network. The store and forward facilities include a computer for controlling operations and mass data storage equipment. A subscriber to the system delivers an outgoing facsimile message to the store and forward facility with which it is associated, which records the fax message together with data as to originating facsimile machine and destination facsimile machine. The store and forward facility then delivers the facsimile message to the intended receiver facsimile machine, either directly or through another store and forward facility. If unsuccessful on an initial attempt, the store and forward facility periodically retrys to send the facsimile message. The system also provides spooling of all facsimile messages for an intended receiver machine, which are all transmitted upon making connection with the receiver machine. Subscriber mailboxes are provided as part of the mass storage, which can be accessed by a subscriber to have his messages delivered to any facsimile machine he designates. Secure facsimile transmission is achieved through use of subscriber PIN numbers. Broadcasting, redirecting messages and cost accounting can also be achieved by the system and method.



CLAIMS

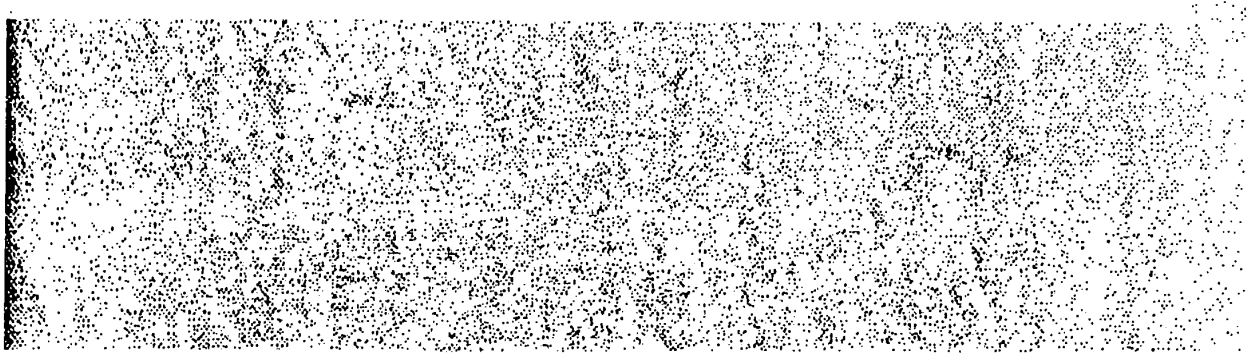
1. A system for facilitating facsimile communications between a transmitting facsimile machine and at least one intended receiving facsimile machine, comprising at least one store and forward facility, means coupling the at least one store and forward facility to the switched telephone network for receiving transmissions from a transmitting facsimile machine, said store and forward facility including computer means for controlling its operation and including mass storage means for storing facsimile transmissions together with information identifying the transmitting facsimile machine and the at least one intended receiving facsimile machine under control of said computer means, said store and forward facility also including means coupling it to the switched telephone network for transmitting facsimile messages stored in the mass storage means to at least one intended receiving facsimile machine.

2. The system of claim 1 wherein said computer means is programmed such that if the at least one intended receiving facsimile machine is busy or otherwise unable to receive a transmission at the time the store and forward facility attempts to transmit a facsimile message stored in the mass storage means, the store and forward facility periodically retries transmitting the facsimile message to the at least one intended receiving facsimile machine.

3. The system of claim 2 wherein said computer means is additionally programmed to establish a linked queue in said mass storage means spooling all stored facsimile messages intended for a particular receiving facsimile machine, and transmitting all the spooled facsimile messages intended for that particular receiving facsimile machine upon successfully making contact with the intended receiving facsimile machine.

4. The system of claim 1 wherein said computer means of said at least one store and forward facility is programmed, upon successful completion of a facsimile transmission to an intended receiving facsimile machine, to transmit a message to the transmitting facsimile machine confirming delivery of the transmission to the intended receiving facsimile machine.

5. The system of claim 2 wherein said computer means of said at least one store and forward facility is programmed, upon being unsuccessful in making a transmission to an intended receiving facsimile machine, to transmit a message to the transmitting facsimile machine indicating that the message has been entered into the mass storage means at the store and forward facility, and at least also indicating the reason for



a delay in transmitting the message to the intended receiving facsimile machine.

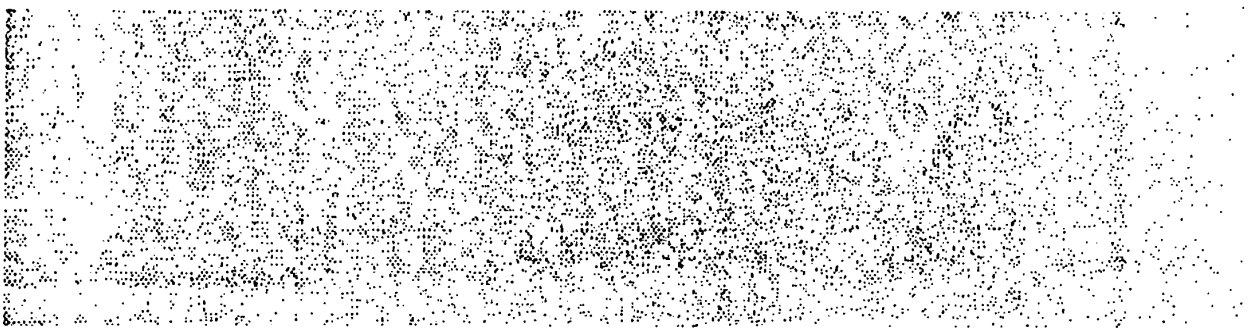
6. The system of claim 1 wherein the at least one store and forward facility includes means for receiving broadcast instructions from a user at a transmitting facsimile machine and associating those broadcast instructions with a facsimile message received from the transmitting facsimile machine and stored in the mass storage means, and for transmitting the stored facsimile message to a plurality of receiving facsimile machines in accordance with the broadcast instructions.

7. A system in accordance with claim 1 wherein said mass storage means additionally includes mailboxes associated with particular system subscribers and wherein facsimile messages received and stored by the mass storage means and intended for receiving facsimile machines associated with those subscribers are stcred in the respective mailboxes, said store and forward facility being responsive to instructions received from a subscriber to transmit the facsimile messages stored in that subscriber's mailbox to any particular facsimile machine designated in the instructions by the subscriber, whereby a subscriber who is traveling or otherwise away from the fixed location of his facsimile machine may have facsimile messages intended for receipt by his facsimile machine collected, and retrieve them from any location where any other facsimile machine is situated.

8. A system in accordance with claim 1 wherein said computer means of said at least one store and forward facility is programmed to retain a facsimile message in the mass storage means for a predetermined time period even after successful transmission of the facsimile message to an intended receiving facsimile machine, and wherein the store and forward facility is responsive to instructions received from either originating or receiving subscribers to retransmit the facsimile message to another intended receiving facsimile machine.

9. A system in accordance with claim 1 for use in system operation wherein individual subscribers may be provided with unique PIN numbers, wherein individual subscriber PIN numbers are stored in the mass storage means, and wherein the store and forward facility recognizes an incoming facsimile message that is security coded by a transmitting facsimile machine, and wherein the security coded facsimile message is sent to an intended receiving facsimile machine only upon receipt from the intended receiving facsimile machine of the appropriate subscriber PIN number.

10. A system in accordance with claim 9 where said computer means is programmed such that, upon receipt by the store



and forward facility of a security coded facsimile message from a transmitting facsimile machine, the store and forward facility sends a transmission to an intended receiving facsimile machine indicating that the store and forward facility is holding a security coded facsimile message, whereby a subscriber at the intended receiving facsimile machine is prompted to input to the store and forward facility his PIN in order to have the facsimile message transmitted to the intended receiving facsimile machine.

11. A method for facilitating facsimile communications between a transmitting facsimile machine and at least one intended receiving facsimile machine, comprising the steps of providing at least one store and forward facility having computer means for controlling its operation and having mass storage means for storing facsimile messages, coupling the at least one store and forward facility to the switched telephone network for receiving facsimile messages from transmitting facsimile machines, recording received facsimile messages in the mass storage means together with information indicating the transmitting facsimile machine and the intended receiving facsimile machine, and transmitting facsimile messages stored in the mass storage means to intended receiving facsimile machines.

12. A method in accordance with claim 11 including the step that if an intended receiving facsimile machine is busy or otherwise unavailable to receive at the time the at least one store and forward facility attempts contact to transmit a facsimile message, of periodically retrying to transmit the facsimile message to the intended receiving facsimile machine.

13. A method in accordance with claim 11 including the step of establishing a linked queue in the mass storage means spooling all stored facsimile messages intended for a particular receiving facsimile machine, and transmitting all the spooled facsimile messages intended for that particular receiving facsimile machine upon successfully making contact with the intended receiving facsimile machine.

14. A method in accordance with claim 11 including the step, upon successful completion of a facsimile transmission to an intended receiving facsimile machine, of transmitting a message to the transmitting facsimile machine confirming delivery of the transmission to the intended receiving facsimile machine.

15. A method in accordance with claim 11 including the step, upon being unsuccessful in making a transmission to an intended receiving facsimile machine, of transmitting a message to the transmitting facsimile machine indicating that the message has been entered into the mass storage means at the store and forward facility, and at least also indicating in the message the reason for a delay in successfully transmitting the message to the intended receiving facsimile machine.

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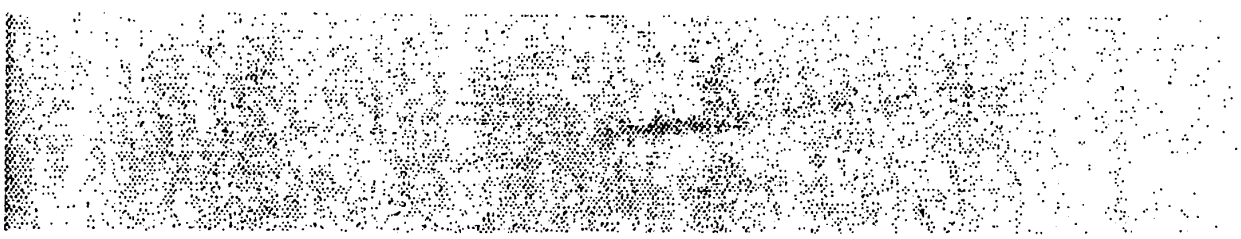
16. A method in accordance with claim 11 including the step of providing the at least one store and forward facility with means for receiving broadcast instructions from a user at a transmitting facsimile machine and associating those broadcast instructions with a facsimile message received from the transmitting facsimile machine and stored in the mass storage means, and including the step of transmitting the stored facsimile message to a plurality of receiving facsimile machines in accordance with the broadcast instructions.

17. A method in accordance with claim 11 including the step of defining mailboxes in the mass storage means associated with particular system subscribers, and including the step of storing facsimile messages intended for those particular system subscribers in their respective mailboxes, and further including the step, in response to instructions received from a system subscriber, of transmitting facsimile messages stored in that subscriber's mailbox to a facsimile machine designated by that subscriber in the instructions.

18. A method in accordance with claim 11 including the step of retaining facsimile messages in the mass storage means for a predetermined time period after successful delivery of the facsimile messages to intended receiving facsimile machines, and, in response to instructions received from either the transmitting or receiving facsimile machines with respect to a particular facsimile message, the step of retransmitting that particular facsimile message to additional intended receiving facsimile machines.

19. A method in accordance with claim 11 including the step of providing subscribers with unique individual PIN numbers, storing the individual PIN numbers in the mass storage means, recognizing an incoming facsimile message from a transmitting facsimile machine which has been security coded, transmitting to the intended receiving facsimile machine for the security coded message a message indicating that the store and forward facility is holding a security coded message, and transmitting to the intended receiving facsimile machine the security coded message only after receipt by the store and forward facility from the intended receiving facsimile machine of the unique PIN number of a subscriber associated with that intended receiving facsimile machine.

20. A method for facilitating facsimile communications between a transmitting facsimile machine and at least one intended receiving facsimile machine, comprising the steps of providing a plurality of store and forward facilities at geographically spaced locations each having computer means for controlling its operation and having mass storage means for storing facsimile messages, coupling each store and forward



facility to the switched telephone network for both receiving from and transmitting to a plurality of facsimile machines associated with each store and forward facility facsimile messages, recording in the mass storage means each facsimile message transmitted from an associated facsimile machine together with information indicating the transmitting facsimile machine and the intended receiving facsimile machine, and transmitting facsimile messages stored in the mass storage means to intended receiving facsimile machines if those intended receiving facsimile machines are associated with the store and forward facility which received the facsimile message from a transmitting facsimile machine, or to another of the plurality of store and forward facilities if the intended receiving facsimile machine is associated with the another store and forward facility.

21. A method in accordance with claim 20 including the step that if an intended receiving facsimile machine is busy or otherwise unavailable to receive at the time a store and forward facility attempts contact to transmit a facsimile message, or periodically retrying to transmit the facsimile message to the intended receiving facsimile machine.

22. A method in accordance with claim 21 including the step of establishing a linked queue in each mass storage means spooling all stored facsimile messages intended for a particular receiving facsimile machine, and transmitting all the spooled facsimile messages intended for that particular receiving facsimile machine upon successfully making contact with the intended receiving facsimile machine.

23. A method in accordance with claim 22 including the step, upon successful completion of a facsimile transmission to an intended receiving facsimile machine, of transmitting a message to the transmitting facsimile machine, either directly or through another store and forward facility associated with that particular transmitting facsimile machine, confirming delivery of the transmission to the intended receiving facsimile machine.

24. A method in accordance with claim 23 including the step, upon being unsuccessful in making a transmission to an intended receiving facsimile machine, of transmitting a message to the transmitting facsimile machine, either directly or through another store and forward facility associated with that particular transmitting facsimile machine, indicating that the message has been entered into the mass storage means at one of the store and forward facilities, and at least also indicating the reason for a delay in successfully transmitting the message to the intended receiving facsimile machine.

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25. A method in accordance with claim 24 including the step of providing the store and forward facilities with means for receiving broadcast instructions from a user at a transmitting facsimile machine and associating those broadcast instructions with a facsimile message received from the transmitting facsimile machine and stored in the mass storage means, and including the step of transmitting the stored facsimile message to a plurality of receiving facsimile machines in accordance with the broadcast instructions, either directly or through additional store and forward facilities associated with particular ones of the plurality of intended receiving facsimile machines.

26. A method in accordance with claim 25 including the step of defining mailboxes in the mass storage systems of each store and forward facility associated with particular system subscribers associated with particular store and forward facilities, and including the step of storing facsimile messages intended for those particular system subscribers in their respective mailboxes, and further including the step, in response to instructions received from a system subscriber, of transmitting facsimile messages stored in that subscriber's mailbox to a facsimile machine designated by that subscriber in the instructions.

27. A method in accordance with claim 26 including the step of retaining facsimile messages in the mass storage means for a predetermined time period after successful delivery of the facsimile messages to intended receiving facsimile machines, and, in response to instructions received from either the transmitting or receiving facsimile machines with respect to a particular facsimile message, the step of retransmitting that particular facsimile message to additional intended receiving facsimile machines.

28. A method in accordance with claim 27 including the step of providing subscribers with unique individual PIN numbers, storing the individual Pin number in the mass storage means of a store and forward facility associated with a particular subscriber, recognizing an incoming facsimile message from a transmitting facsimile machine which has been security coded, transmitting to the intended receiving facsimile machine for the security coded message a message indicating that the store and forward facility is holding a security coded message, and transmitting to the intended receiving facsimile machine the security coded message only after receipt by the store and forward facility from the intended receiving facsimile machine of the unique PIN number of a subscriber associated with that intended receiving facsimile machine.

29. A system in accordance with claim 1 wherein said computer means is programmed to store in the mass storage means relevant charging parameters including number of pages, destination and special system feature options provided for each facsimile message sent by a subscriber and received by a subscriber from a non-subscriber, and to generate charging summaries for subscribers periodically from the stored charging parameters.

30. A method in accordance with claims 11 or 20 including the step of storing in the mass storage means relevant charging parameters including number of pages, destination and special system feature options provided for each facsimile message sent by a subscriber and received by a subscriber from a non-subscriber, and generating charging summaries for subscribers periodically from the stored charging parameters.

31. A method in accordance with claims 11 or 20 including the step, upon receipt of a facsimile message from a transmitting facsimile machine, of immediately attempting delivery of the facsimile message to an intended receiving machine at the same time the message is being recorded in the mass storage means.

32. A method in accordance with claims 11 or 20 including the step that when an additional facsimile message intended for a particular receiving facsimile machine is received by a store and forward facility while that facility is in communication with that particular facsimile machine, the additional facsimile message is immediately appended to a message queue for the particular facsimile machine and delivered as part of the communication with that particular facsimile machine.

Facsimile Telecommunications System and Method

Field of the Invention

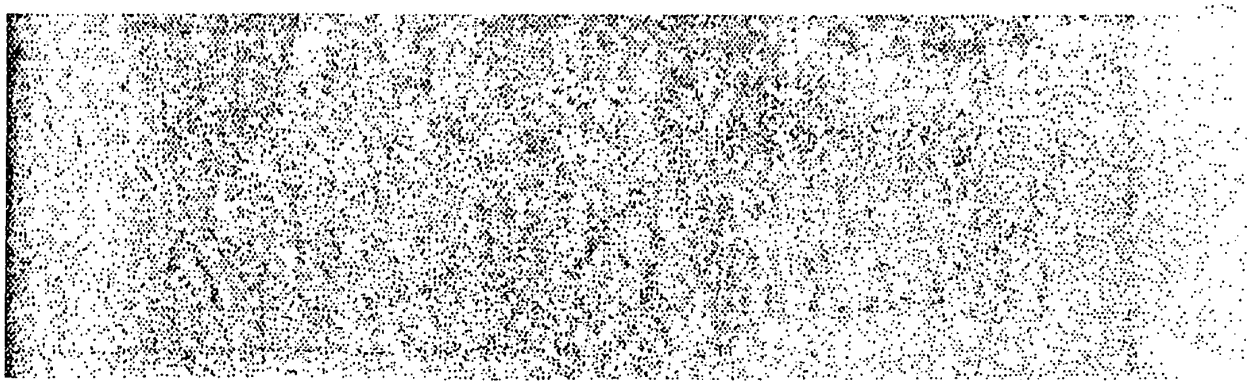
The field of this invention is telecommunications systems used in connection with facsimile transmissions. More specifically, this invention relates to a system and method for enhancing ease of facsimile transmissions and providing features relative to facsimile transmissions not heretofore available.

Background of the Invention

The electronic transmission of documents by way of facsimile (fax) systems employing public and private switched telephone networks has become both commonplace and, often, an essential component in many business activities. In such a setting, it is very common for the fax terminals (fax machines) to be kept quite busy during a major fraction of the business day. Moreover, where sender and recipient are in different time zones, the "business day" can approach 24 hours, particularly in international activities. It is common for fax users to "broadcast" documents to a number of different recipients, that is, send the same message to several different fax machines. It is also true that the contents of some faxed documents are of such a sensitive nature that the originator or addressee would like to have a measure of control over who might see those documents as they move from the receiving machine to the hands of the actual addressee.

These circumstances present a number of practical problems for a fax user. In order to make a successful fax transmission it is necessary that the receiving machine be available at the time that the transmitting machine attempts to contact it. If the receiving machine is already in use handling another message, the transmitter will receive a "busy" signal. The originator's only recourse is to continue initiating telephone calls until contact can be established. This is a "hit or miss" process at best and can be very wasteful of the originating operator's time.

Some, rather expensive, fax machines have digital memories which will allow them to memorize the document to be transmitted and to be programmed to make multiple redials in an effort to establish contact in an automatic way. However, this is limited to only one or two documents and, more importantly, it ties up the transmitting machine until the effort is successful or abandoned. This is hardly an acceptable solution if that machine has other documents to send or receive.



There are other conditions which can result in a failure to transmit even though a telephone connection has been established. Perhaps the most common of these is the absence of paper in the receiving machine. In such situations, repeated attempts to "redial" will lead to repeated toll charges with each attempt, with no actual success until the receiving machine is serviced (which may be some time if the machine is operating unattended because it is nighttime half-way around the world).

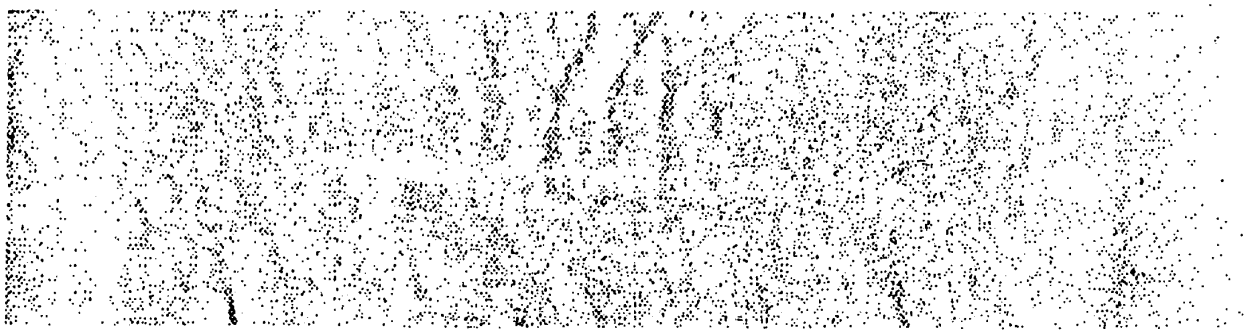
Busy machines which are destined to receive messages are affected by the converse problem. Since they and the prospective transmitting machines must engage in (perhaps, automated) "telephone tag", they are used very inefficiently. When a transmitting machine gets a busy signal, even if it automatically redials, it can only guess at when the receiving machine will be available. Thus, the receiving machine will likely remain idle for some fraction of the time until such an attempt is made.

The practice of broadcasting documents to a number of addressees obviously compounds these problems and adds still others of its own. Even if one does not encounter busy signals or impaired machines, convenient broadcasting demands an expensive memory-type fax machine on the transmitting end. Such machines read in the document once and then proceed to automatically dial the various recipient machines. This process ties up the sending machine and its telephone line and makes them unavailable for incoming calls. This, of course, exacerbates the busy signal problem for those units trying to contact the sending machine.

The security of sensitive documents is still another problem. Once contact is established between two fax machines, the transmission of the document proceeds automatically, irrespective of who may be standing by the receiving machine at the time. In a busy office, the contents of these documents are accessible to the fax operator and anyone else who happens to be in the vicinity.

It is also common for individuals to wish to deliver fax documents to a recipient who is not currently available through a known machine (eg. a person on a business trip). This is a very inconvenient situation in that it requires that the paper documents be held until the traveler phones in from a remote machine. It further requires that there be someone available at that time who has knowledge of and access to the documents intended for the recipient.

Still another concern is adequate accounting control over the billing of calls. Typically, many businesses wish to be



able to track the costs of both fax machine use and the associated telephone charges. While telephone charges can be ascribed from telephone company records, in the present environment these must be related to records of the number of pages transmitted per call and so forth, separately maintained by the fax machine or its attendants.

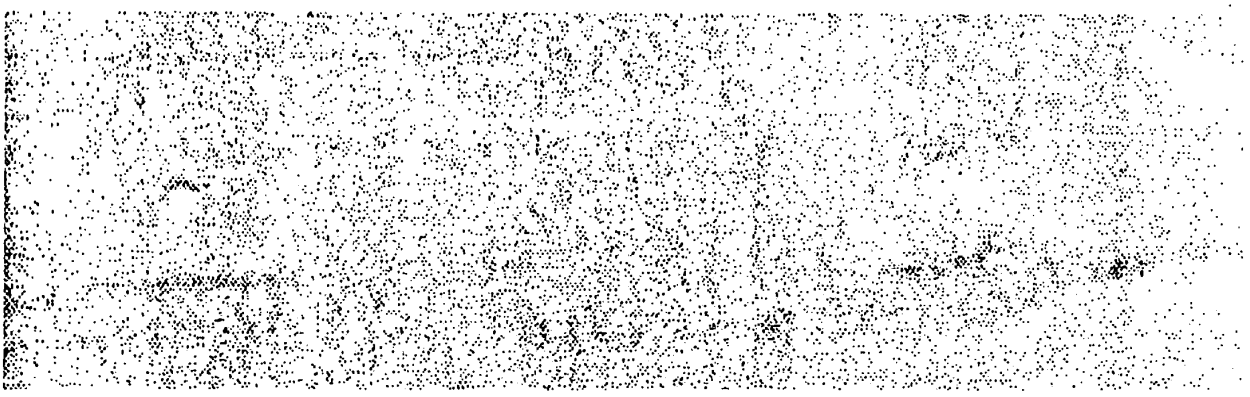
Summary of the Invention

The objects of this invention are to address these many shortcomings of present fax systems and to provide an integrated system for their solution. Furthermore, the intention is to achieve this in a way which is fundamentally compatible with existing fax terminal machines. The basic approach is to provide special computer-based fax Store And Forward Facilities (SAFF's) as an integral part of a switched telephone network system. All fax transmissions entered into the network are routed to such a facility, typically geographically near the originating machine, where they are temporarily stored or "spooled" by the computer in a mass storage buffer, such as a magnetic disk.

The fax message from the originating machine is intended for a destination machine, which may or may not be in a position to immediately answer the call. If the destination machine is within the service region of that SAFF, the system then proceeds to attempt to call the destination fax machine. If the destination machine is within the service area of a different SAFF, the system forwards the fax document data to that facility by long-distance lines, in which case this second facility attempts to call the destination machine. In either case, if contact is established and the message is delivered immediately, the system directs a printed report back to the originating fax machine confirming delivery to the destination machine, and other pertinent data.

If, on the other hand, the delivery cannot be completed immediately due to a busy signal, a machine fault (eg, receiving machine out of paper) or any other reason, the spooled document is saved and the system makes periodic attempts to contact the destination machine and complete the transmission.

In the meantime, the system sends a printed report back to the originating machine acknowledging that the message has been entered into the system, indicating the reason the delivery is being delayed, stating the protocol the system will take to deliver the message, and providing a reference number or "Message Code" which identifies the message and may be used at a later time to trace the status of the document.



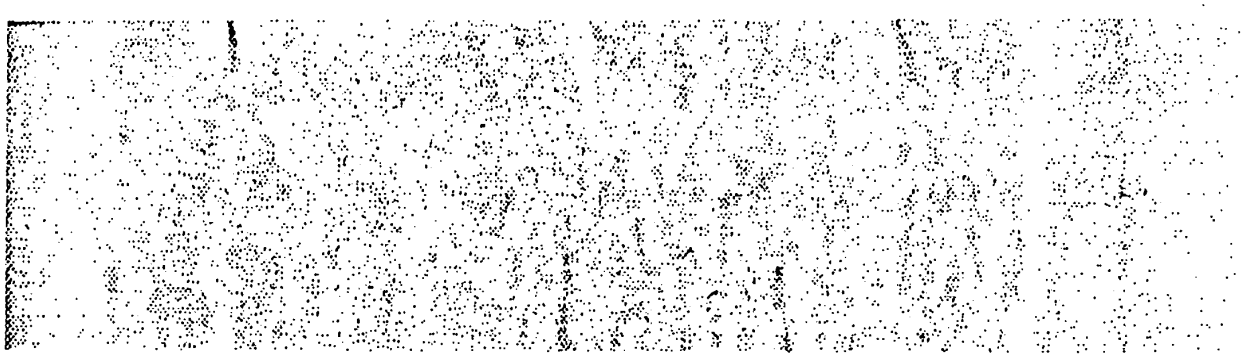
Placing the delivering spooling system geographically near the destination machine has the advantage of more economical use of any long-distance lines that may be involved. These lines are used only to move the message from the originator to the spooling system in the vicinity of the destination, which is virtually certain to be successful on the first try. Subsequent attempts to contact the destination machine can be handled more or less locally and need not tie up the bulk of the long-distance facilities.

If the delayed delivery is ultimately successful, the system will send a printed delivery report to the originating machine. On the other hand, if the delivery attempt protocol has gone through its whole cycle without success, a report will be sent to the originator indicating that the delivery procedure has failed and requesting instructions as to how to proceed (eg. try again, redirect the message to an alternate number, or delete the message).

An important feature of the system is that it recognizes all of the documents that are spooled in the system at a given time for a given destination machine. These are identified and linked together to form a message queue for that machine. In this way, once contact is established, all of the waiting messages can be "dumped" to that machine in a continuous batch. Furthermore, if new messages arrive while that dump is occurring, they are simply appended to the end of the active queue and are transmitted when their turn comes. This has the advantage of greatly enhancing the utilization efficiency of a busy destination machine.

Since all outgoing fax documents are temporarily stored at the facility near the originating machine, it is also practical to provide for automatic broadcasting of documents to multiple destinations. Lists of "broadcast groups" of phone numbers can be programmed into the facility by users, or a list of destination phone numbers entered "by hand" at the time of a call. The SAFF can then broadcast the message to every machine of the selected list. This is a great advantage to broadcast users in that they need only tie up their machines for one outgoing transmission, the one to the SAFF. The SAFF copies the message to all of the destination machines as outlined above. In the meantime, the originating machine is available for receiving or transmitting other documents.

Similarly, since the documents are stored near the originator, the system can permit messages which have already been sent to be copied to other destinations after the fact, without the necessity of resending the message to the SAFF. Likewise, since the messages are also spooled in a facility near the destination, the system also provides the recipient with



the option of forwarding or redirecting documents to still other destinations, as if the recipient were the originator. The system can also accept and store messages destined for a fictitious destination or "Mail Box". Thus, individuals who are traveling can, at their convenience, dial into the system and pick up any waiting documents.

Closely akin to these features is the ability to have the originator of a transmission include the requirement that the recipient provide a security code, such as a PIN number, in order to release the document from the spool to the destination machine. In this case, the SAFF sends a written report to the destination machine advising that a secure message is waiting for a particular recipient and the fax identification of the originating machine. The recipient must then call in to the SAFF and key in the security code to initiate the delivery of the document. Since the document is spooled, the delivery easily may be delayed until the recipient is available to supply the code.

Finally, since the documents and their delivery are both under the control of the telephone system, as a special service the telephone call accounting system can provide both time and charges for the telephone services rendered and fax information, such as pages transmitted, sorted according to the originator's clients. This can greatly facilitate the fax user who wishes to do cost accounting or to bill clients for costs incurred.

Brief Description of the Drawings

Other objects and advantages of the present invention will be apparent from the following Detailed Description of the preferred embodiments thereof and from the attached Drawings of which:

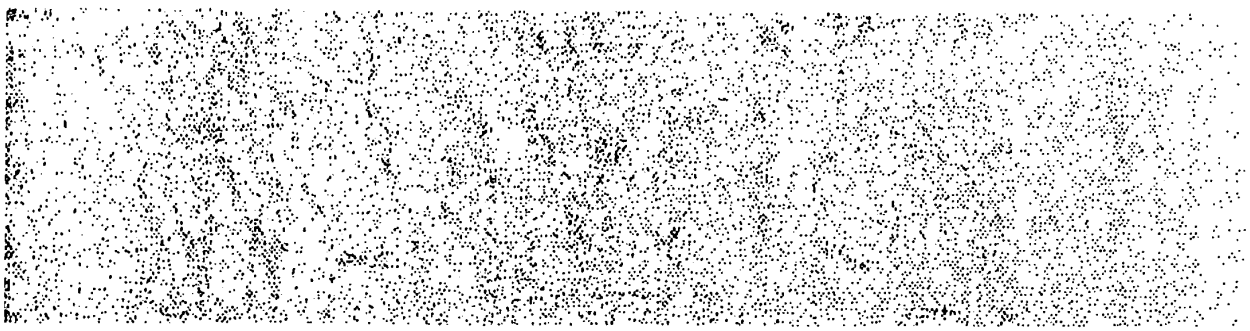
Fig. 1 illustrates the inter-relationships of the principal elements of a connection between two SAFFs.

Fig. 2 shows a more detailed view of the various systems within a single SAFF, such as those shown in Figure 1.

Fig. 3 illustrates the major components of the Originate Function in the SAFFs shown in Figures 1 and 2.

Fig. 4 illustrates the major components of the Answer Function in the SAFFs shown in Figures 1 and 2.

Figs. 5a and b show a flow chart describing the general processing steps required to handle a fax or voice message



incoming to the Originate Function of a SAFF, as described particularly in Figures 2 and 3.

Figs. 6a and b show a flow chart describing the general processing steps required to handle the delivery of a fax message incoming to the Answer Function of a SAFF, as described particularly in Figures 2 and 4.

Fig. 7 shows a flow chart of the general processing steps required to handle a service request in the General Service unit of a SAFF, as described particularly in Figure 2.

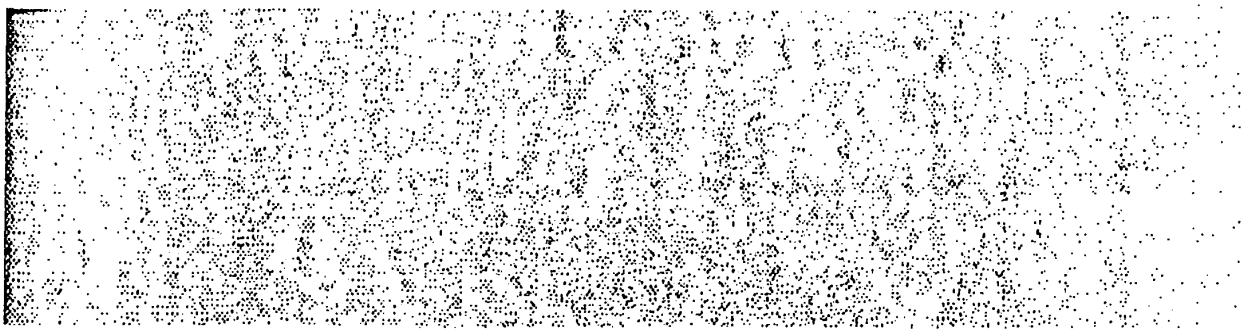
Detailed Description

Introduction

The preferred embodiment of this invention is a multi-function, interactive facsimile transmission system which is integrated into a switched telephone distribution network, where "network" is taken broadly to mean the entire system required to complete a communication from an originator to an answerer. This embodiment provides a comprehensive computerized fax message management system based on automated fax Store And Forward Facilities (SAFF) embedded in the network. This system requires no modifications to existing facsimile machines, but rather, relies on the network to provide the enhanced services.

The system contains several components which actually transmit the fax messages and related information, provide written fax reports to users about the status of messages within the system, allow user intervention in the sequence of automatic actions of the system, provide an accounting of services rendered for both the customer and the telephone company, and control and supervise all of these activities.

In the preferred embodiment, it is presumed that the SAFF's are placed at the interface between the local telephone delivery system and the long-distance delivery system, as indicated in Figures 1 and 2. In this setting, the SAFF system can be controlled and its services offered by either one. However, it is obvious that useful systems can be constructed where the SAFF exists as close to the user as a component of his or her own in-house telephone system (such as a PBX or Centrex) or as remotely as a single, independent, stand-alone SAFF serving a wide geographical area. It is also obvious that commercially viable systems can be constructed which provide subsets of the features of the preferred embodiment. The choice of site/control setting and service features might be driven by any number of economic, market, or legal



considerations, which would militate toward offering the system at an alternate location in the network, or in a "stripped down" form.

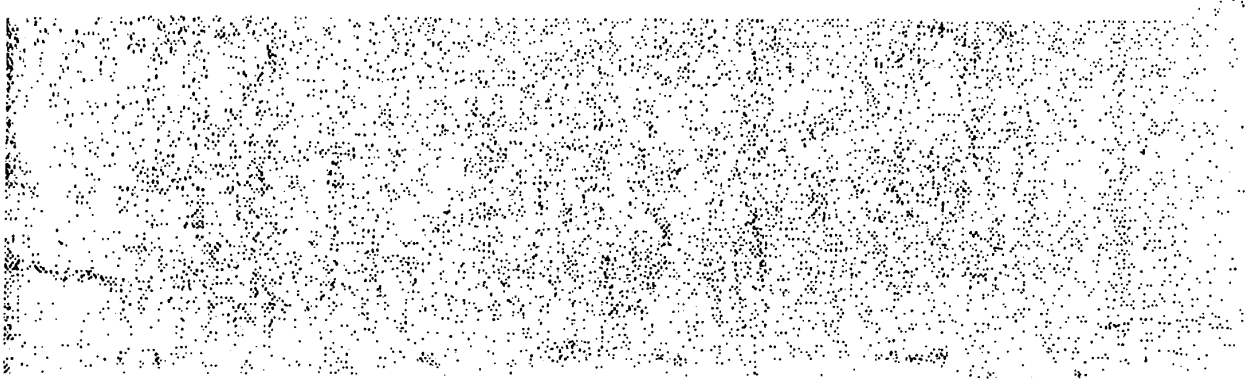
To more clearly understand the present invention, it is useful to consider the manner in which a fax transmission occurs in the traditional setting. Here the communication between two machines is initiated when the destination machine answers a telephone call directly from the originating machine. Typically, there is an exchange of digital data identifying the sending and receiving machines to each other and establishing the fax mode or format to be used. If this exchange is satisfactory, then the actual image transmission takes place. Otherwise, the call is terminated, usually with some form of written diagnostic to the respective users.

Message Interception

In the present invention, all fax transmissions initiated by a subscriber to the fax management system are first intercepted by an "originator" SAFF; that is, the SAFF which directly services the originating fax machine. Figure 1 shows two exemplary SAFFs 8 and 18, with interconnections between the SAFFs and with subscriber fax machines being diagrammatically indicated. Thus in Figure 1, the SAFF 8 includes an originate function 9 coupled over telephone lines 4 to originating fax machines 1. Likewise, the SAFF 18 includes an originate function 22 coupled over telephone lines 26 to originating fax machines 30. Each of the SAFFs 8 and 18 also includes respective answer function blocks 12 and 19 respectively connected over telephone lines 6, 24 to fax machines 3, 28. Each of the SAFFs 8, 18 also includes service interfaces 10, 21 coupled via telephone lines 5, 25 to telephones 2, 29. The function and purpose of the service interfaces is more fully explained hereafter, and they are under control of status and control blocks 11 and 21.

Access to the system of Figure 1 can be obtained much the same as access to a specific long-distance company's network. That is, subscribers such as 1 in Figure 1 can dial a unique access code at the time a call is initiated, or a telephone line dedicated to a fax terminal may be permanently routed to the SAFF system, in this case the SAFF 8 of Figure 1. Either way, one accesses SAFF Directed Lines 4 and the SAFF 8 itself in the process of dialing the destination fax machine.

The SAFF 8 then answers the phone in place of the destination machine, such as one of 28 shown in Figure 1 as serviced by SAFF 18. For the moment, this SAFF 8 near the originator becomes the proxy for the destination machine 28. While



noting the actual destination telephone number, the SAFF 8 engages the originating machine in the same digital dialogue that would have occurred if a direct connection to the destination machine had actually been made. Thus, it echoes back the destination telephone number, to identify the intended destination machine, and agrees to accept the fax format requested by the originating machine.

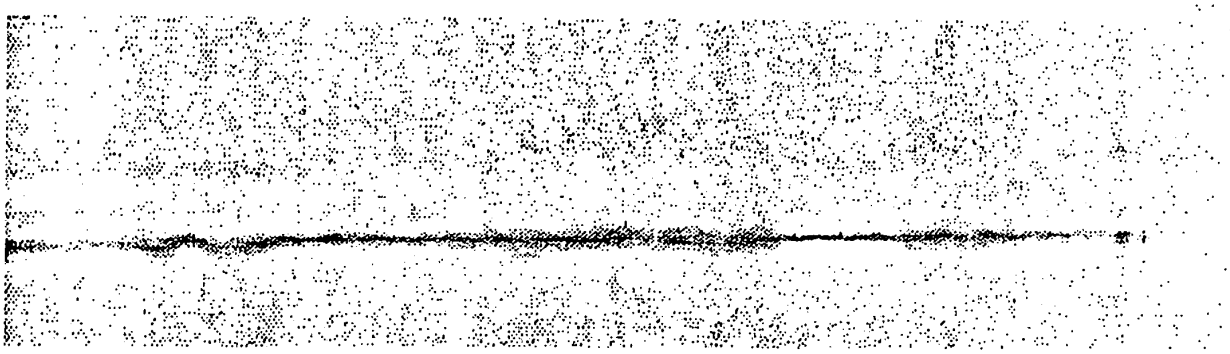
This causes the originating machine 1 to respond by transmitting the fax document image data. The originating machine's identification, the destination machine's telephone number, the fax format, and the document image data are all stored on a mass storage device 67 (in Figure 3), such as a computer magnetic disk unit. Furthermore, a unique alphameric Message Code is assigned to the block of data to identify it while it is resident in the SAFF system. This Message Code is related to the file name for the stored data.

Delivery

At this point the SAFF 8 initiates two actions. The first is to generate an "Acceptance Record" of the transaction to this point. This record, in one form or another, will be returned to the originator as will be described below. The second step is to begin to deliver the fax message to the destination machine 28.

The details of the delivery process depend to some degree on the geographic location of the destination within the network. A single SAFF can, in principle, service a broad geographical area. However, in the preferred embodiment, communications beyond a certain limiting distance involve at least two SAFFs, one 8 near the originator 1 and the other, a "destination SAFF", 18 near the recipient 28 of the document. The choice of one, two, or more SAFFs is determined by network economics, or other considerations, and is not essential to the invention.

For the sake of this discussion, we will define a "local" message to imply that the originating and the destination machines are serviced by the same SAFF. (Although, this does not preclude the possibility that the two machines are some considerable distance apart and connected by a toll call.) On the other hand, we will define a "long-distance" message to mean that the originating and destination fax machines are serviced by different SAFFs and, thus, one SAFF must exchange data with the other, perhaps through intermediaries. Similarly, the term "near" used in connection with a SAFF refers to being within the service area of that SAFF.



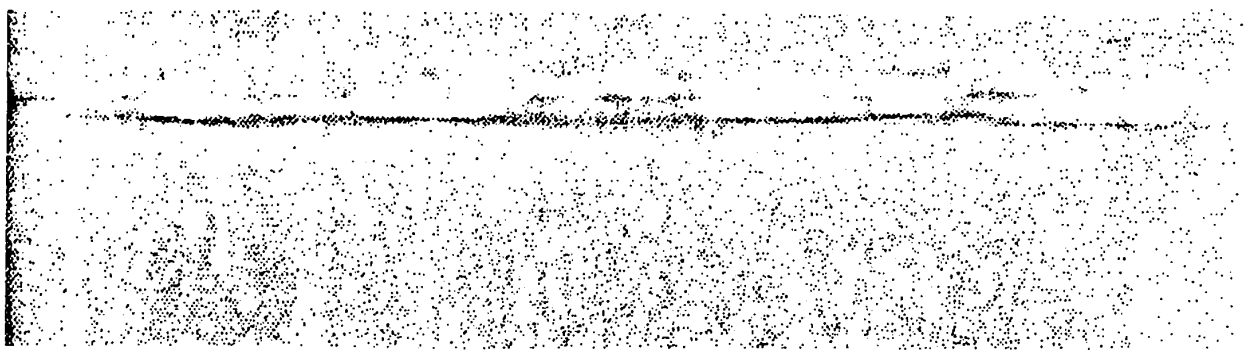
Each SAFF 8, 18 has two clearly defined roles: the "Originate Function" 9, 22 for handling data with an originating machine, and the "Answer Function" 19, 12 for handling data with a destination machine. The details of these two subsystems are illustrated in Figures 3 and 4 respectively. In the local message mode, the connection between the Originate Function, such as 9, and the Answer Function, such as 12, is linked within the single SAFF 8 by way of a Local Call Loop-back connection 13, between the two Functions. In the long-distance mode, the Originate Function 9 of SAFF 8, near the originator, is linked to the Answer Function 19 of another SAFF 18, near the destination, by long-distance lines, such as 14, or 16 for SAFF 18. Thus, processing a long-distance message involves the same basic steps as a local message, except that the activity is shared interactively between at least two different SAFFs.

Originate Function

With this understanding of SAFF functions, the following detailed discussion will illustrate the operation of the system in the long-distance case, since it is the more complex, and therefore provides a more comprehensive example. Figures 1, 2, 3, and 4 all show elements of the SAFF system in varying degrees of detail and all will be referred to in the following. It will be noted that some critical elements are shown in more than one of the Figures.

As an example, it is assumed that one of the subscribers 1 attached to SAFF 8 wishes to send a fax message to one of the subscribers 28 attached to SAFF 18. The subscriber 1 places the call to the destination machine 28 which is routed over SAFF Directed Lines 4 to the Originate Function 9 of SAFF 8. These signals originate within the SAFF system and they are picked up by the On-net Interface 64 which is part of the Originate Function, as shown in Figure 3. This Interface signals the Originate Host Computer 70 of the incoming call and the Host responds by directing the incoming data to a Mass Storage Unit 67 where it is stored in a file 68.

During this storage process the Host directs two other activities. It creates a call status record file 69 (Figure 3) in mass storage, recording the time and date of the origination, the telephone number of the calling machine, the telephone number of the destination machine, any security or other special services requested, various housekeeping information, and it assigns the Message Code number which locates not only the status file but also the fax data file associated with it. The Host also passes the destination machine's telephone number to the Outbound Control unit 74 which proceeds to



connect the originating SAFF 8 with the nearest available SAFF 18 to the destination through a long-distance interface 75 over long-distance circuits 79 (14 in Figure 1). In the process of establishing this connection, the Outbound Control unit employs an algorithm which examines the number and kind of available trunk resources and chooses the most efficient combination of these lines for the task required.

Answer Function

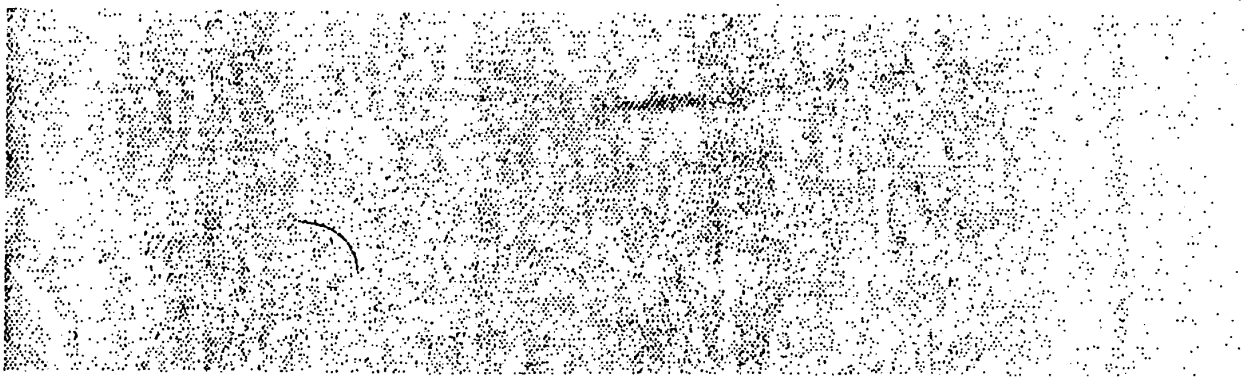
The originating SAFF 8 then proceeds to transmit the originator and destination telephone numbers, the stored fax image, the Message Code, and other housekeeping data to the destination SAFF 18. These data are sent by the most expedient mechanism offered by the long-distance service. For example, if this service employs digital communications, the fax data may well be transmitted at a significantly higher rate than it was originally received into the system.

The fax data is received by the Long-distance Interface 95 (Figure 4) in the Answer Function 19 of the destination SAFF. This unit signals the Answer Host Computer 85 of the incoming data. The Host then routes these data to its Mass Storage facility 87. (It should be noted for later reference that the originator SAFF and the destination SAFF now both have a copy of these data.) The Host notes whether other messages are pending for the destination machine and either opens a Delivery Queue file 88, or appends the new message to the existing Queue File.

The Host also records the arrival time and other pertinent information about the fax message in a Call Status file 90 in Mass Storage unit 87, and sends a status update back to the originating SAFF 8 by way of the Status and Control Interface 84, and the System Status and Control Unit 11 via Long-distance Trunks 15.

It then signals the Local Interface 83 to dial the destination machine's (81 in Figure 4) telephone number on ordinary outgoing local lines 24, 82. If the destination fax's line is available, the destination SAFF now becomes the proxy for the originating fax machine and engages the destination machine in the necessary preliminary digital dialogue.

If this is successful, the document image, including the source and destination identification information, the Message Code, and the entry and delivery times, is played back from storage and delivered to the destination. A "Delivery Record" is then created by the Answer Host 85 which indicates the date and time of delivery, and any other pertinent data. The

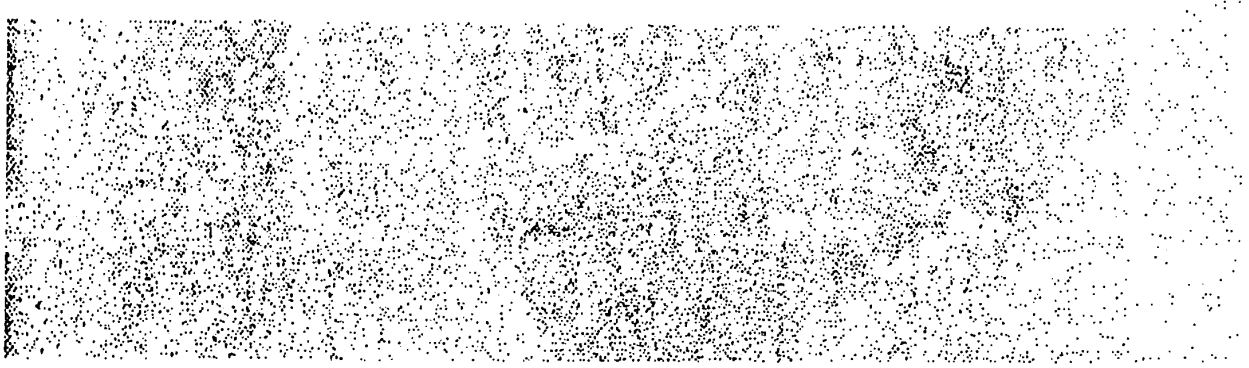


Delivery Record is sent back to the originating SAFF 8, again by way of the Status and Control Interface 84, and the System Status and Control Unit 11, via Long-distance Trunks 15. The originator SAFF 8 then appends this information to the Acceptance Record to form a complete "Transaction File". The originating SAFF 8 then sends this file, as a delivery receipt or report, back to the originating machine 1, 60, as a fax document.

If the destination machine's line is busy, or the contact fails for some other reason, the destination SAFF's Host Computer 85 will enter a sequence whereby it will attempt to contact the destination machine and transmit the document on a predetermined schedule for a specific period of time or number of tries. As this sequence is entered, a "Retry Record" is generated documenting the situation and the system's response to it. This record contains the reason that the delivery was delayed and it indicates which protocol the system will use to attempt to deliver the message. This is transmitted back to the originating SAFF 8, as described above, and appended to the previously described Acceptance Record to form a Transaction File which is then sent as a fax message back to the originator. The assigned Message Code is a part of every transaction report and may be used at any time to trace the status of undelivered documents, as will be described shortly.

If the retry effort is ultimately successful, a Delivery Record is appended to the Transaction File which is sent back to the originating machine. If the effort fails after reaching the predetermined limit, this is also recorded, appended, and sent back to the originator. In this case, the originator is given the option of dialing back into the system within a certain length of time (typically several hours) and instructing the destination SAFF as to how to dispose of the document (eg. repeat retry sequence, forward to a different telephone number, or delete the message).

This process is handled by using an ordinary touchtone phone to dial a multipurpose (perhaps, toll free) fax system "Service Number"; which will be referred to here and in later sections. This might be a unique number for every SAFF, or it might be a standardized number common to many localities, except perhaps for area code, such as is 555-1212 for calling "Information". This Service Number is answered by the General Service Control units (10 in Figure 1, 50 in Figure 2) of the SAFF to which the call is directed. This unit contains an automated voice response system that presents a menu of the available services and prompts the user to select the desired choices by pressing particular numbers on the touchtone keypad. In an advanced embodiment, a computer-based voice



recognition system replaces the keypad and accepts verbal commands in a conversational way.

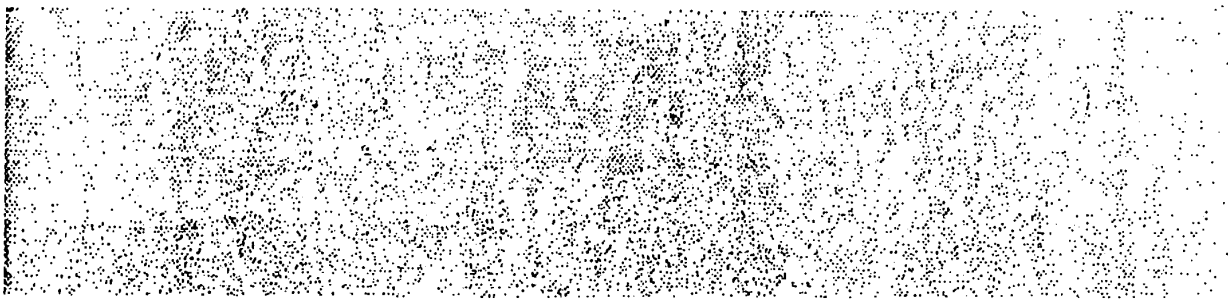
The General Service Control unit 50 can communicate with its own System Status and Control unit 11, and through that unit, any other such unit 11, 20 via Long-distance Trunks 15. Through these connections, both inquiries relating to messages in the system and instructions as to their disposition may be addressed to the entire SAFF system.

Having selected the "failed-connection message disposition" choice, the user is prompted to key in the Message Code. The system verbally repeats the code and the delivery discrepancy for verification, and then presents a menu of disposition options for the user to select with the keypad.

If the user does not take advantage of this "what to do now" opportunity within the time limit, the message is retransmitted back to the originator with a report. It is then erased from both the originator and destination SAFF files after a suitable delay (typically six hours). If the originator wishes to resend the message during this "grace" period, it may be recovered and resent to the original destination or forwarded to another destination(s), as will be described later.

In each of the various cases where the SAFFs automatically direct fax message status reports (such as, the Acceptance, Delivery, or Retry records above), the system can be programmed to accumulate records from all calls over a period of time (eg. an hour) at the originator SAFF and deliver them as a single fax document at the end of the period or upon request by the originator. This has the advantage of reducing the number of report calls and the subsequent burden on the originating fax machine. The originator SAFF will enter a retry sequence if it finds the originator's line busy or the machine unavailable when it attempts to deliver reports. This is a persistent sequence which it will continue trying for direct contact at intervals of an hour or so for a considerable length of time (eg. 72 hours). It also places a copy of the report in the originator's Mail Box (described below) so that the originator may recover it in between SAFF delivery attempts.

It should also be noted that the originator has the option of dialing the Service Number at any time and inquiring about the status of a given message. Here again, the voice response system prompts, presents menus, and uses the Message Code to locate and report on the current location and condition of the message. A written record can be directed to the originating or destination fax machine, if desired.



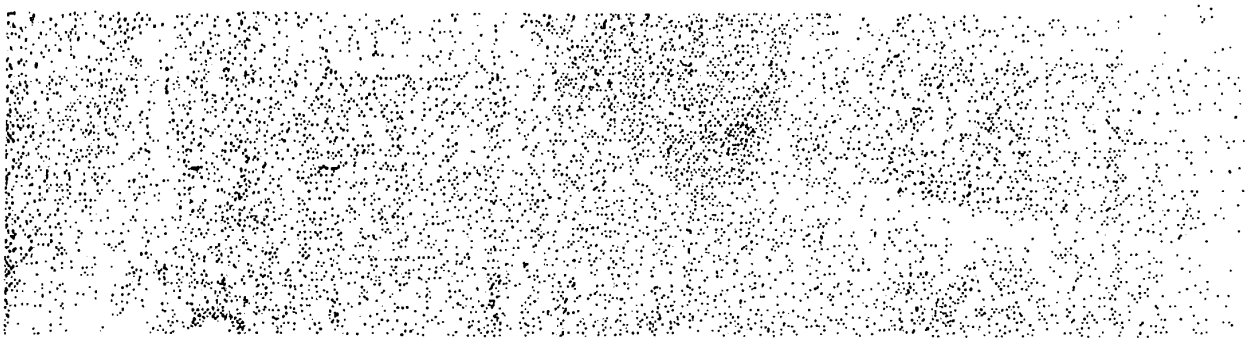
Another feature of the system is that the act of accepting and storing an incoming message at the originator SAFF, and the act of dialing and forwarding that message to the destination by the destination SAFF, can overlap in time. That is, if the originator SAFF has lines available, once the initial connection dialogue between the originator and the SAFF is complete, the SAFF may immediately make its first attempt to contact the destination SAFF and, thus, the destination machine, while it is beginning to spool the document.

If this immediate contact is successful, then the message is passed from the originator SAFF 8 to the destination SAFF 18 to the destination machine 28 directly from the Originate Host Computer's memory 70 while the two SAFFs are still in the process of spooling the document to disk. This is facilitated by a "write-through pipeline" whereby the Originate Host 70 passes the incoming fax data through directly to the Outbound Control unit 74 at the same time it is being written to mass storage. It is held in a temporary memory buffer in the Outbound unit until it is clear whether or not an immediate connection to the destination machine is possible. At that point the temporary buffer fax data is either sent and then deleted, or merely deleted. The net effect is that the spooling process only adds a few seconds delay in the message delivery over the traditional direct machine-to-machine contact when the destination machine is readily available.

On the other hand, if lines are limited, the originating SAFF can choose to delay until suitable lines are available. This has the advantage of improving communications resource management and enhancing the efficiency of the telephone system's line usage over the direct contact scheme.

The foregoing describes the basic fax SAFF message handling system and from this discussion several advantages should be apparent. The originating machine always functions as if it makes contact and delivers documents on the first try, thus immediately freeing the machine and the attendant personnel for sending or receiving other transmissions. Likewise, the telephone system only handles one call across its local and long-distance lines from the originating machine to the destination SAFF, since the state of the destination machine has no impact on the call. This significantly improves the efficiency of line usage when messages are addressed to busy fax terminals.

Although some additional calls are needed to deliver the various reports, these require very little long-distance time, as they are transmitted over the circuits as highly compressed coded messages. It is the nearby originating SAFF that translates them into "plain language" for fax delivery as a local



message. As pointed out, additional savings in these local messages can be gained by compiling multiple reports and delivering them in bulk as a single call. It should be noted that the delivery of reports to an originator is a cooperative process between the Originate Function and the Answer Function of the originate SAFF. The Originate Function 9 actually generates these reports and passes them through the Local Call Loop-back 13 (76 in Figure 3) to the Answer Function 12 for delivery as an ordinary fax message.

In addition to these basic features, the design of the system also provides for a number of additional services and advantages which are described below.

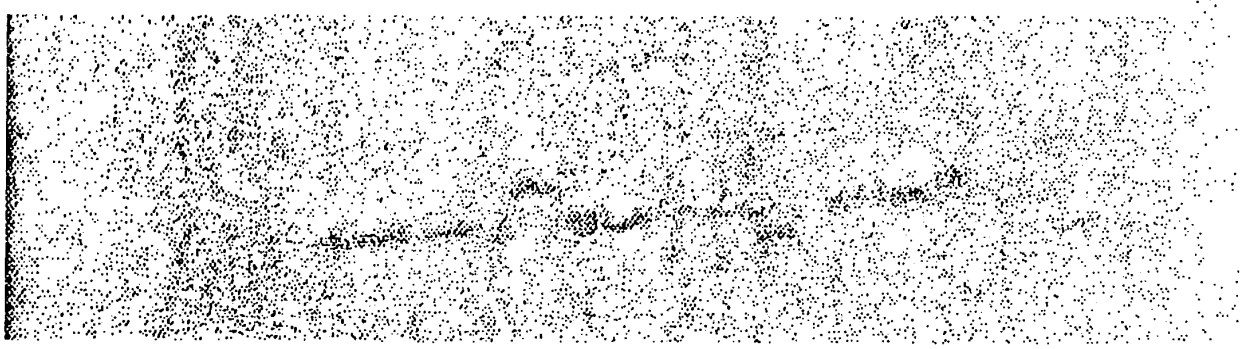
Message Queuing

As pointed out, all fax messages directed to a particular telephone number are spooled by the Answer Function of the destination SAFF, as detailed in Figure 4. The Host Computer 85 controlling this function monitors the incoming messages and links all undelivered messages for a given telephone number into a message Delivery Queue file 88. The computer also compiles a constantly updated, ordered catalog of the file names of the messages waiting for each fax machine.

Consequently, when messages arrive at a rate faster than they can be delivered, for whatever reason, they are held in this queue for delivery. As soon as the destination SAFF establishes contact with the destination machine, it begins sending the entire queue of messages in a single, essentially uninterrupted transmission. Messages that arrive while the transmission is in progress are appended to the end of the queue.

This scheme eliminates the "trial and error" dial and redial attempts that result from a number of independent incoming calls competing in an uncoordinated way for the single destination line. It can significantly enhance the efficiency of the destination fax machine and the long-distance and local telephone circuits connected to a busy machine.

When the queue exceeds a certain limiting size, the destination SAFF will periodically insert and send a "Queue Report" (as a fax document) to the destination machine showing a list of the waiting messages. This list shows the originating machine identification, the time entered into the originator SAFF, the number of pages in the document, and the approximate time that the message will be delivered based on its position in the queue.



The user can advance a particular message to the head of the queue by calling the fax Service Number and supplying the desired message number, by using the voice response menus. The General Service unit 50 directs these instruction to the System Status and Control Unit 11, which in turn directs them to the Answer Function Host 85 through its Status and Control Interface 84.

Alternately, the originator can designate a priority level to a given fax message at the time it is dialed in (eg. by using a different access code). In this case, the destination SAFF will insert higher priority messages ahead of lower priority messages in the queue as they are received. The originator would normally pay a premium price for this service.

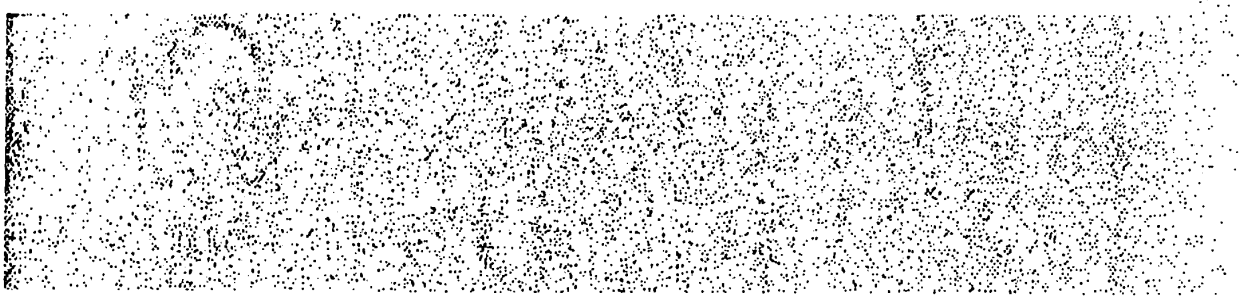
Another originator option is the time of delivery. If desired, the originator can specify the time of day which the message should be delivered. In this case the message is forwarded to the destination SAFF directly, but is not entered into the queue until the specified time. This can be used in combination with an assigned high priority to insert the message at the head of the queue at the appointed time.

When messages are finally delivered to the destination machine they are not immediately erased from the spool file 88 at the destination SAFF. Rather, they are maintained in a "Delivered Message" directory 90 for a period of time (typically six hours). A feature offered by this action is the opportunity for the subscribing recipient of a message to make additional copies, redirect, or forward copies of selected messages to other destinations. This is accomplished by calling the Service Number and selecting the appropriate choices from the voice response menus.

Security and Mail Boxes

It is not uncommon for documents of a sensitive nature to be sent by facsimile from place to place. This is often a problem, especially in a busy office or where a machine is nominally unattended during the transmission, in that the originator has no control over who may be standing by the machine when the document prints out, or who may leaf through a stack of faxes piled up in a hopper right after lunch.

This is a problem which others have attempted to deal with in a variety of ways. For example, Bond, U.S. Pats. 3,594,495 and 3,641,432, discloses a "radio facsimile postal system" which features the direct delivery of documents to specific addressees by facsimile via communications



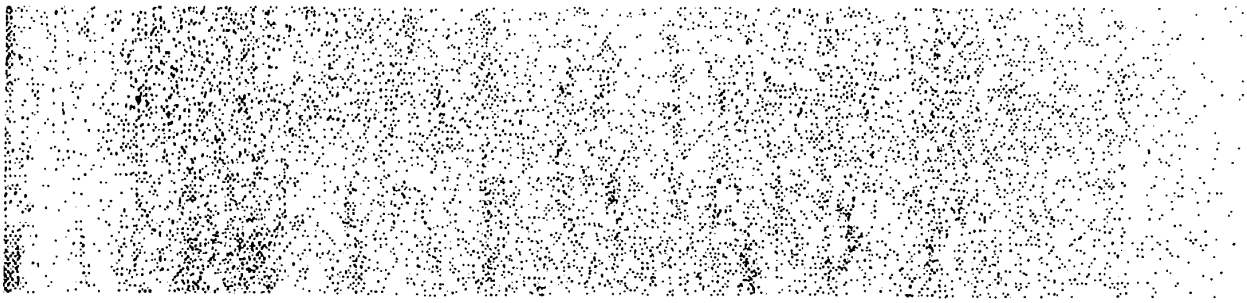
satellites. In this system, intended as a replacement for or supplement to the ordinary "paper" postal system, fax messages were directed from special public fax terminals operated by the post office to a central satellite earth-station. Here the messages were sorted according to their geographical destination for concentration and uplinking to a satellite servicing that area. The satellite then broadcasts all of the uplinked messages back to Earth.

In principle, anyone with a radio receiver in the satellite's service area could access any of the messages, so Bond built in a "privacy code" which operated with the receiver to allow the message to print out only on the desired machine. In reality, this privacy code was nothing more than an addressing signal which enables the selected fax receiving system. Thus, Bond's system is merely a restricted version of the services presently provided to fax users by the telephone networks. His privacy code function is the same as a telephone number: it selects which of a plurality of fax machines will actually receive the message. Unfortunately, his approach leads to exactly the security dilemma facing telephone fax users.

Chapman, U.S. Pat. 4,106,060, has approached the problem in a somewhat different way. He too discloses a facsimile-based mail system. However, in his system, the messages are directed by whatever means to a "paper" post office near the addressee, rather than the addressee's home or place of business. This post office then makes a paper copy of the the fax message, places it in an envelope, and delivers it to the addressee as ordinary mail. This is a reasonably effective solution to the security problem, but it can only be relied upon to provide "next day" delivery, and there are a number of other, competing alternatives for document delivery service on that time scale.

In the present invention the security problem is addressed by a control variation of the destination SAFF queuing system. Messages which the originator wishes to designate as secure are temporarily directed to a auxiliary storage file 54, 89 in the Answer Function of the destination SAFF called a "Mail Box". Instead of being delivered to the destination machine, a report is sent to that machine indicating that a secure message is waiting for a particular addressee. Optionally, a voice message may be directed to a designated telephone number by the General Service Control 50.

This feature works in the following way. Each individual SAFF is assigned its own unique telephone exchange code or codes (typically indicated by the first three digits of a seven digit local number). Thus, the SAFF appears to the



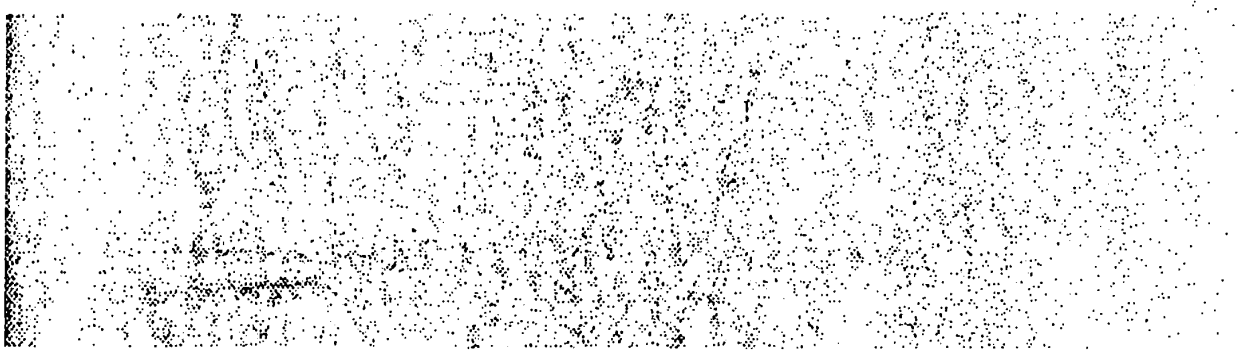
world as if it were a distinct telephone exchange(s), separate from all other exchanges in that area code region. All subscriber's to a given SAFF are assigned their fax telephone numbers with that exchange prefix. Subscribing individuals wishing Mail Boxes (typically associated with a "default" fax machine) are issued "fictitious" telephone numbers which actually terminate in fax Mail Boxes, rather than in an actual telephone line.

Mail Box numbers are published so that correspondents may use them. In addition, each individual is also given a secret security code or PIN number which will access his or her box. The host computer managing the SAFF maintains a list that relates each fictitious number with the individual's name, the security code, and the real telephone number of the default destination machine. This default machine is the one to which messages and reports will normally be sent, when appropriate.

An originator wishing to send a secure message merely dials the (fictitious) Mail Box telephone number at the time the document is sent. The system directs the message to the Mail Box file 89 in the destination SAFF associated with that number, and the Answer Host 85 sends a "Message Waiting" report to the default destination fax machine through the Local Interface 83. If more than one message is in the Mail Box queue, then this report lists them all.

In order to get the fax document actually sent to the destination, the security code must be sent back to the destination SAFF. Typically, this would be done by the addressee dialing his or her own Mail Box number. Since this call originates from a "normal" telephone 34 over Ordinary Local Lines 40, rather than the fax's SAFF Directed Lines 38, the call is directed to the Off-net Incoming Screener 48 in the (destination) SAFF which functions in conjunction with a mailbox service control 49. This unit recognizes that the call is not a fax transmission and thus treats it as a voice service request. A voice response system then prompts the caller to key in the security code. When the correct code is supplied, the SAFF system announces the number of messages waiting and, if desired, the message codes of each. Mail Box contents are maintained in a queue 89 just as are "regular" spool files. Thus, the user is also given the opportunity to reorder the messages within a Mail Box Delivery queue, through the System Status and Control units 11, 20 in the same way as other messages.

The system finally permits the addressee to make a selection of messages for immediate release, and provides an opportunity to "redirect" them to a fax machine 3 other than the default machine over ordinary local lines 39. The SAFF then



releases the selected documents and moves them to the head of the appropriate destination Delivery Queue 88 for immediate delivery.

When messages are accepted into the SAFF system and arrive at a mail box, The Answer Function of the destination SAFF issues a "Posting Report" which is directed back to the Originator in the manner described for other reports. The report is similar to a Delivery Report, except that it indicates that the message has been received by the mail box. When the Mail Box Queue is actually read by the addressee the Destination SAFF sends an actual Delivery Report to the originator indicating the date and time of delivery and so forth.

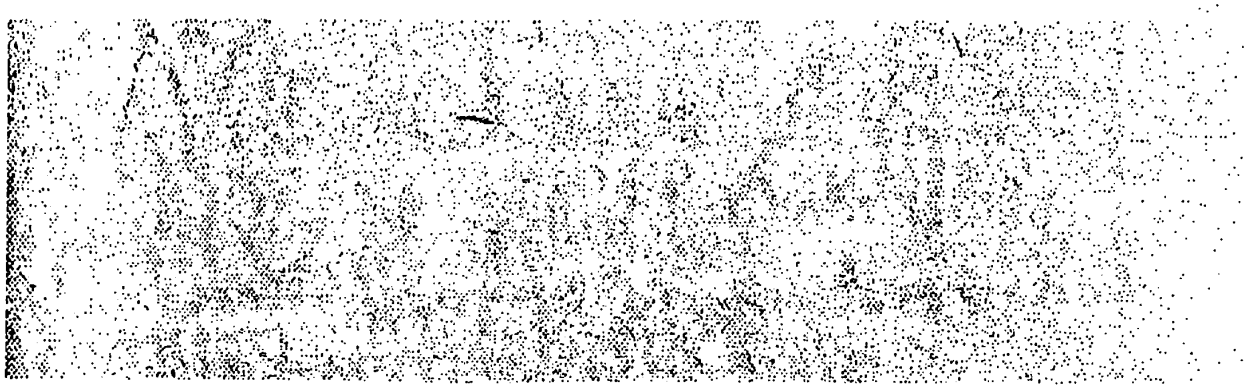
Another advantage of the Mail Box system is that it can provide a convenient way for individuals who are away from their "home" machine to still have access to their documents. Such individuals may call in to their Mail Box number to hear from the voice response unit whether they have any messages waiting. By use of the redirection feature, messages sent to a fax Mail Box can be accessed by an individual with the security code from any telephone with a fax machine.

For example, a person on a business trip can have all his or her fax documents directed to their Mail Box. Upon arriving at a hotel that has a fax machine, the traveler places a call to the Mail Box number and supplies the information outlined above, including the telephone number of the hotel fax machine. The SAFF then calls the hotel machine and dumps the queue of waiting documents.

Broadcasting

The queuing, Mail Boxes, and security codes are all derivative benefits of the spooling of messages at the destination SAFF. There is a counterpart advantage to the originator SAFF's spooling as well. Since the originator SAFF maintains a copy of each message, that copy can be used to broadcast messages to multiple destinations.

This can be initiated in a number of ways. For example, the user can dial in a code prefix indicating that a list of destination numbers is to follow. The numbers are then entered and finally another code is entered to signal "end of list". The Originate Host 70 recognizes these inputs and attaches them to the message which follows. As an alternative, the user can store different numbered broadcast telephone lists in the Originate SAFF mass storage files 69 (entered much as described above) and invoke them simply by dialing a two or three digit "short-cut" code. In either



case, from there the fax transmission to the originator SAFF proceeds normally.

Upon reception of the list and the document, the originator SAFF proceeds to open as many local loop-back or long-distance lines as it can to deliver the broadcast message to the various destinations, essentially simultaneously. Although the originator is billed for making a number of different calls, in fact the originating machine is only tied up for the time required to make one call. Furthermore, the full power of the delivery system is asserted for each destination machine, including reporting, redials, queuing, and so forth.

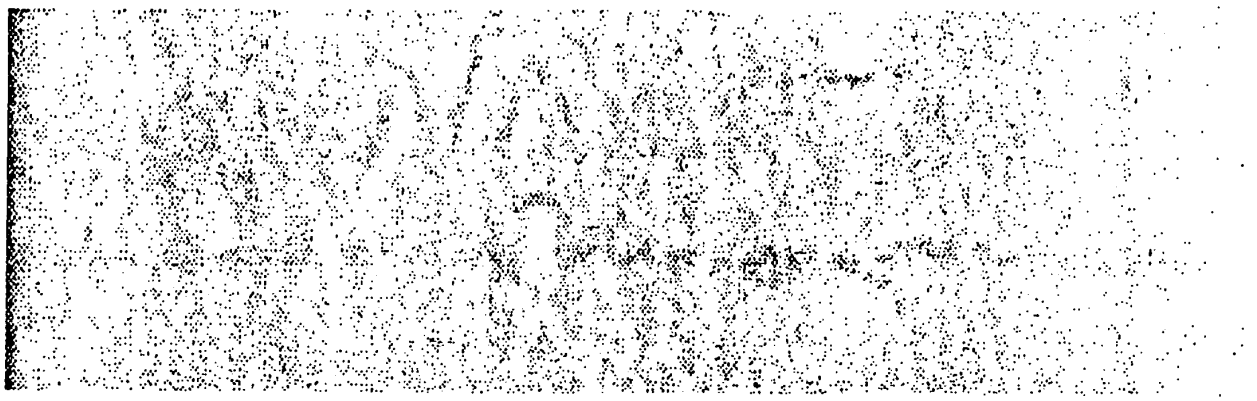
A feature related to broadcasting is the redirection of messages by the originator. Since fax messages are spooled at the originator SAFF and held for a period of time even after delivery (typically six hours), the originator can dial the Service Number any time during this period and direct a copy of the spooled message to be sent to other destination machines.

Communications With Non-subscribers

Thus far, the discussion has presumed that both the originator and answerer were subscribers to the SAFF system. It is quite reasonable to assume that subscribers will wish to send or receive fax messages with non-subscribers, as well. While the services provided by the SAFF are more limited in such cases, nevertheless, the system both anticipates and enhances communications with non-subscribers for the benefit of the subscribers.

When a subscriber originates a call to a non-subscriber the delivery process is almost identical to subscriber-to-subscriber calls. The fax data is forwarded to the Answer Function of the appropriate destination SAFF and delivery is pursued, all in the usual way. For the benefit of the subscribing originator, the message is stored in the usual way at the destination SAFF until delivery is completed. If multiple SAFF-processed messages arrive before the delivery is complete, a temporary Delivery Queue will be created and used as required. However, since the non-subscriber will have no account in the system, attempts to use the Service Number to manipulate the queue, forward messages, make multiple copies, and use the other special services available to a subscribing answerer, will be unsuccessful.

Calls originated by a non-subscriber directed to a subscribing answerer move by a somewhat different mechanism. As noted, each SAFF appears to the world as a distinct telephone



exchange and all subscriber's to a given SAFF are assigned their fax telephone numbers with that exchange prefix. Consequently, all calls directed to a SAFF subscriber eventually end up at the subscriber's SAFF, whether they originated from within the SAFF system network or not. Messages originating "off-network" can arrive by any route. For example, they may be truly local calls, or they may be long-distance calls which arrive over any available long-distance network.

In any case, messages originating from a non-subscriber 33 are delivered to the answering fax machine's SAFF by the local lines 39 provided by the local telephone company. They are answered by the SAFF's Off-net Incoming Screener 48, which, upon noting that they are fax transmissions, directs the calls to the Originate Function 9 of that SAFF. From that point, the call is treated as if it were a local fax call and it is passed over to the Answer Function 12 via the Local Call Loop-back 13 for delivery to the subscriber.

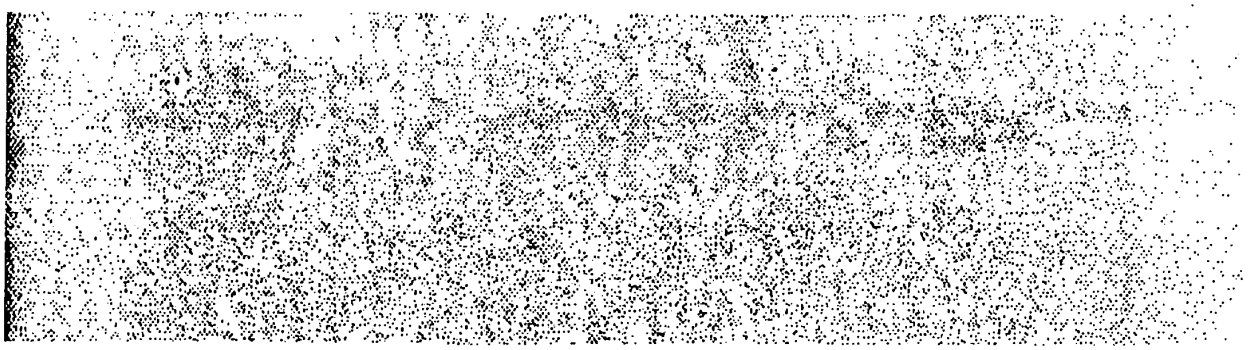
In this situation an Acceptance Record will be returned to the originating machine, but no further originator services are provided. On the other hand, the answering subscriber has the full range of Answer Function available.

Charges and Detailed Billing

Normally, the Originate Function of the originator SAFF has ultimate responsibility for the management of outgoing messages. It initiates all connections to the Answer Functions of the various SAFFs with which it must communicate. It is the node to which all reports concerning message status and disposition must flow. It interrogates Answer SAFFs when extraordinary updates are required. Consequently, the Originate Function is also the focus of charging data.

The telephone company presumably charges for all of the various services provided by this system. The method, algorithm, and rates are determined by actual costs and applicable regulations. Typically, the user would be billed for telephone connect time, toll charges, extraordinary services, such as those provided by calling the Service Number, the amount of mass storage space consumed as a function of time, and so forth.

One of the user services for which a special charge might be made is a subscriber's customer specific billing system. In this option the user can "flag" each fax transmission with a keyed-in prefix which contains a user customer, client, or project number. This number is stored as a key field in the



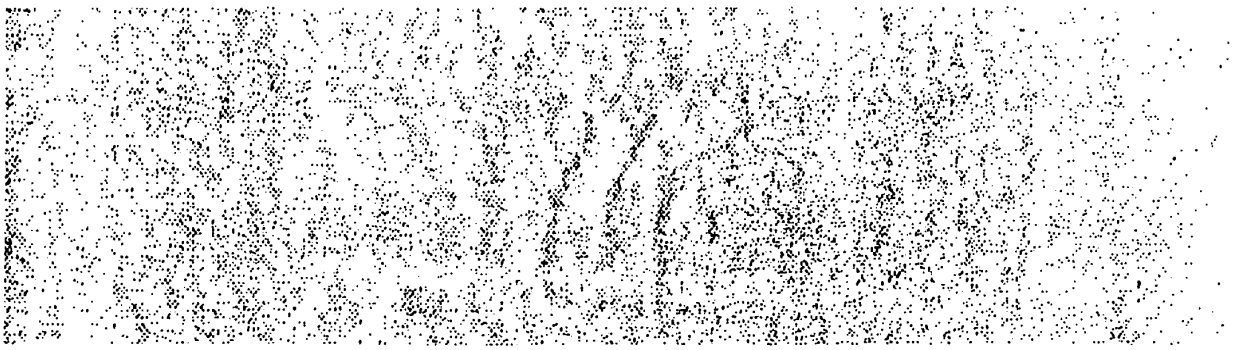
Transaction File for that call. Thus, when the telephone bill is prepared, the billing computer can sort the subscriber's bill on this field and present the user with a list of all fax messages, total usage time, number of pages, and related charges, all grouped by the subscriber's own customers, clients, or projects. Furthermore, it can accept the subscriber's particular algorithm for billing calls to customers or clients and generate a column showing what the subscriber will bill for the service (as a separate matter from what the SAFF system and the telephone company have billed the subscriber). This can be of great assistance in attributing costs and billing customers for services rendered.

Software Control

In the preferred embodiment, each of the principal units of the SAFF such as described in Figures 2,3, and 4 is controlled by its own computer processing unit or units. These units are interrupt-driven computers which are connected together by the System Status and Control unit 11. This unit is an electronic switch yard for control communications between the Originate, Answer, and other units within a given SAFF, as well as the the other SAFFs in the system through the control long-distance trunks 15. While there are many tasks which the various control processors must perform to handle fax operations, the primary ones are intercepting incoming calls, either for fax forwarding or service requests, and delivering the fax messages to their destinations. The general software organization of these principal activities is shown in Fig. 5, 6, and 7. It should be noted that these figures are simplified and intended to be generally descriptive. For example, some procedures illustrated here as sequential (for the sake of simplicity) can actually be performed concurrently. Likewise, not every function of the system is represented in detail. Generally speaking, similar results also can be obtained with a number of other obvious arrangements of the functional blocks.

Broadly speaking, fax messages addressed to the Originate Function of a SAFF arise either through the special SAFF Directed Local Lines 4 (Figures 2 and 3) as a result of direct connection or dialing a special access code, or they arise from Ordinary Local Lines (off-net lines) 39, 40, 63. Those which arrive via off-net lines are processed first by the Off-net Screener 48, which may direct them to either the Originate Function 9 or to Mail Box Service 49. Figure 5, therefore combines all three of these related functions.

At the outset one of the two incoming call interfaces 64 and 65 signals the Host Computer 70 that it is beginning to

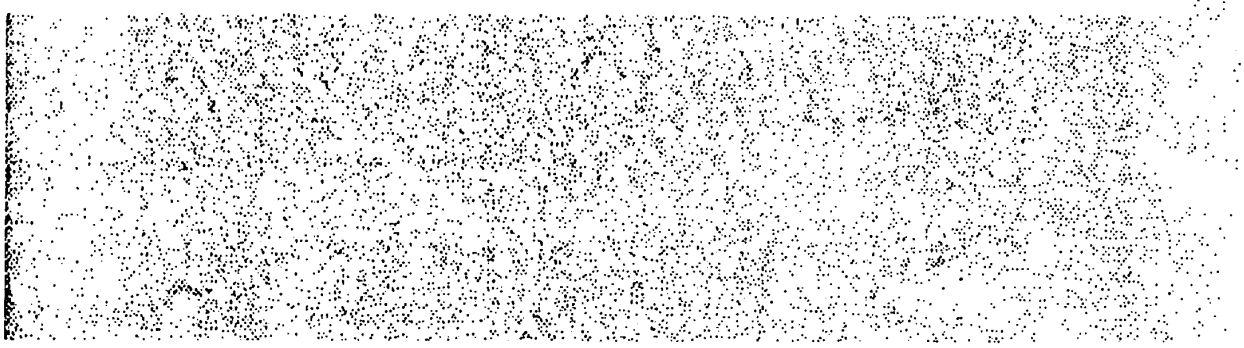


process a call at 100 in Figure 5a. These units have their own buffer capability and can tolerate some delay before the Host responds. Ultimately the Host must decide whether it is responding to an on-net or off-net call 101. If it is an off-net call there are two possibilities (excluding wrong numbers) 102: it may either be a fax call, in which case it is from a non-subscriber to a subscriber, or it is a mail box service call. If it is a fax call then the billing for services must be directed to the subscribing destination addressee 112. From that point it is handled like an on-net call as will be described shortly.

If it is not a fax call then it is presumed to be a mail box service call 103, and the caller is presented with the voice response menu 104 for such service. The user responds to these prompts with a touchtone keypad, or verbally, 105 and a decision ladder, shown succinctly as 107 selects the desired implementation routine 108, 109, 110 (for brevity only three typical choices are shown, and this element is actually a loop which will permit multiple commands). The chosen routine passes parameters to a command parser 121 (Figure 5b) which prepares an command statement which is then sent 122 to the System Status and Control unit 11, through the interface 72. This command will be passed to the Answer Host 85 through its interface 84 for actual action on the Mail Box Queue 89. If the service requires a response to the caller the transmission path is reversed. When the operation is completed 123 the call is terminated.

If on the other hand, the original call is found at 101 to be an on-net call, billing is generally directed at the originator 113 and the Host 70 begins the opening digital dialogue 114 with the calling machine, acting in place of the destination machine. This dialogue includes gathering and storing the fax identifications, originating and destination telephone numbers and so forth 116. The Host opens a Transaction File and links it to a data file 117 for the expected data, and then stores all of the call and file information 118 keyed to the Message Code. The destination telephone number and other information are passed almost immediately 119 to the Outbound Controller 74, which then opens a temporary buffer to hold the fax message in case immediate contact can be established, and it attempts to establish that contact through the destination SAFF.

In pursuing this contact, the Outbound Controller 74 examines the status of available trunks. If trunks are available, it will immediately attempt to connect with the destination SAFF, otherwise it will defer the call until a trunk is available. In the event of a broadcast message, the Outbound Controller will select the number of trunks to use



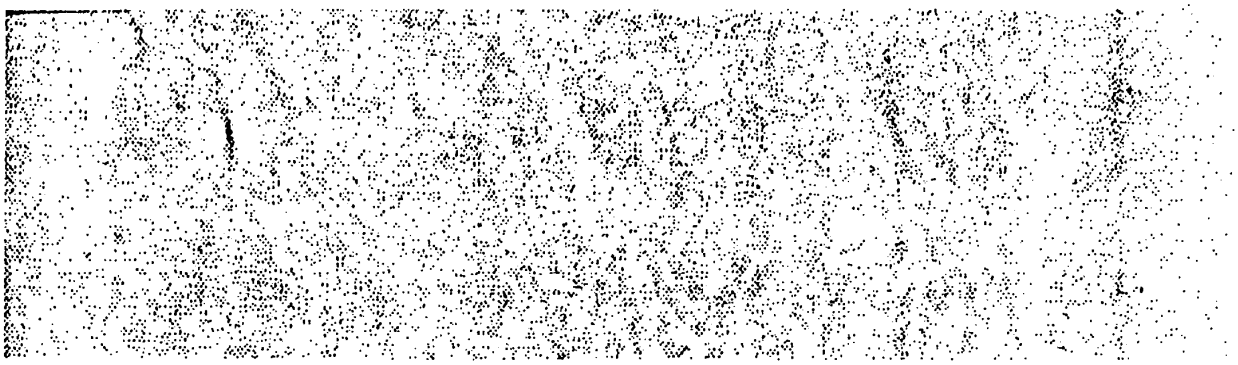
simultaneously based on the percentage of the trunks already in use, in order to avoid tying up all of the SAFF's outgoing capacity with a single message task. Other considerations can affect these usage choices depending on the details of the setting of the system.

The Host then enters a loop which gets the incoming fax data 125 (Figure 5b) from the On-net 64 or Off-net 65 Interface's buffer and stores each byte in the fax data file 126 while sending another copy 127 to the Outbound controller 74 until the incoming data is complete 128. The Host then checks 129 with the Outbound controller to see if it was successful in making immediate connection with the destination machine. If it was successful and a satisfactory transfer occurred, then a Delivery Report is sent back 132 to the originating machine before it leaves the line. Otherwise, an Acceptance Report is sent 131, and in either case the outcome is reported 133 to the Transaction File and the call is terminated 134.

A complementary set of activities occurs in the Answer Function of the destination SAFF as described in Figure 6a and b. Here an incoming call is detected 136 by the Inbound Control 92 (Figure 4). The Answer Host Computer 85 then opens a new fax data and Transaction file for the message if there is no current queue for that destination machine, or it prepares to append the data to an existing queue 137. The various call and file parameters are linked and stored 138 and the call parameters are passed through 139 to the Local Interface 83, which then decides 141 whether the call is addressed to a "real" fax number, or a fictitious number terminating in a mail box. If the number is real the Local Interface attempts to contact the destination machine for immediate delivery.

The Host then enters a loop where it gets the incoming data 147, stores it 148 in the fax Delivery Queue, and passes it through 149 to the Local Interface buffer. When the Host determines that the fax transfer is complete 150, it then checks 152 (Figure 6b) to see if the Local Interface has been able to make immediate delivery. If it has, the Host initiates the transmission of the Delivery Report 167 back through its Status and Control Interface 84 to the System Control and Status unit 11, which in turn updates the Transaction File and sends it back to the originator SAFF over Trunk 15. It is this communication which ultimately results in the immediate Delivery Report described previously. The transaction in then terminated 169.

If immediate connect is not established a Retry Report is sent 153 back through the System Status and Control unit and the Retry sequence begins. The Retry criteria can be varied



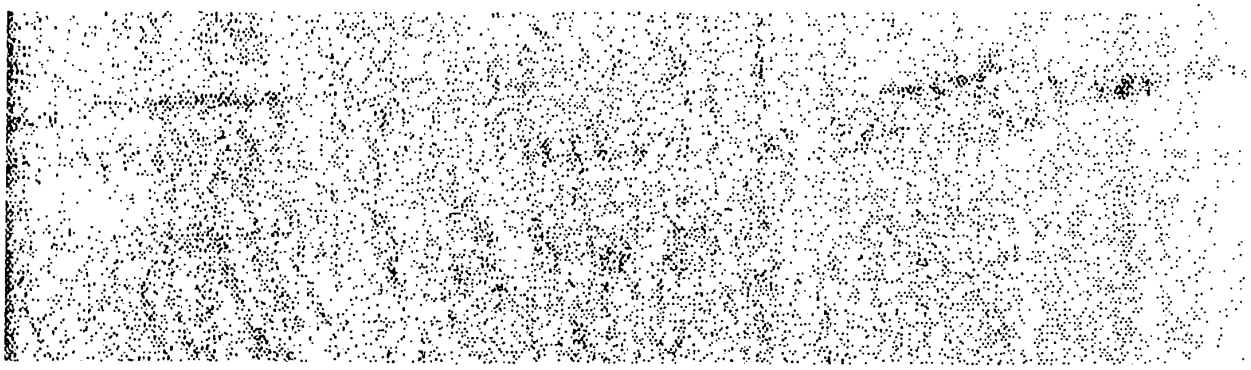
154, both in place and with the SAFF setting. For example, if the SAFF is integrated into a local exchange, the SAFF can actually monitor the desired line and simply wait for it to become available. In other settings it will be necessary for the SAFF to actually redial at prescribed intervals. In any case attempts to connect are made 155 and if they are not successful 156 a counter or timer is checked 159 to see if the retry limit has been exceeded. If not, the process is repeated and if so, a Failed Delivery Report 160 is sent back through the system and the effort terminated 170.

If the retry effort is successful the Delivery Queue is retrieved 158 and message by message 162 the queue is dumped, with a pause 163 after each message to confirm receipt, send a Delivery Report 164 and to check for end of queue 165. If a message fails during the queue dump the retry sequence at 154 is resumed at the failure point and the process repeated to a conclusion. When the last message has been received satisfactorily, the transaction is terminated 168.

If it is determined at 141 (Figure 6a) that this is a mail box call, a loop is entered which gets the fax data 142 and stores it 143 in the appropriate Mail Box Queue. When the end of message is detected 144, a Posting Report 145 is sent back through the system and a Message Waiting Report 146 is sent forward through the system to the default destination machine.

General Service calls always arrive on Ordinary Local Lines 5. Upon detection and answering 172, the voice response menu is presented 173 to the user. As with the Mail Box Service, the user keys in responses or gives them orally 174 and a decision ladder 175 identifies the desired service routine such as 177, 178, or 179. Here again only a few of the possible choices have been shown for sake of illustration and looping for multiple service requests is provided. The selected service routine generates command parameters which are parsed 181 as system commands and sent 182 to the System Status and Control unit 11 for execution. Upon completion of all requests the call is terminated 183.

What has been described are the presently preferred embodiments of a system and method for providing a comprehensive interactive facsimile message management system embedded in a switched telephone network. It should be apparent that many modifications to the system and the method are possible without departing from the true spirit and scope of the invention.



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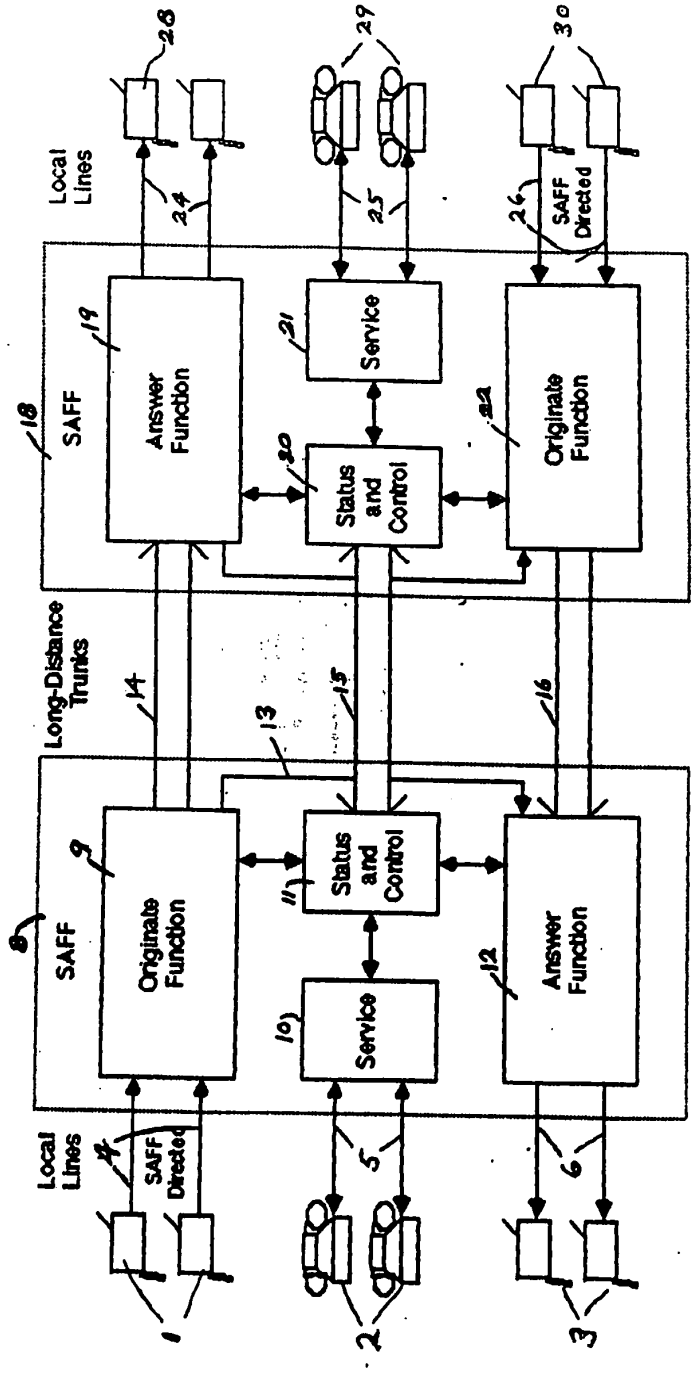

Fig 1

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CANADA

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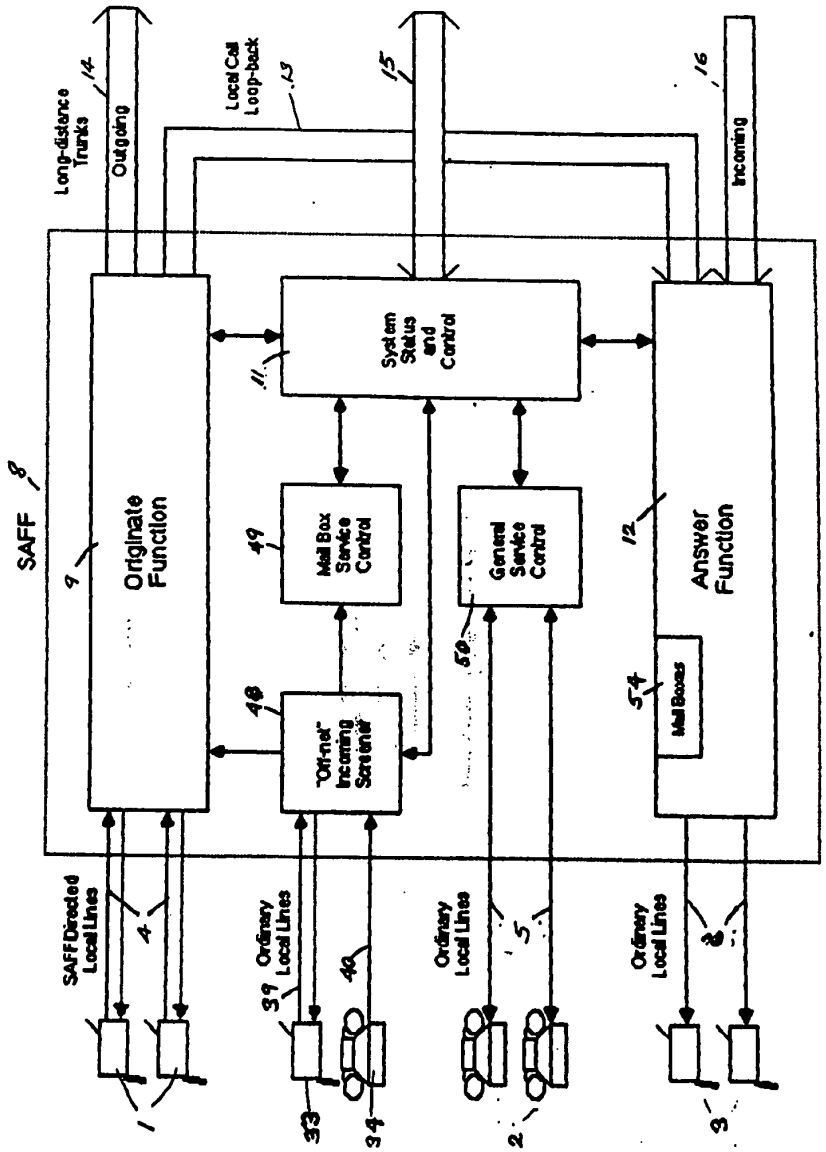

Fig. 2

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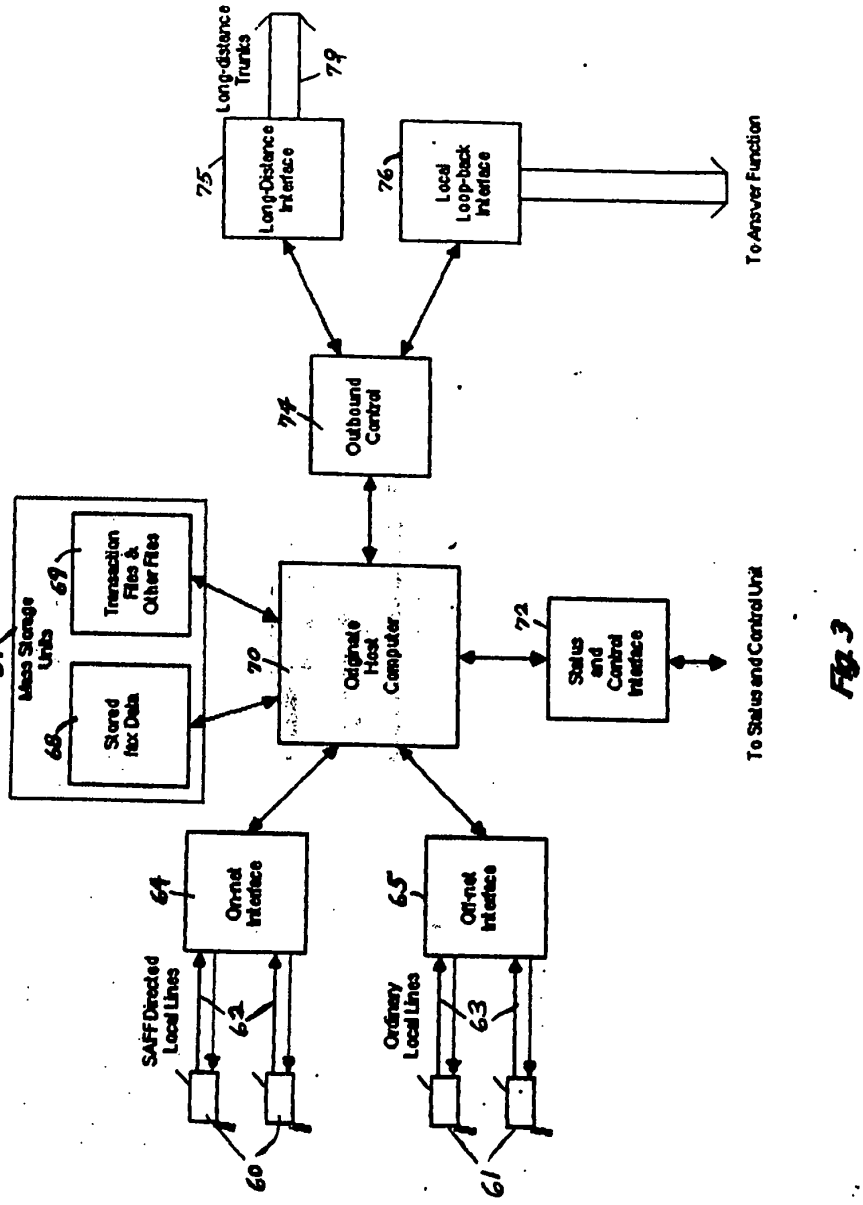

Fig 3

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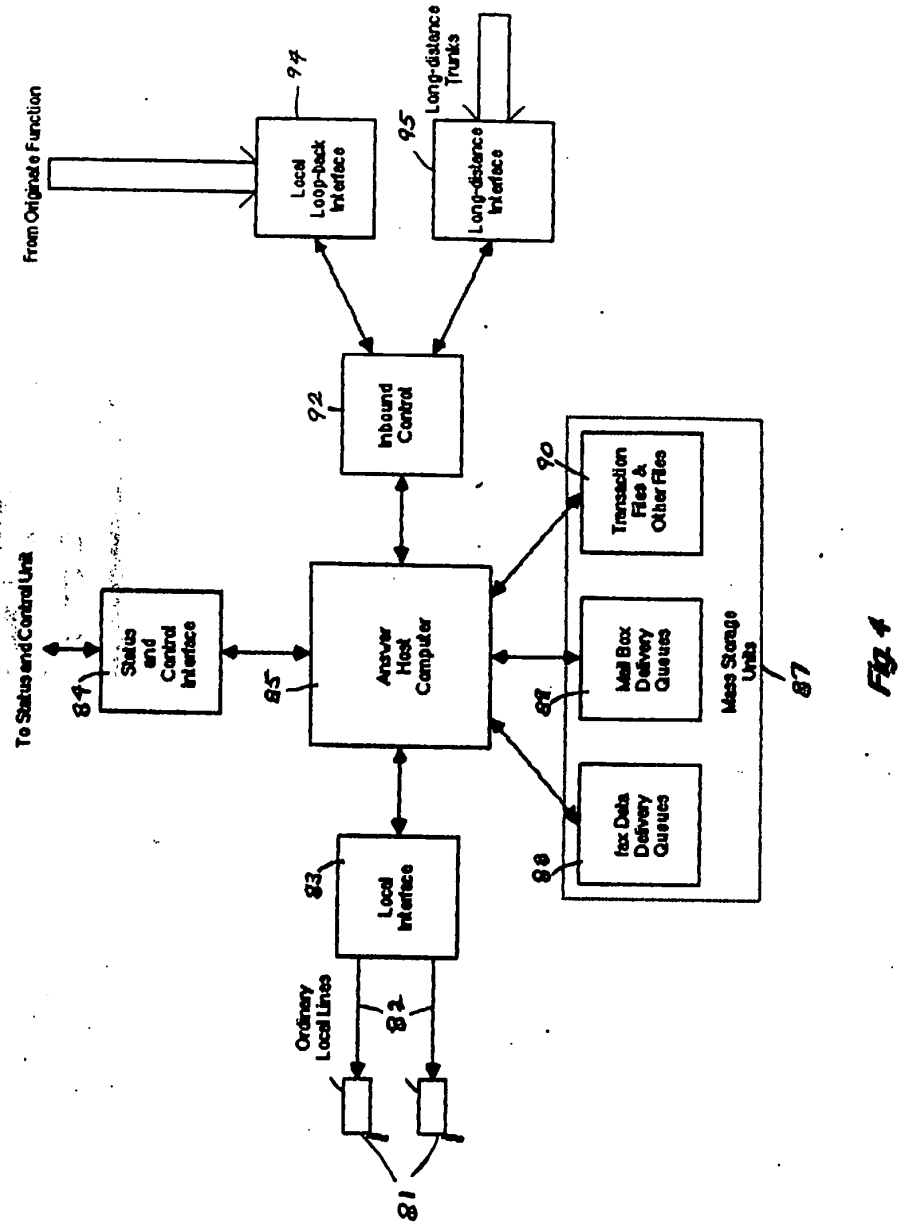

Fig. 1

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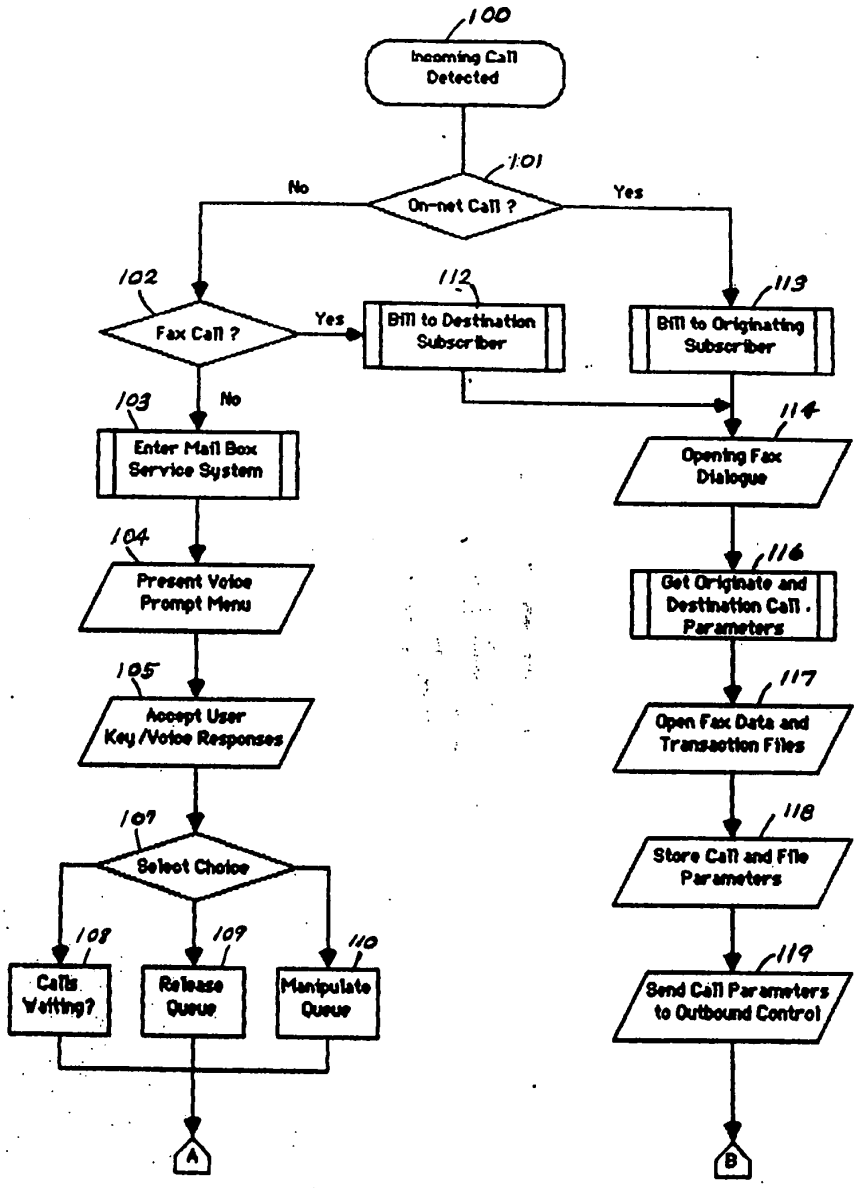

Fig. 5a

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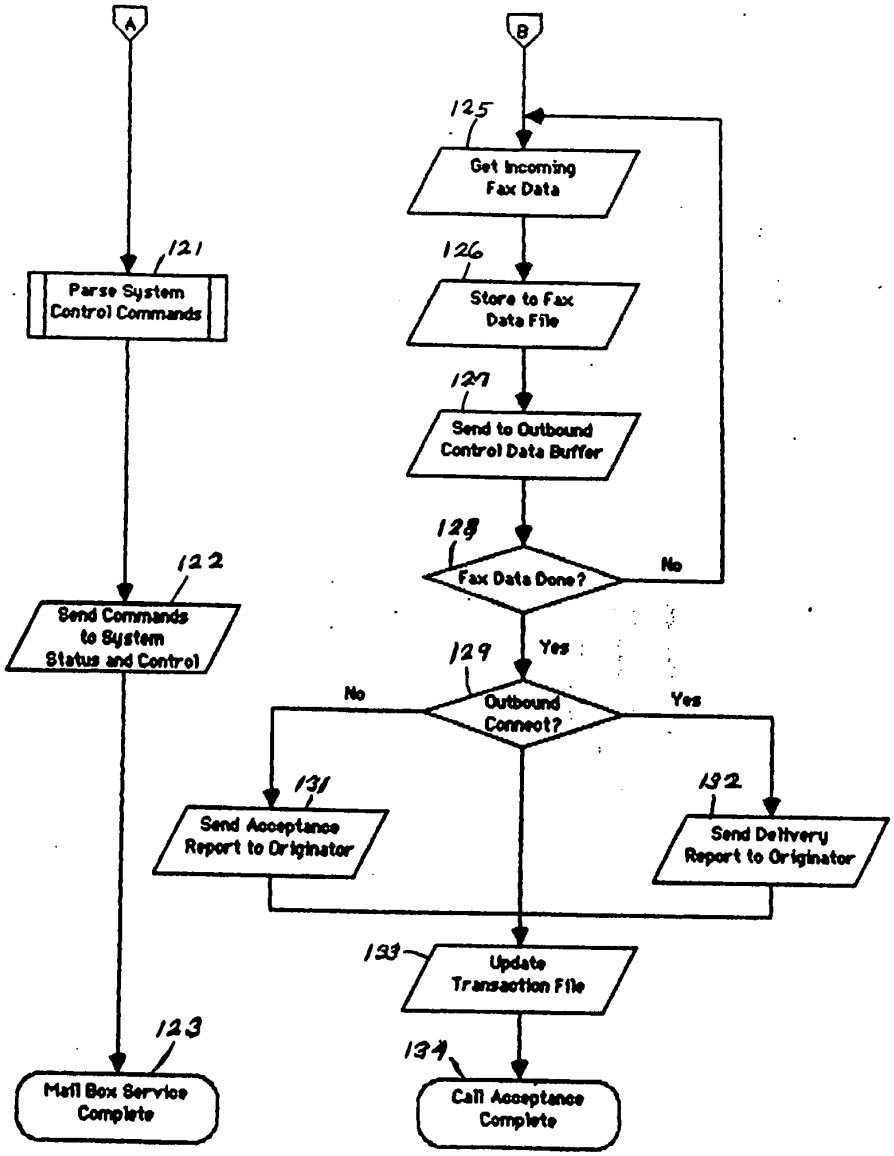

Fig. 5b

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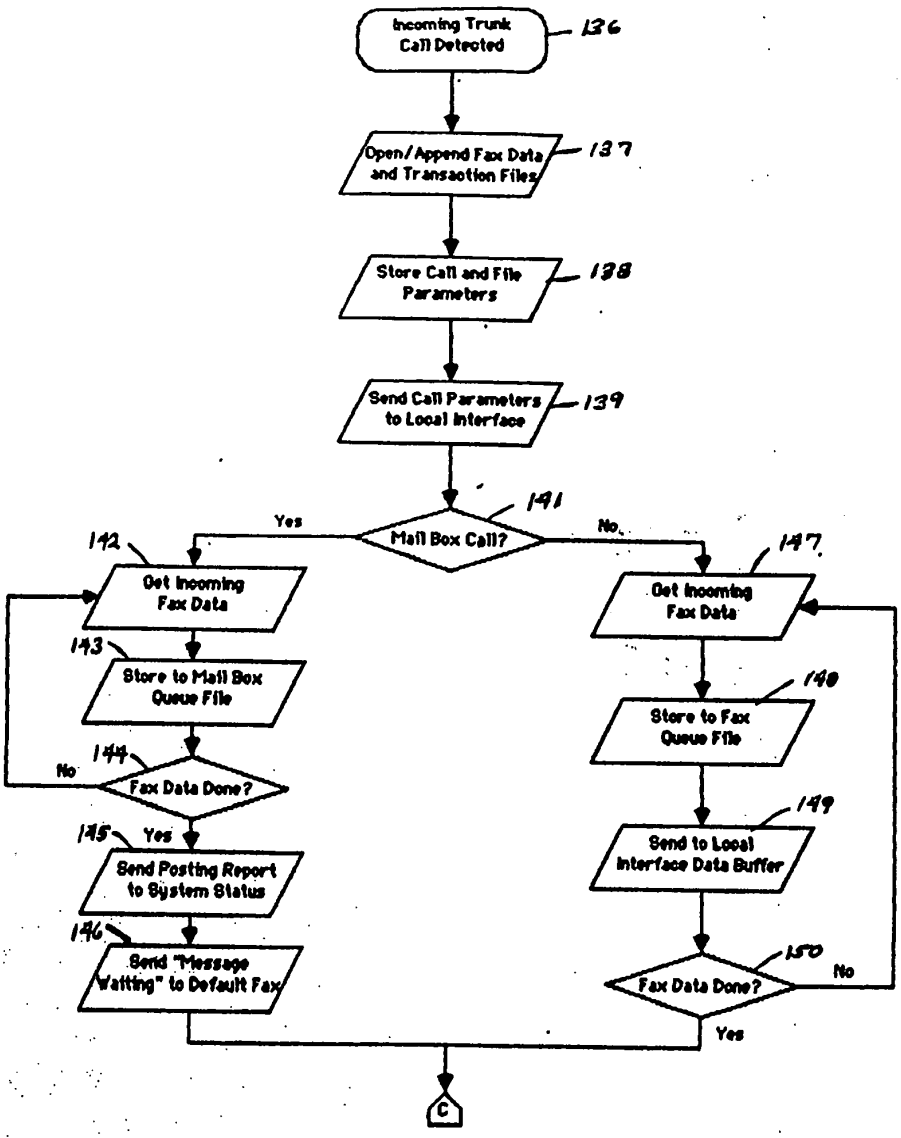

Fig. 6a

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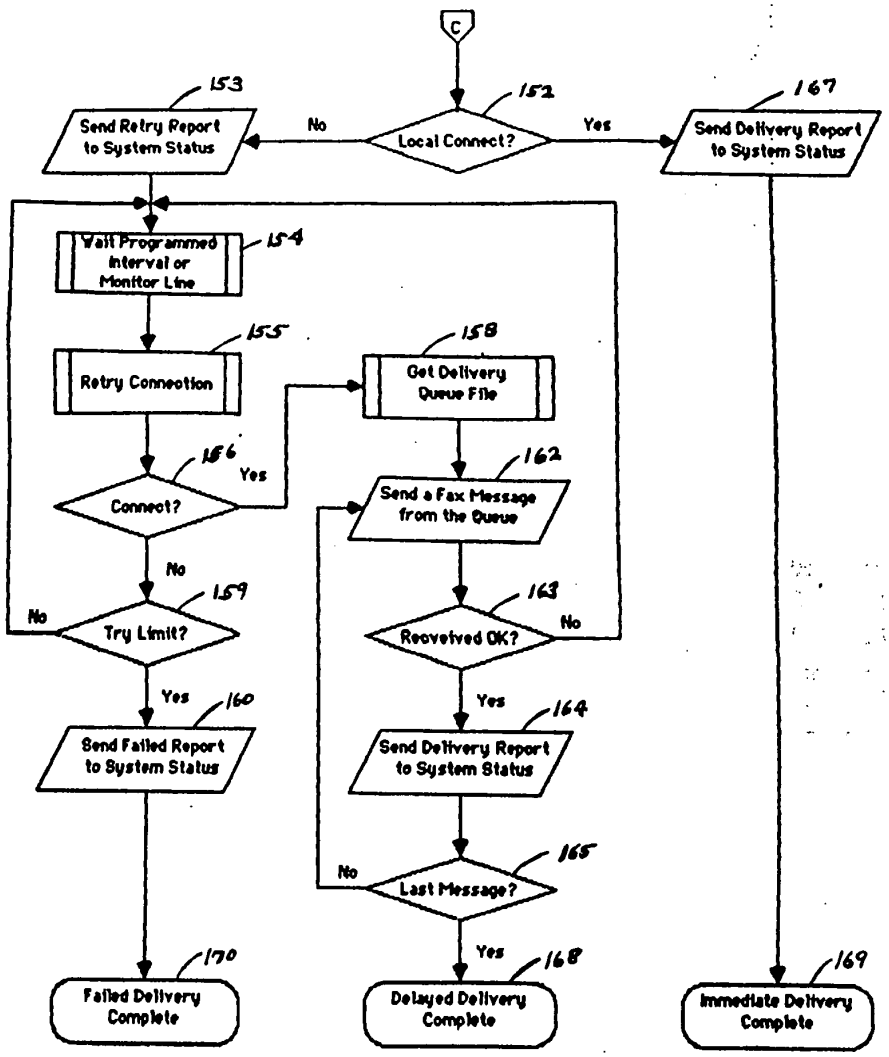

Fig. 6b

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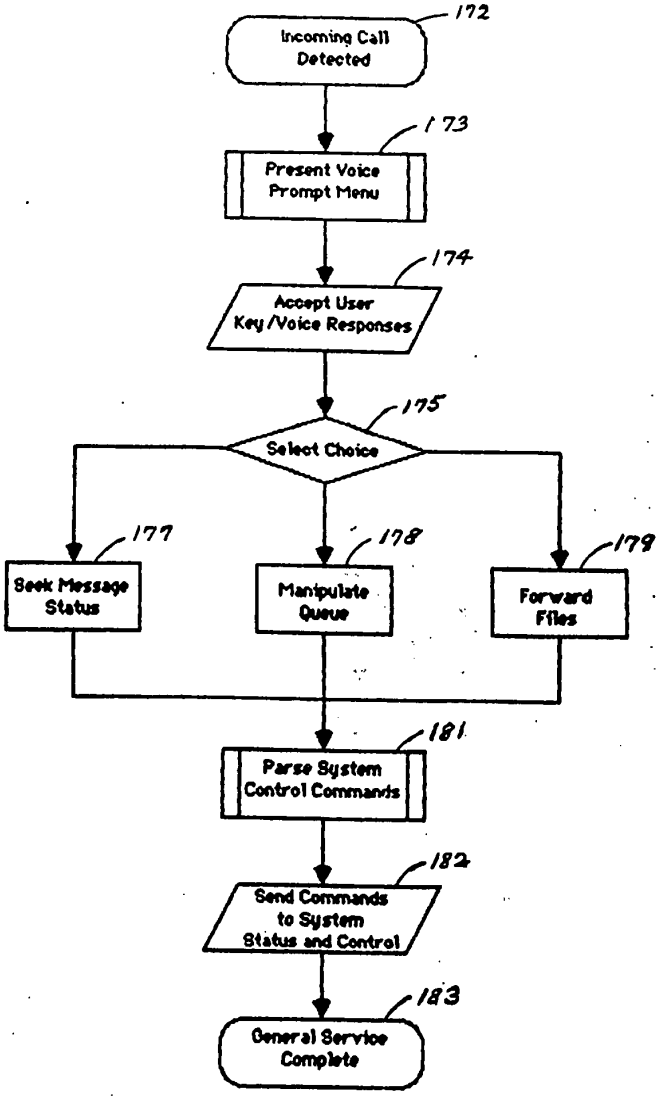

Fig. 7

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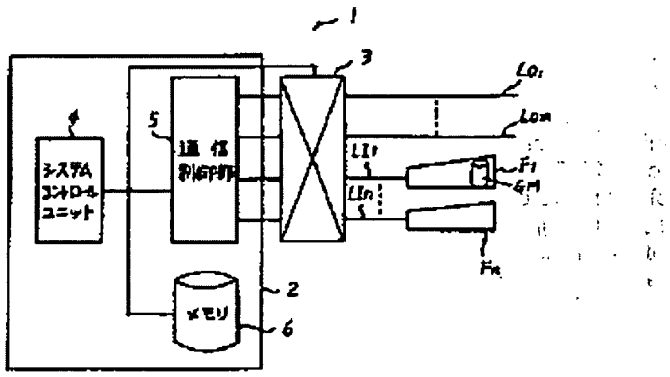
FACSIMILE STORE AND FORWARD SWITCHING SYSTEM

Patent number:	JP1258526
Publication date:	1989-10-16
Inventor:	TSUNODA NAOKI
Applicant:	RICOH CO LTD
Classification:	
- international:	H04L11/20
- european:	
Application number:	JP19880086839 19880407
Priority number(s):	

Abstract of **JP1258526**

PURPOSE:To execute the effective use of the memory of a Fax store and forward switching system by providing at least one terminal of the facsimile(Fax) terminal of an extension equipped with a picture memory and providing a means to accumulate prescribed picture information into the picture memory and transmit the transfer information of the effect to the related Fax terminal.

CONSTITUTION:In a Fax store and forward switching system 1, for example, when the time designation transmission is requested from extension Fax terminals F1-Fn, the system 1 accumulates temporary the picture information of an original from the extension Fax terminals F1-Fn to request the communication request to a memory 6 at the time of the designation time, the picture information is read and transmitted to a designed destination from the memory 6. When the confidential transmission service from the Fax terminal of line wires LO1-LOm to special extension Fax terminals F1-Fn is requested, the system 1 receives the picture information from a requester, accumulates the picture information into the memory 6, and thereafter, the prescribed identifier is designated from the extension Fax terminals F1-Fn, an in case of requesting reception, the system answers the reception request and transmits the picture information of the memory 6.



⑫日本国特許庁(JP)　⑪特許出願公開

⑩公開特許公報(A)　平1-258526

⑤Int.Cl.⁴	識別記号	庁内整理番号	㊸公開　平成1年(1989)10月16日
H 04 L 11/20	101	C-7830-5K	

審査請求　未請求　請求項の数 2　(全5頁)

㊹発明の名称　ファクシミリ蓄積交換装置

㉑特　願　昭63-86839
㉒出　願　昭63(1988)4月7日

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明細書

1．発明の名称

ファクシミリ蓄積交換装置

2．特許請求の範囲

(1)複数の内線と外線を介して複数のファクシミリ端末に接続され、各ファクシミリ端末からの画情報を受信して一旦メモリに蓄積した後、所定の宛先に送信するファクシミリ蓄積交換装置において、内線のファクシミリ端末として画像メモリを備えたファクシミリ端末を少なくとも1端末設け、受信してメモリに蓄積した画情報を、所定の宛先に送信できないとき、該画情報を該画像メモリ付ファクシミリ端末に送信して該画像メモリに蓄積させ、当該宛先等にその旨の転送情報を送信することを特徴とするファクシミリ蓄積交換装置。

(2)前記画像メモリ付ファクシミリ端末への画情報の送信をあらかじめ設定した所定の時間毎あるいはメモリに画情報が所定容量まで蓄積された時に行うことを特徴とする請求項1記載のファクシミリ蓄積交換装置。

3．発明の詳細な説明

(産業上の利用分野)

本発明はファクシミリ蓄積交換装置に関し、画情報を蓄積するメモリの有効利用を図ったファクシミリ蓄積交換装置に関する。

(従来の技術)

近時、ファクシミリ装置が普及するにつれ、複数の内線および外線を介して複数のファクシミリ端末に接続され、各ファクシミリ端末からの画情報をメモリに蓄積した後、指定された宛先に送信するファクシミリ蓄積交換装置が出現している。

このようなファクシミリ蓄積交換装置においては、種々の通信サービスを行っており、例えば、内線ファクシミリ端末から発呼があると、通常のファクシミリ通信手順に従ってファクシミリ制御信号の交換を行った後、当該ファクシミリ端末の有している機能に応じた通信手順を設定し、画情報の受信を行っている。このとき、内線ファクシ

ミリ端末が時刻指定送信を要求すると、ファクシミリ蓄積交換装置は受信した画情報を一旦メモリに蓄積した後、指定の送信時刻に指定された宛先に通常のファクシミリ通信手順に従って送信する。

また、外線ファクシミリ端末から発呼があると、送信相手の内線ファクシミリ端末に接続したり、ファクシミリ蓄積交換装置が当該外線ファクシミリ端末からの画情報を受信してメモリに蓄積した後、内線ファクシミリ端末に送信している。また、外線ファクシミリ端末が親展サービスを要求すると、ファクシミリ蓄積交換装置は、受信した画情報をメモリに蓄積し、その後、内線ファクシミリ端末からの受取要求があると、メモリ内の画情報を送信する。

（発明が解決しようとする課題）

しかしながら、このような従来のファクシミリ蓄積交換装置にあっては、メモリに蓄積した画情報を相手ファクシミリ端末がビジー状態であるとか、紙切れである等の理由により送信できない場合、画情報が送信されずに不達原稿等としてメモリにいつまでも蓄積される。したがって、メモリを有効に利用することができなかった。

そこで、従来、蓄積した画情報の送信先にあらかじめ設定した所定回数だけ再発呼処理を行っても送信できない場合や、親展サービスで所定の許容時間内に受取要求がない場合には、ファクシミリ蓄積交換装置のメモリに蓄積した不達原稿や親展原稿の画情報を消去するファクシミリ蓄積交換装置もある。

しかしながら、ファクシミリ蓄積交換装置のメモリに蓄積した不達原稿や親展原稿の画情報を消去してしまうと、ファクシミリ蓄積交換装置に通信サービスを依頼したファクシミリ端末のオペレータは同様の通信サービスを繰り返し要求する必要があり、ファクシミリ蓄積交換装置の利用性が低下し、また、不達原稿の画情報を有効に利用することができない。

（発明の目的）

そこで、本発明は、内線ファクシミリ端末として画像メモリを備えたファクシミリ端末を少なくとも1端末設け、不達原稿となった画情報や親展原稿の原情報を該ファクシミリ端末に送信してその画像メモリに蓄積し、その旨転送情報を該当するファクシミリ端末に送信することにより、ファクシミリ蓄積交換装置のメモリが不達原稿や親展原稿の画情報により占領されることを防止するとともに、不達原稿や親展原稿の画情報を内線ファクシミリ端末の画像メモリに利用可能な状態で蓄積して、ファクシミリ蓄積交換装置のメモリの有効利用を図るとともに、ファクシミリ蓄積交換装置を利用した通信サービスの便利性をより一層向上させることを目的としている。

（発明の構成）

本発明は、上記目的を達成するため、

（1）複数の内線と外線を介して複数のファクシミリ端末に接続され、各ファクシミリ端末からの画情報を受信して一旦メモリに蓄積した後、所定の宛先に送信するファクシミリ蓄積交換装置において、内線のファクシミリ端末として画像メモリを備えたファクシミリ端末を少なくとも1端末設け、受信してメモリに蓄積した画情報を、所定の宛先に送信できないとき、該画情報を該画像メモリ付ファクシミリ端末に送信して該画像メモリに蓄積させ、当該宛先等にその旨の転送情報を送信することを特徴とするもの。

および、

（2）前記画像メモリ付ファクシミリ端末への画情報の送信をあらかじめ設定した所定の時間毎あるいはメモリに画情報が所定容量まで蓄積された時に行うことを特徴とするものである。

以下、本発明の実施例に基づいて具体的に説明する。

第1、2図は本発明の一実施例を示す図である。

第1図において、1はファクシミリ蓄積交換装置であり、ファクシミリ蓄積交換装置1は本体2と構内交換機（Private Branch Exchange: PBX）3を備えている。

本体2は、システムコントロールユニット4、通信制御部5およびメモリ6を備えており、構内交換機3には内線L1，～Lnを介して内線フ

ァクシミリ端末F₁～Fnが接続されるとともに、外線LO₁～LOmが接続されている。構内交換機3はシステムコントロールユニット4からの指示に従い、発呼動作を行うとともに、内線LI₁～LInn相互および内線LI₁～LInと外線LO₁～LOmとの接続・交換を行う。

内線ファクシミリ端末F₁～Fnのうち内線ファクシミリ端末F₁は画像メモリGMを備えており、画像メモリGMは原稿複数ページ分の画情報を蓄積する容量を有している。

通信制御部5は変・復調器、圧縮・再生器、ダブルバッファメモリ等を備えている。通信制御部5はシステムコントロールユニット4からの指示に従い、相手ファクシミリ端末（内線ファクシミリ端末F₁～Fnまたは外線に接続されたファクシミリ端末）とファクシミリ制御信号の交換を行うとともに、相手ファクシミリ端末より送信されてきた画情報の復調、冗長度抑圧符号化を行いながらダブルバッファメモリの片方に貯めこみ、一杯になると、メモリ6に転送するという入力動作、およびメモリ6から転送されてきた画情報をダブルバッファメモリの片方に貯めた後、変調して相手ファクシミリ端末に送出するという出力動作を行う。

システムコントロールユニット4は内部ROMに格納するプログラムに従ってファクシミリ蓄積交換装置1の各部を制御してファクシミリ蓄積交換装置1としてのシーケンスを実行するとともに、本発明の不達原稿の画情報転送処理を実行する。

メモリ6は各ファクシミリ端末から送信されてきた画情報を蓄積し、メモリ6に蓄積された画情報は指定宛先毎にシステムコントロールユニット4によりファイル管理されている。

次に、作用を第2図に示すフローチャートに基づいて説明する。

ファクシミリ蓄積交換装置1は内線ファクシミリ端末F₁～Fnあるいは外線LO₁～LOmに接続されたファクシミリ端末からの通信サービス要求があると、その通信サービス要求に応じて種々の通信サービスを提供する。例えば内線ファクシミリ端末F₁～Fnから時刻指定送信の要求があると、ファクシミリ蓄積交換装置1は通信要求を依頼してきた内線ファクシミリ端末F₁～Fnからの原稿の画情報を受信して一旦メモリ6に蓄積し、指定時刻になると、メモリ6から当該画情報を読み出して指定された宛先に送信する。また、外線LO₁～LOmのファクシミリ端末から特定の内線ファクシミリ端末F₁～Fn宛への親展送信サービスの要求があると、ファクシミリ蓄積交換装置1は依頼元からの画情報を受信してメモリ6に蓄積し、その後、内線ファクシミリ端末F₁～Fnから所定のID（識別子）を指定して受取要求があると、その受取要求に答えてメモリ6の画情報を送信する。

このように、ファクシミリ蓄積交換装置1では通信サービスの内容によってはメモリ6に画情報を蓄積し、通信サービスが完了するまで、メモリ6に蓄積される。しかし、送信先がビジー状態や紙切れ状態等で、メモリ6内の画情報を送信できないときや、親展送信サービスで受取要求がない場合には不達原稿としていつまでもメモリ6に蓄積され、メモリ6の有効利用が図れない。

そこで、本実施例では、内線ファクシミリ端末として画像メモリGMを備えたファクシミリ端末F₁を設置し、所定の転送時刻、あるいはメモリ6の蓄積容量等に基づいてメモリ6の不達原稿の画情報を内線ファクシミリ端末F₁に転送してその画像メモリGMに蓄積させる。

すなわち、システムコントロールユニット4は、まず、不達原稿がメモリ6に有るか、すなわち、時刻指定送信要求に応じて受信した原稿の画情報で指定時刻に発呼したが受信できず、所定回数再発呼して送信できない画情報がメモリ6に有るかどうか、をチェックし（ステップP₁）、不達原稿が無いときには、受取要求の無い親展原稿の画情報がメモリ6に有るかどうかチェックする（ステップP₂）。親展原稿の画情報も無いときには、転送レポート要求が有るかチェックし（ステップP₃）、転送レポート要求が無いときにはステップP₁に戻る。

ステップP₁あるいはステップP₃で不達原稿あるいは受取要求の無い親展原稿が有るときには、あらかじめ設定された転送時刻かどうかチェックし（ステップP4）、転送時刻になっていないときには、メモリ6への蓄積量があらかじめ設定した蓄積量に達しているかどうかチェックする（ステップP₅）。転送時刻としては、例えば、1日1回あるいは数回適当な時刻を転送時刻として設定してもよいし、また不達原稿では送信指定時刻から何時間か後を転送時刻とし、親展原稿では原稿受信時刻から何時間か後を転送時刻としてもよい。また、メモリ6の蓄積量としてはメモリ6の全メモリ容量から以降の通信サービスとの関係から適宜原稿のページ数等で設定する。

転送時刻になっておらず、メモリ6の蓄積量も所定量に達していないときには（ステップP₄、P₅）、ステップP₁に移行して同様の処理を繰り返す。転送時刻になるか、メモリ6への蓄積量が所定量に達すると、画像メモリGMを備えた内線ファクシミリ端末F₁を発呼し（ステップP₆）、不達原稿や親展原稿を内線ファクシミリ端末F₁に転送する（ステップP₇）。このとき、ファクシミリ蓄積交換装置1は、不達原稿についてはメモリ送信して内線ファクシミリ端末F₁の画像メモリGMに蓄積させ、親展原稿については親展送信して内線ファクシミリ端末F₁の画像メモリGMに蓄積させる。原稿の送信が終了すると、回線を切断する（ステップP₈）。

次いで、ファクシミリ蓄積交換装置1は該当する内線ファクシミリ端末F₁～Fnを発呼して転送レポートを出力する（ステップP₉、P₁₀、P₁₁）。この転送レポートは不達原稿や親展原稿を内線ファクシミリ端末F₁の画像メモリGMに転送した旨およびその原稿のリストを示すレポートであり、ファクシミリ装置のレポート機能を利用している。すなわち、ファクシミリ蓄積交換装置1は、まず、不達原稿や親展原稿を転送した内線ファクシミリ端末F₁に発呼し、転送レポートを出力する。したがって、内線ファクシミリ端末F₁のオペレータは内線ファクシミリ端末F₁の画像メモリGMに不達原稿や親展原稿の画情報が蓄積されていることを知ることができる。次いで、ファクシミリ蓄積交換装置1は転送原稿が不達原稿のときは、時刻指定送信を依頼してきた内線ファクシミリ端末F₁～Fnを発呼し、転送レポートを出力する。したがって、時刻指定送信を依頼した内線ファクシミリ端末F₁～Fnのオペレータは原稿が消去をされないで、内線ファクシミリ端末F₁の画像メモリGMに蓄積されていることを知り、内線ファクシミリ端末F₁の画像メモリGMに蓄積されている原稿の画情報を有効に利用することができる。

また、前記ステップP₃で、即に内線ファクシミリ端末F₁に転送した不達原稿や親展原稿に対して送信要求や受取要求があると、ファクシミリ蓄積交換装置1は転送レポート要求と判断して、ステップP₉に移行し、当該内線ファクシミリ端末F₁～Fnに転送レポートを出力する（ステップP₉～P₁₁）。

このように、本実施例のファクシミリ蓄積交換装置1においては、不達原稿や親展原稿を内線ファクシミリ端末F₁の画像メモリGMに転送し、画像メモリGMに蓄積させることができるので、ファクシミリ蓄積交換装置1のメモリ6を有効に利用することができるとともに、内線ファクシミリ端末F₁の画像メモリGMを有効に利用することができる。また、内線ファクシミリ端末F₁の画像メモリGMに蓄積した不達原稿や親展原稿を有効に利用することができる。

なお、上記実施例においては、ファクシミリ蓄積交換装置1のメモリ6に蓄積した原稿を転送する条件として、転送時刻とメモリの蓄積量を取り上げたが、これに限るものではなく、また、その条件の設定方法も上記実施例のものに限るものではない。

（効果）

本考案によれば、ファクシミリ蓄積交換装置のメモリが不達原稿や親展原稿の画情報により占領されることを防止することができるとともに、不達原稿や親展原稿の画情報を内線ファクシミリ端末

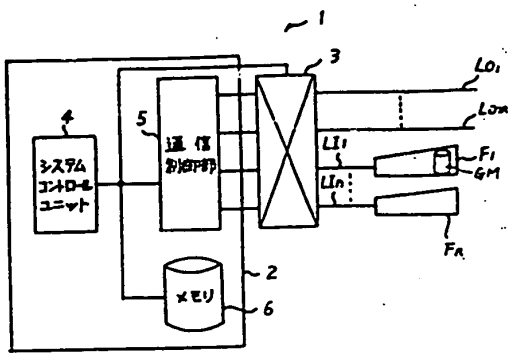
の画像メモリに利用可能な状態で蓄積することができ、ファクシミリ蓄積交換装置のメモリの有効に利用することができるとともに、ファクシミリ蓄積交換装置を利用した通信サービスの便利性をより一層向上させることができる。

4．図面の簡単な説明

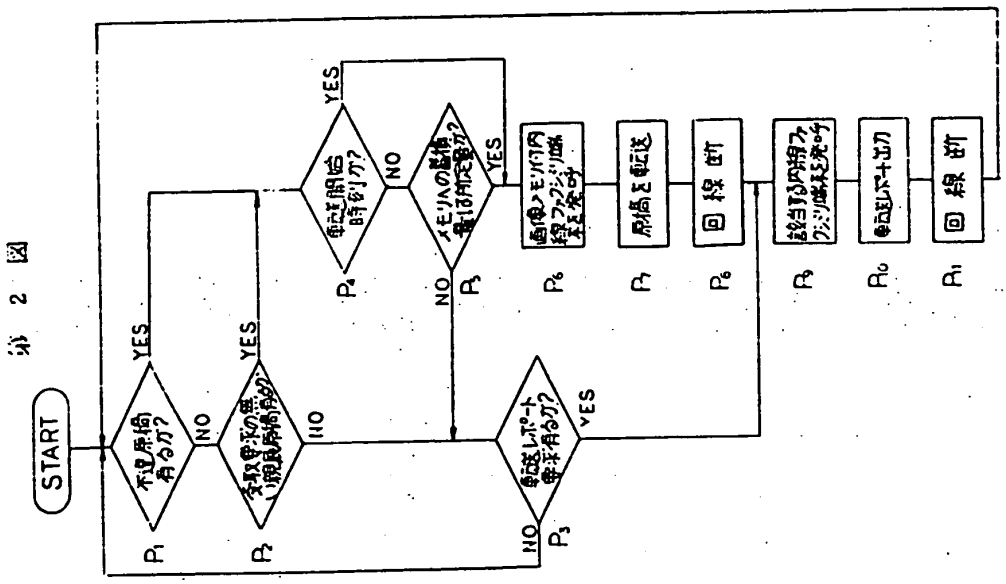
第1、2図は本発明のファクシミリ蓄積交換装置の一実施例を示す図であり、第1図はそのファクシミリ蓄積交換装置のブロック図、第2図はその原稿転送処理を示すフローチャートである。

1……ファクシミリ蓄積交換装置、
2……本体、
3……構内交換機、
4……システムコントロールユニット、
5……通信制御部、
6……メモリ、
LI，～LIn……内線、
LO，～LOm……外線、
F，～Fn……内線ファクシミリ端末、
GM……画像メモリ。

第1図



第2図



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H4K KOD
H4F FDB FS24 FS3C

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UK CL (Edition J) H4K KOD KOF
INT CL⁴ H04M
Derwent WPIL (online) INSPEC (RTM) online

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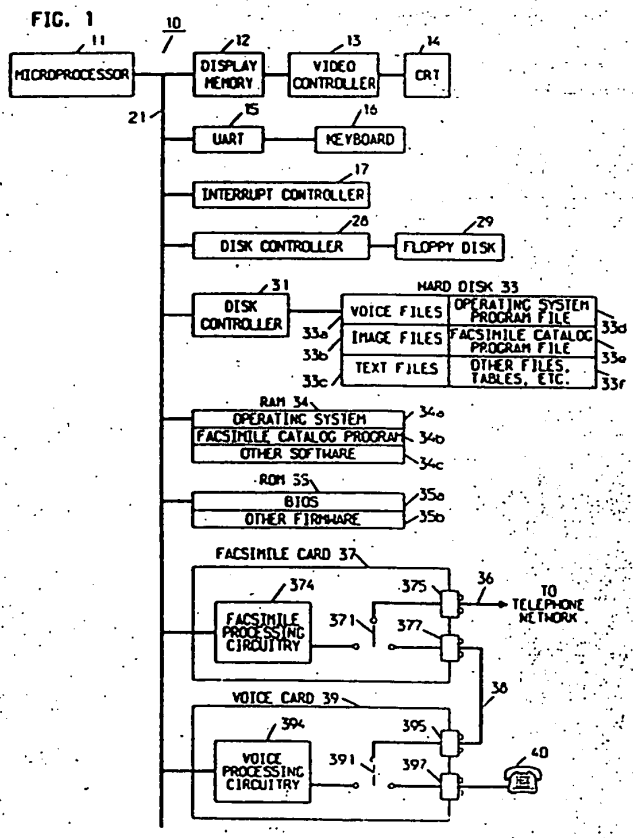
(54) Document distribution system with voice generation and facsimile

(57) Printed or other pre-formed documents are delivered to requesters rapidly and at low cost by a microcomputer-based system which uses voice generation circuitry to invite a person calling in to the system to specify the document needed by pushing particular keys of his/her touch-tone telephone 40 or by spoken input. Upon ascertaining the identity of the document in question, the computer transmits the document to the caller in standard facsimile form, either over the telephone connection already established if the telephone call was initiated from a telephone connected with a facsimile machine, or to a different telephone number specified by the caller.

FIG. 1



GB 2 211 698 A

FIG. 1

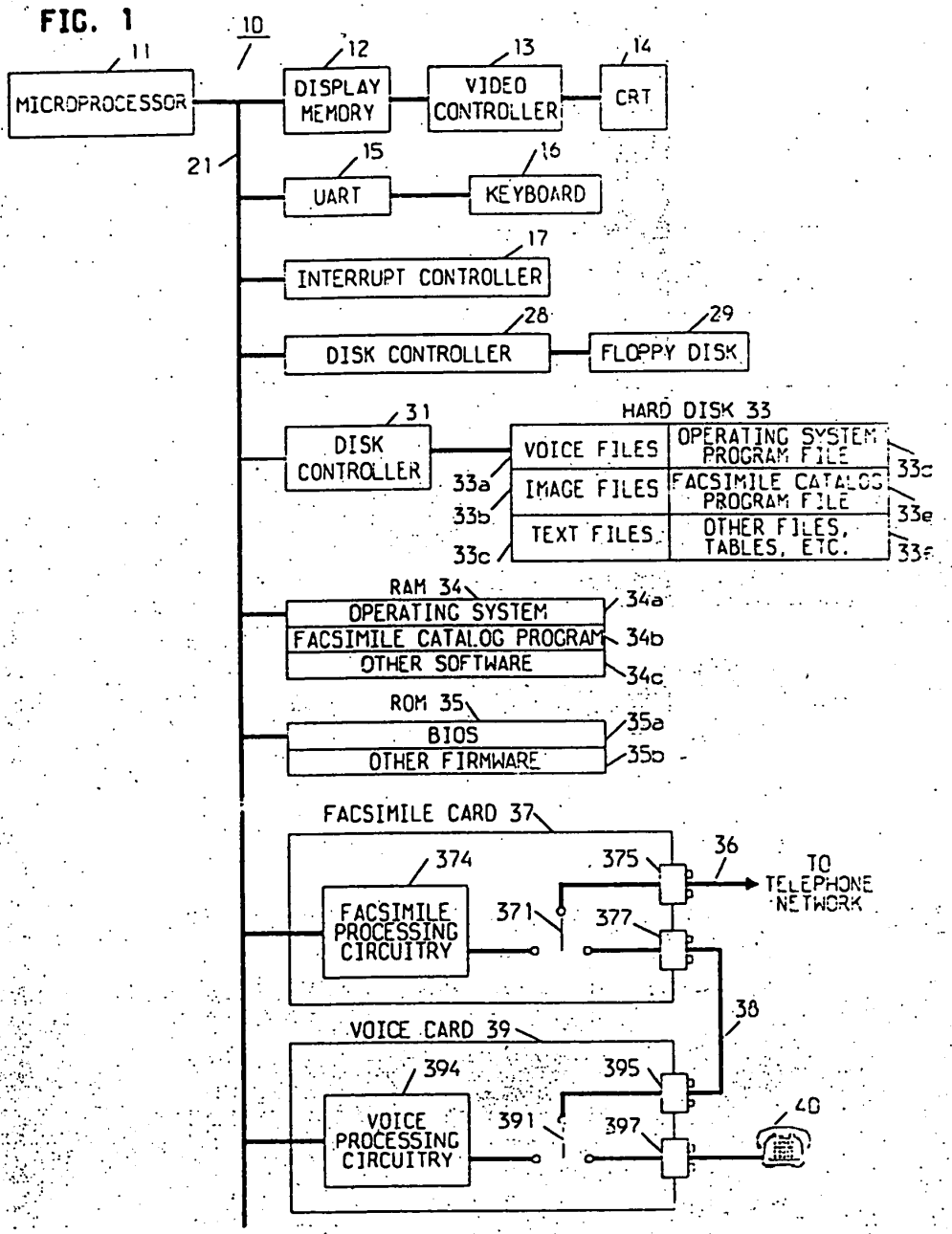

10
11
MICROPROCESSOR
12
DISPLAY MEMORY
13
VIDEO CONTROLLER
14
CRT
21
15
UART
16
KEYBOARD
17
INTERRUPT CONTROLLER
28
DISK CONTROLLER
29
FLOPPY DISK
31
DISK CONTROLLER
HARD DISK 33
VOICE FILES
IMAGE FILES
TEXT FILES
OPERATING SYSTEM PROGRAM FILE
FACSIMILE CATALOG PROGRAM FILE
OTHER FILES, TABLES, ETC.
33a
33b
33c
33d
33e
33f
RAM 34
OPERATING SYSTEM
FACSIMILE CATALOG PROGRAM
OTHER SOFTWARE
34a
34b
34c
ROM 35
BIOS
OTHER FIRMWARE
35a
35b
FACSIMILE CARD 37
374
FACSIMILE PROCESSING CIRCUITRY
375
36
TO TELEPHONE NETWORK
371
377
38
VOICE CARD 39
394
VOICE PROCESSING CIRCUITRY
395
391
397
40

FIG. 2

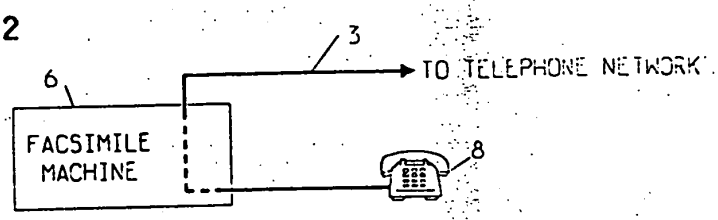

3
TO TELEPHONE NETWORK
6
FACSIMILE MACHINE
8

FIG. 4

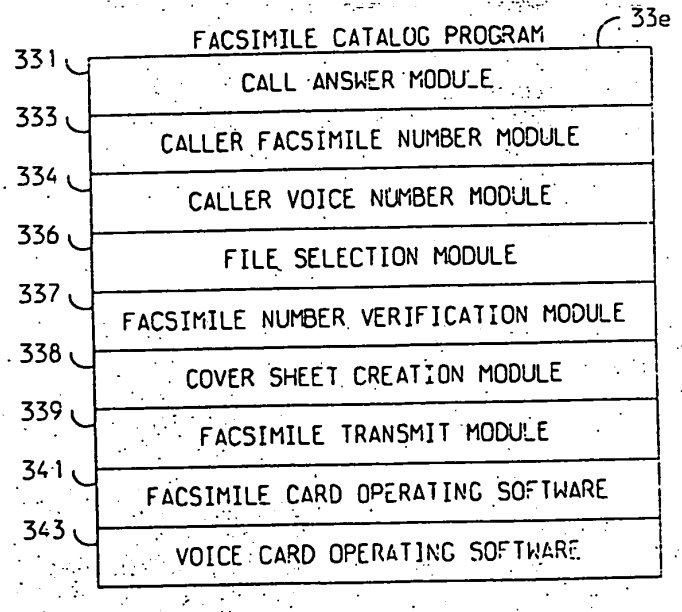
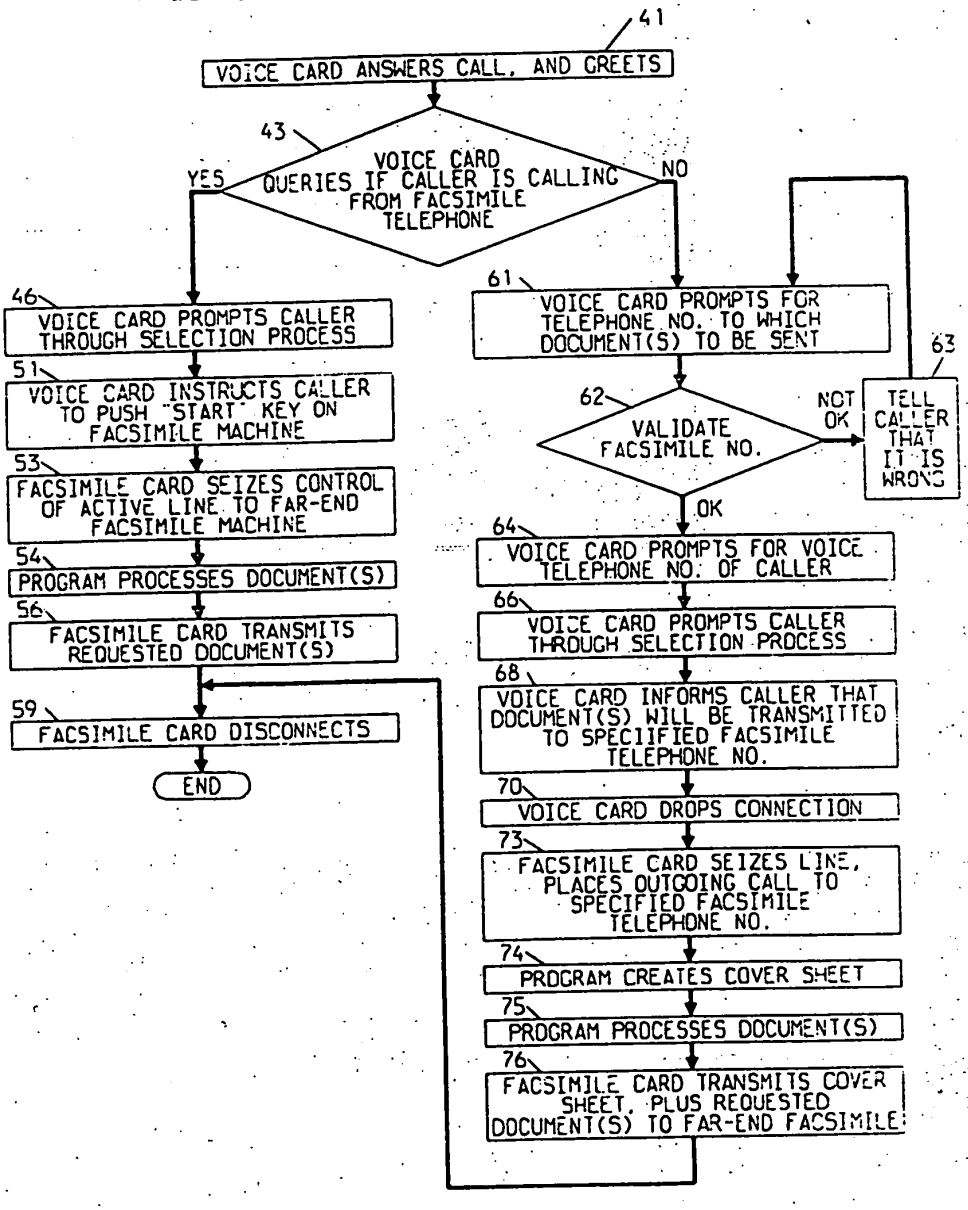

FACSIMILE CATALOG PROGRAM
33e
331
CALL ANSWER MODULE
333
CALLER FACSIMILE NUMBER MODULE
334
CALLER VOICE NUMBER MODULE
336
FILE SELECTION MODULE
337
FACSIMILE NUMBER VERIFICATION MODULE
338
COVER SHEET CREATION MODULE
339
FACSIMILE TRANSMIT MODULE
341
FACSIMILE CARD OPERATING SOFTWARE
343
VOICE CARD OPERATING SOFTWARE

FIG. 3


41
VOICE CARD ANSWERS CALL, AND GREETS
43
VOICE CARD QUERIES IF CALLER IS CALLING FROM FACSIMILE TELEPHONE
YES
NO
46
VOICE CARD PROMPTS CALLER THROUGH SELECTION PROCESS
51
VOICE CARD INSTRUCTS CALLER TO PUSH "START" KEY ON FACSIMILE MACHINE
53
FACSIMILE CARD SEIZES CONTROL OF ACTIVE LINE TO FAR-END FACSIMILE MACHINE
54
PROGRAM PROCESSES DOCUMENT(S)
56
FACSIMILE CARD TRANSMITS REQUESTED DOCUMENT(S)
59
FACSIMILE CARD DISCONNECTS
END
61
VOICE CARD PROMPTS FOR TELEPHONE NO. TO WHICH DOCUMENT(S) TO BE SENT
62
VALIDATE FACSIMILE NO.
NOT OK
63
TELL CALLER THAT IT IS WRONG
OK
64
VOICE CARD PROMPTS FOR VOICE TELEPHONE NO. OF CALLER
66
VOICE CARD PROMPTS CALLER THROUGH SELECTION PROCESS
68
VOICE CARD INFORMS CALLER THAT DOCUMENT(S) WILL BE TRANSMITTED TO SPECIFIED FACSIMILE TELEPHONE NO.
70
VOICE CARD DROPS CONNECTION
73
FACSIMILE CARD SEIZES LINE, PLACES OUTGOING CALL TO SPECIFIED FACSIMILE TELEPHONE NO.
74
PROGRAM CREATES COVER SHEET
75
PROGRAM PROCESSES DOCUMENT(S)
76
FACSIMILE CARD TRANSMITS COVER SHEET, PLUS REQUESTED DOCUMENT(S) TO FAR-END FACSIMILE

METHOD AND APPARATUS FOR TRANSMITTING DOCUMENTS

This invention relates to methods of and apparatus for transmission of documents.

It is a common and oft-repeated circumstance of business and consumer life that one needs to obtain a printed document from a supplier of same. Such documents range from government forms to integrated circuit "specification" sheets to airline schedules. A typical such transaction begins when the person needing the documents telephones the business establishment or agency in question and, having been put in contact with an order clerk, salesman, etc, requests the needed document. Typically, the document is delivered to the requester in the mail. When the requester is in a hurry, however, an "overnight delivery" service or, perhaps, private messenger may be used. Such expedited delivery mechanisms are relatively expensive, however.

The present invention is directed to a system, which is illustratively microcomputer-based, for delivering printed or other pre-formed documents to requesters rapidly and at low cost. In particular, the requester dials a telephone number associated with the system. The latter uses voice generation circuitry to invite the requester, hereinafter the "caller", to specify the document needed, such as by pushing particular keys of his/her touch tone telephone. Upon ascertaining the identity of the document in question, the computer transmits the document to the caller in standard facsimile form.

Advantageously, if the telephone call was initiated from a telephone connected with a facsimile machine—a fact that the system may ascertain by querying the caller during the telephone transaction—the facsimile data is communicated over the telephone connection already established. If, on the other hand, the telephone call was initiated from a telephone that is not connected with a facsimile machine, then, in preferred embodiments of the invention and in accordance with a feature thereof, the caller is prompted to enter the telephone number of a facsimile machine to which the requested document can be sent and the document is then sent there.

In accordance with a further feature of the invention, when the document is to be sent to a facsimile machine other than one connected with the callers telephone, the caller may also be prompted for caller-identifying data, such as his/her telephone number. This data is supplied by the system with the requested document--preferably on a separate cover sheet-thereby enabling an attendant at the receiving facsimile machine to identify the intended recipient.

The invention will now be described by way of example with reference to the accompanying drawings, in which:

FIG. 1 is a block diagram of a microcomputer system embodying the invention;

FIG. 2 is a block diagram of a standard facsimile machine station from which documents can be requested from the system of FIG. 1;

FIG. 3 is a flowchart of the processing performed by software within the system of FIG. 1; and

FIG. 4 is a memory map of a region of the hard disk used in the system of FIG. 1.

Referring now to FIG. 1 system 10 is based around a standard microcomputer and commercially available special-purpose circuit cards and provides individuals who call into the computer with a catalog service-specifically, in this example, the ability to request "specification" sheets for integrated circuits.

The system is illustratively based on an AT&T Model PC6300 personal computer, at the heart of which is a microprocessor 11 having address, data and control buses denoted generically as bus 21. Connected to bus 21 are a display memory 12 whose contents are used by a video controller 13 to generate video signals for a CRT 14; a universal asynchronous receiver transmitter (UART) 15, which serves as a serial interface between microprocessor 11 and a keyboard 16; an interrupt controller 17, to which hardware interrupt leads (not shown) extend, inter alia, from UART 15; a floppy disk controller 28, which serves as an interface between microprocessor 11 and a floppy disk memory 29, and a hard disk

controller 31, which serves as an interface between microprocessor 11 and hard disk memory 33. The latter holds, inter alia, voice, image and text files 33a, 33b and 33c, respectively, as discussed in further detail

hereinbelow; a copy of the workstation's operating system 33d—illustratively the MS—DOS® operating system; a copy of an application module, herein referred to as "facsimile catalog program" 33e, which, when executing, controls the system hardware; and a number of other files not here relevant indicated at 33f.

Also connected to bus 21 is random access memory (RAM) 34 and read-only memory (ROM) 35. When the system is in operation, RAM 34 holds the executed copies of a) the operating system, indicated as 34a, and b) facsimile catalog program, indicated as 34b, and c) other software not here relevant, indicated as 34c. ROM 35 contains the conventional Basic Input/Output System (BIOS) 35a as well as other firmware 35b.

Also connected to bus 21 are two circuit cards that play a central role in implementing the invention. One of these is voice card 39 which may be, for example, the card marketed by Natural Microsystems under the name WATSON. As called out in the drawing, voice card 39 includes input and output connectors 395 and 397, respectively, a switch 391 and voice processing circuitry 394, the latter comprising all the other circuitry on the card. When in one position, switch 391 simply interconnects connector 395 and 397, thereby providing a direct path through the card. When in its other position, switch 391 connects input connector 395 to the voice processing circuitry.

Voice card 39 has a number of capabilities. Among the capabilities relevant here are the ability to a) recognize touch tone inputs and report the identity of the digit or symbol represented thereby onto bus 21 and b) to re-create human speech from digitally stored versions thereof supplied from the bus and to output that speech to connector 395.

The other of the aforementioned circuit cards is facsimile card 37, illustratively the FAXCON-20 facsimile communication board available from AT&T. Similar to voice card 39, facsimile card 37 includes input and output connectors 375 and 377, respectively, a switch 371 and facsimile processing circuitry 374, the latter comprising all the other circuitry on the card. Among the capabilities of facsimile card 37 relevant here is the ability to accept files containing text and/or image data, convert that data into facsimile images and supply it, when switch 371 is appropriately thrown, to connector 375 using standard facsimile formats

and protocols.

Circuit cards 37 and 39 are interconnected by way of a jumper cable 38 which connects facsimile card output connector 377 to voice card input connector 395. In addition, a telephone line 36 is connected to facsimile card input connector 375 and a standard telephone set 40 is connected to voice card output connector 397.

When the system is in an idle state, switch 371 within card 37 is set so as to interconnect facsimile card connectors 375 and 377 while switch 391 within card 39 is set so as to interconnect voice card connectors 395 and 397. Thus prior to the receipt of any telephone call, telephone line 36 is directly connected through both cards to telephone set 40.

Turning now to FIGS. 2 and 3, the facsimile station depicted in FIG. 2 is seen to comprise a standard facsimile machine 6 having connected thereto a standard touch-tone telephone 8 and a conventional telephone line 3 which extends into the public dialed network. When a person at telephone 8 wishes to be availed of the catalog service provided by system 10, he/she dials the telephone number associated with telephone 40. Having been instructed by facsimile catalog program 34b, which is now in control of the system, to be monitoring the incoming line, voice card 39 recognizes the ringing voltage and, as indicated at 41 of FIG. 3, answers the call. It does this, specifically, by causing its switch 391 to connect voice processing circuitry 394 to connector 395 and thence to the telephone line back through facsimile card 37. (Although not shown in the FIG., voice processing circuitry 394 has an internal connection to connector 395 that enables it to monitor the signals applied thereto, such as ringing voltage.)

Facsimile catalog program 34b at this point operates voice card 39 to deliver a sequence of messages to the caller. In each case, the message is delivered by instructing the operating system 34a to retrieve one of voice files 33a from hard disk 33 and route the file via bus 21 to voice processing circuitry 394 of voice card 39. The voice processing circuitry converts this file into audible speech which is thereupon transmitted to the caller via the telephone line.

System 10 illustratively provides to requesters "specification" sheets for integrated circuits manufactured by the (fictitious) XYZ Microchip Corporation, and, as further indicated at 41, the first message is a

greeting, illustratively the greeting "You have reached the XYZ Microchip Corporation automated facsimile catalog." This is immediately followed by a second message, again delivered to the voice card via the above-outlined mechanism. As indicated at 43, this second message queries as to whether the caller is calling from a facsimile telephone, i.e., a telephone associated with a facsimile machine, the message illustratively being, "Touch '1' on your touch-tone telephone if you are calling from a facsimile telephone; otherwise touch any other key." The program now instructs the voice card to be receptive to an answering touch-tone input from the caller. The voice card, being capable of recognizing touch tone inputs, provides facsimile catalog program 34b with an indication of the caller's response.

Since in the present example, telephone 8 is, in fact, associated with a facsimile machine, the caller will touch "1" at this time. The program thereupon proceeds to step 46 at which it prompts the caller through a selection process so to elicit from the caller what specific information the caller wishes to receive. This process may involve several queries and responses, allowing the caller to be increasingly specific with respect to the desired information.

A typical such interaction might be:

FAX CATALOG:	Touch '1' for information on digital integrated circuits; touch '2' for information on analog integrated circuits.
USER:	[Enters '1'].
FAX CATALOG:	Touch '1' for 74LS series devices; touch '2' for 74LP series devices.
USER:	[Enters '1'].
FAX CATALOG:	Enter the 4-digit code of the device that you are interested in.
USER:	[Enters '7522'].

(In some applications, the caller may make selections based on information previously disseminated by the supplier, such as a printed index of available documents.)

As indicated at 51, facsimile catalog program 34b now causes the voice card to instruct the caller to now operate the "START" key on the facsimile machine with which the caller's telephone is associated. To this point, facsimile machine 6 has been providing a signal path from telephone line 3 directly through to telephone 8. However, responsive to the operation of the "START" key, facsimile machine 6 now disconnects telephone 8 from the line and connects the line to the internal facsimile circuitry of the machine. There should not be any source documents in the input tray of the caller's facsimile machine. Accordingly, the latter assumes the role of recipient in the upcoming facsimile transaction.

After a preprogrammed delay to allow the caller to comply with the instruction to operate the "START" key, facsimile catalog program 34b instructs facsimile card 37 to now operate its switch 371, causing facsimile card 37 to seize control of the active, already established telephone connection to the far-end facsimile machine, as indicated at 53. At this point, there is a direct telephone connection between facsimile circuitry 374 in facsimile card 37 and the facsimile circuitry in the caller's facsimile machine.

As also indicated at 53, facsimile card 37 now negotiates with facsimile machine 6, in the standard way, such parameters as line speed, transmission protocols and transmitter/receiver identity. Upon successful completion of these negotiations, facsimile card 37 notifies facsimile catalog program 34b of this fact. Proceeding then to step 54, the program then processes the requested document(s)—in this case the "specification" sheet for the "7522" microchip—in preparation for transmission to facsimile machine 6. In particular, it instructs the operating system to retrieve from hard disk 33 one or more of either image files 33b or text files 33c. These files contain the text and/or graphic images which comprise the document(s) that the caller has requested. In particular, each image file contains a document, or portion thereof, in bit-mapped form and, as such, is directly transmittable by facsimile card 37. A text file, by contrast, contains standard ASCII characters and must be converted by facsimile

catalog program 34b to a bit-mapped form before being sent to the facsimile card. A particular document or package of documents may be stored as either an image file, a text file, or some combination of files to be assembled by the facsimile catalog program.

The various image files may be files that were, for example, created by scanning paper copies of documents through an electronic scanner (not shown) connected to the system; received from a remote location by facsimile transmission; or created on a frame creation system such as the AT&T PC Image Director system. The text files may be files that were, for example, created from keyboard 16 or received from a remote location via a data communications link.

Having assembled the document(s) requested by the caller and, if necessary, converted them to bit-mapped form, facsimile catalog program 34b delivers them to facsimile card 37 via bus 21. Facsimile processing circuitry 374 converts these bit maps into facsimile images in accordance with the negotiated parameters. As indicated at 56, the resulting facsimile images are thereupon transmitted to the caller's facsimile machine 8 via the telephone network, using standard facsimile protocols such as CCITT Group III.

Having completed the facsimile transmissions, facsimile catalog program 34b then instructs facsimile card 37 to disconnect from the telephone line, as indicated at 59. The operation thus comes to an end, with the program now instructing facsimile and voice cards to assume their previous idle states.

Returning, now, to step 43, let us now assume that the caller is not at a telephone associated with a facsimile machine and therefore touches a key other than "1" in response to the step 43 prompt. Facsimile catalog program 34b thereupon proceeds to step 61 at which, in accordance with a feature of the invention, it prompts the caller for the telephone number of the facsimile machine to which the caller wishes to have the documents transmitted. As indicated at 62, the program validates the entered number, illustratively by verifying that it appears to be a valid telephone number; checking for the presence of an area code; stripping off the area code if it is the same as the area code of telephone line 36; and prepending an outside calling dialing code, such as "9", to the number in cases where telephone line 36 extends from a PBX. If any of these

validation checks fail, the program so informs the caller, as indicated at 63, and then returns to step 61 to re-prompt the caller for the desired number.

(Similar validation checks may be provided, as desired, at various stages of the call, such as during the eliciting of the identity of the desired document at step 46 described above.)

Once the caller has supplied an apparently valid number, the program proceeds to step 64, where, for a purpose discussed hereinbelow, it prompts the caller for caller-identifying data, illustratively his/her voice telephone number, i.e., the number at which the caller receives his/her normal telephone calls.

As indicated at 66, the system now prompts the caller through a selection process similar to that carried out a step 46 in order to elicit from the caller what specific information the caller wishes to receive. The program then causes the voice card to inform the caller, at step 68, that the requested document(s) will be transmitted to the previously supplied facsimile telephone number and causes voice card 39 to disconnect from telephone line 36 by operating switch 391, as indicated at step 70.

After waiting a brief period of time, illustratively 2-3 seconds, to assure that the previously established telephone connection has been dropped, facsimile catalog program 34b, at step 73, instructs facsimile card 37 to seize telephone line 36 and place a new, outgoing telephone call to the facsimile number just supplied by the caller. This is accomplished by first having the facsimile card operate switch 371 to connect telephone line 36 to facsimile processing circuitry 374, and then having the latter dial the number. If the called facsimile number is busy or does not answer, the facsimile catalog program will wait a predetermined period of time, illustratively five minutes, and then initiate one or more retries.

Facsimile catalog program 34b now creates, at step 74, a cover sheet for the document(s) about to be transmitted. It does this by instructing the operating system to retrieve a cover sheet template, stored as one of text files 33c in hard disk 33, and modifying it to include the facsimile telephone number and caller's voice telephone number both previously supplied by the caller. As in the prior case, the program, at step 75, a) instructs the operating system to retrieve one or more of either image files 33b or text files 33c from hard disk 33, b) processes them as needed and c) and supplies them along with the cover sheet via bus 21 to facsimile

card 37 for transmission. The facsimile card thereupon transmits them, as indicated at 76 and, once again at step 59, facsimile catalog program 34b instructs facsimile card 37 to disconnect from the telephone line and assume its previously idle state.

FIG. 4 is a memory map of that region of hard disk 33 that holds the "permanent" copy of the facsimile catalog program, denoted 33e, as previously discussed. As shown therein, the program includes a number of identifiable modules, copies of which comprise the executed copy of the program stored in RAM 34. The principal functions of these modules are as follows:

Module Name and Number	Principal Function and Corresponding Flowchart Steps
Call Answer 331	initial telephone call processing (steps 41,43)
Caller Facsimile Number 333	obtaining caller's facsimile number (61)
Caller Voice Number 334	obtaining caller's voice number (64)
File Selection 336	eliciting identity, and processing, of desired documents (46,51,66,68,70)
Facs. Num. Verification 337	validating facsimile number (62,63)
Cover Sheet Creation 338	creating cover sheet (74)
Facsimile Transmit 339	transmitting the requested document(s) (53,54, 56,59,73,75,76)

Two other modules within the facsimile card program are facsimile card operating software 341 and voice card operating software 343. These modules are supplied by the vendor(s) of the cards themselves and control the card hardware in response to commands from the above-listed software modules. And it will, of course, be appreciated that the executing copy of the facsimile catalog program in RAM 34 is comprised of copies of the modules shown in FIG. 4.

Variations will occur to those skilled in the art. For example, although the invention has been disclosed in the context of a particular hardware configuration, other hardware configurations providing the same functionality may be used. In addition, although the caller inputs are illustratively provided via the operation of the keys of a touch-tone

telephone, it may be desired to provide the system with, for example, voice-recognition circuitry which allows the caller to provide spoken inputs instead. In addition, although the presently disclosed system maintains the image and text files in local storage, it may be desired--particularly if there is a large volume of requestable information--to store that information on a larger system and have the local system, i.e., the system interacting with the caller, request and have downloaded the information when it is needed. And in other straightforward variations, the system may be configured to handle multiple calls and document requests on a time-shared or parallel processing basis. It may also be arranged to provide the caller with the opportunity to make multiple document requests in the same transaction with the system. Additionally, it will be appreciated that the documents supplied by the system may be of the type that changes fairly frequently, such as real estate listings, as compared to documents which do not, such as government forms. Moreover, in some implementations, access to highly confidential documents may be restricted by requesting the caller to enter a security password or voice sample prior to providing the caller with the documents.

CLAIMS

1. A method of transmitting,or request, copies of documents stored in machine-readable form, including the machine-implemented steps of answering a telephone call made over a telephone line to complete a first telephone connection from a caller at the far end of said connection, providing to said caller machine-stored voice signals instructing said caller relative to the ordering of copies of one or more of said documents, receiving from said caller responses to said voice signals and determining from said responses the identity of a specific one of said documents, retrieving the machine-readable document from storage, and transmitting the retrieved machine-readable document in facsimile form.

2. A method as claimed in claim 1 including the machine-implemented steps of determining whether a facsimile machine is connected to the far end of said first telephone connection, and, if so, transmitting the retrieved document in facsimile form over said telephone line during said telephone call, and, if not, providing to said caller machine-stored instructions relative to the specification of information identifying a facsimile machine to which the retrieved document is to be transmitted, receiving from said caller responses to those instructions, and initiating a telephone call to the identified facsimile machine to establish thereto a second telephone connection and transmitting the retrieved document in facsimile form over said second telephone connection.

3. A method as claimed in claim 2 including, in the case where a facsimile machine is not connected to the far end of said first telephone connection, the machine-implemented steps of determining the identity of said caller, and transmitting information identifying said caller along with the retrieved document.

4. Apparatus for transmitting documents, including (i) memory means for storing a plurality of documents in machine-readable form, and (ii) means for answering a telephone call made over a telephone line to complete a first telephone connection from a caller at the far end of said connection and for providing to said caller machine-stored voice signals instructing said caller relative

to the ordering of copies of one or more of said documents, for receiving from said caller responses to said instructions and for identifying from said responses a specific one of said documents, and for retrieving the identified document from said memory means and for transmitting it in facsimile form.

5. Apparatus as claimed in claim 4 wherein the means in (ii) serves for determining whether a facsimile machine is connected to the far end of said first telephone connection, and, when it has been determined that a facsimile machine is connected to the far end of said first telephone connection, for transmitting the retrieved document in facsimile form over said telephone line during said telephone call.

6. Apparatus as claimed in claim 5 wherein the means in (ii) serves, when it has been determined that a facsimile machine is not connected to the far end of said first telephone connection, for providing to said caller voice instructions relative to the specification of information identifying a facsimile machine to which the requested document is to be transmitted, for receiving from said caller responses to those instructions, for thereafter initiating a telephone call to the identified facsimile machine to establish thereto a second telephone connection, and for transmitting the retrieved document in facsimile form over said second telephone connection.

7. Apparatus as claimed in claim 6 wherein the means in (ii) serves, when it has been determined that a facsimile machine is not connected to the far end of said first telephone connection, for providing to said caller machine-stored voice signals instructing said caller relative to the specifying of data identifying said caller, for receiving said caller-identifying data from said caller, and for transmitting said caller-identifying data along with the requested document.

8. A computer-based document transmission system, including first circuit means operable under program control for providing audio messages over a telephone line and for interpreting information supplied over the telephone line, second circuit means operable under program control for providing facsimile messages

over the telephone line, storage means for storing machine-readable representations of a plurality of document files, program means a) for operating said first circuit means to answer a telephone call made over a telephone line to complete a telephone connection between a caller at the far end of said connection and said system, to provide machine-stored voice signals instructing said caller relative to the ordering of copies of one or more of said documents, to receive from said caller responses to said voice signals identifying at least a specific one of said documents, and to determine whether a facsimile machine is connected to the far end of said telephone connection, b) for retrieving from said storage means at least a first one of said document files associated with said specific one of said documents, and c) for operating said second circuit means to transmit the retrieved document in facsimile form.

9. A method of transmitting documents substantially as herein described with reference to the accompanying drawings.

10. Apparatus for transmitting documents substantially as herein described with reference to the accompanying drawings.

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(54) Telephone call intercept system

(57) An automatic call interception apparatus (1) provides a barrier between the subscriber and the caller. The apparatus can ask the callers identity, without the subscriber having to speak to the caller personally. The reply is recorded and then played back to the subscriber who can then decide whether or not to accept the call. The call need be intercepted only if the subscriber answers thus minimising inconvenience to the caller.

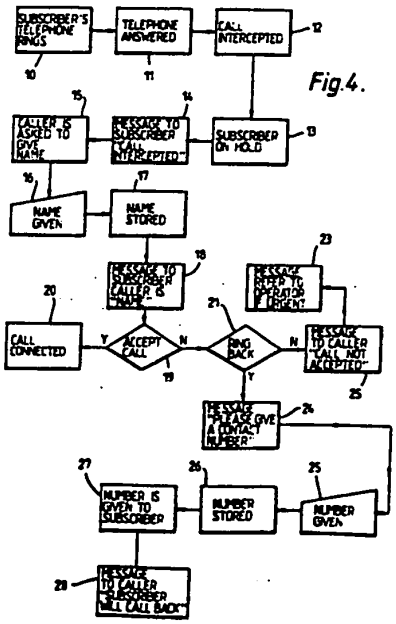


Fig.4.

GB 2 240 693 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

Fig.1a.

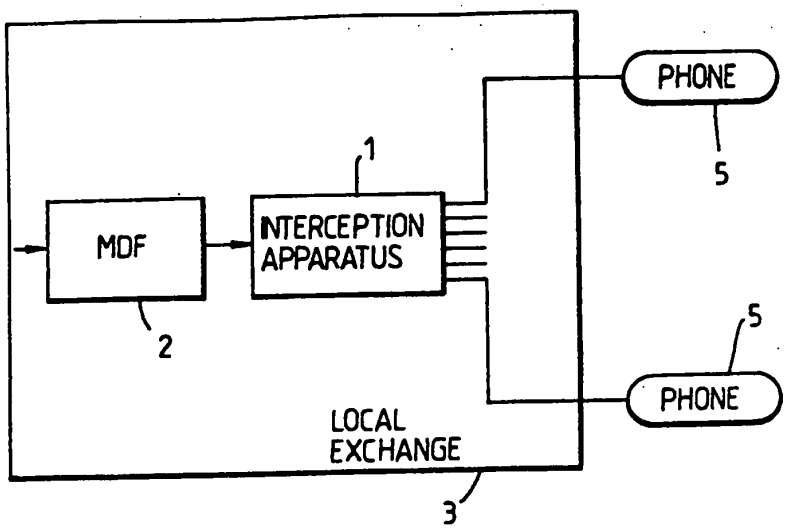

PHONE
5
1
MDF
INTERCEPTION APPARATUS
2
5
PHONE
LOCAL EXCHANGE
3

Fig.1b.

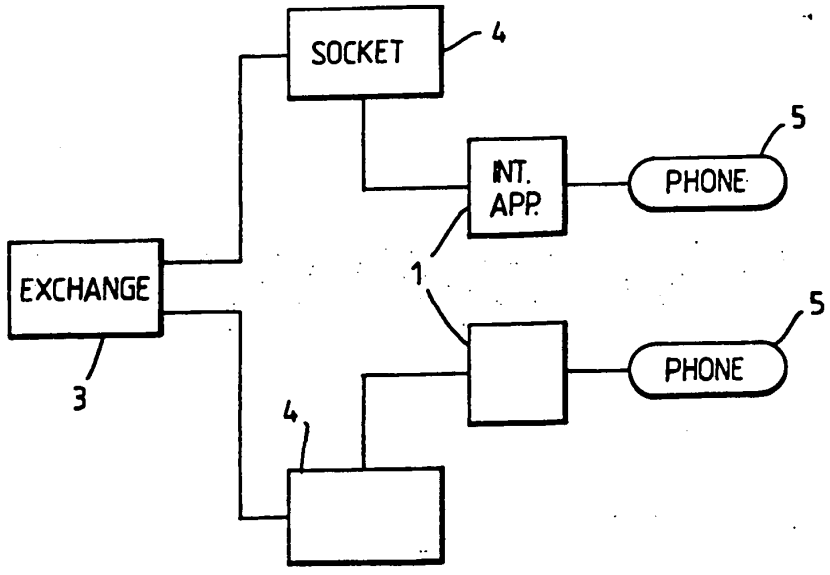

SOCKET
4
5
INT. APP.
PHONE
1
EXCHANGE
5
PHONE
3
4

Fig.2.

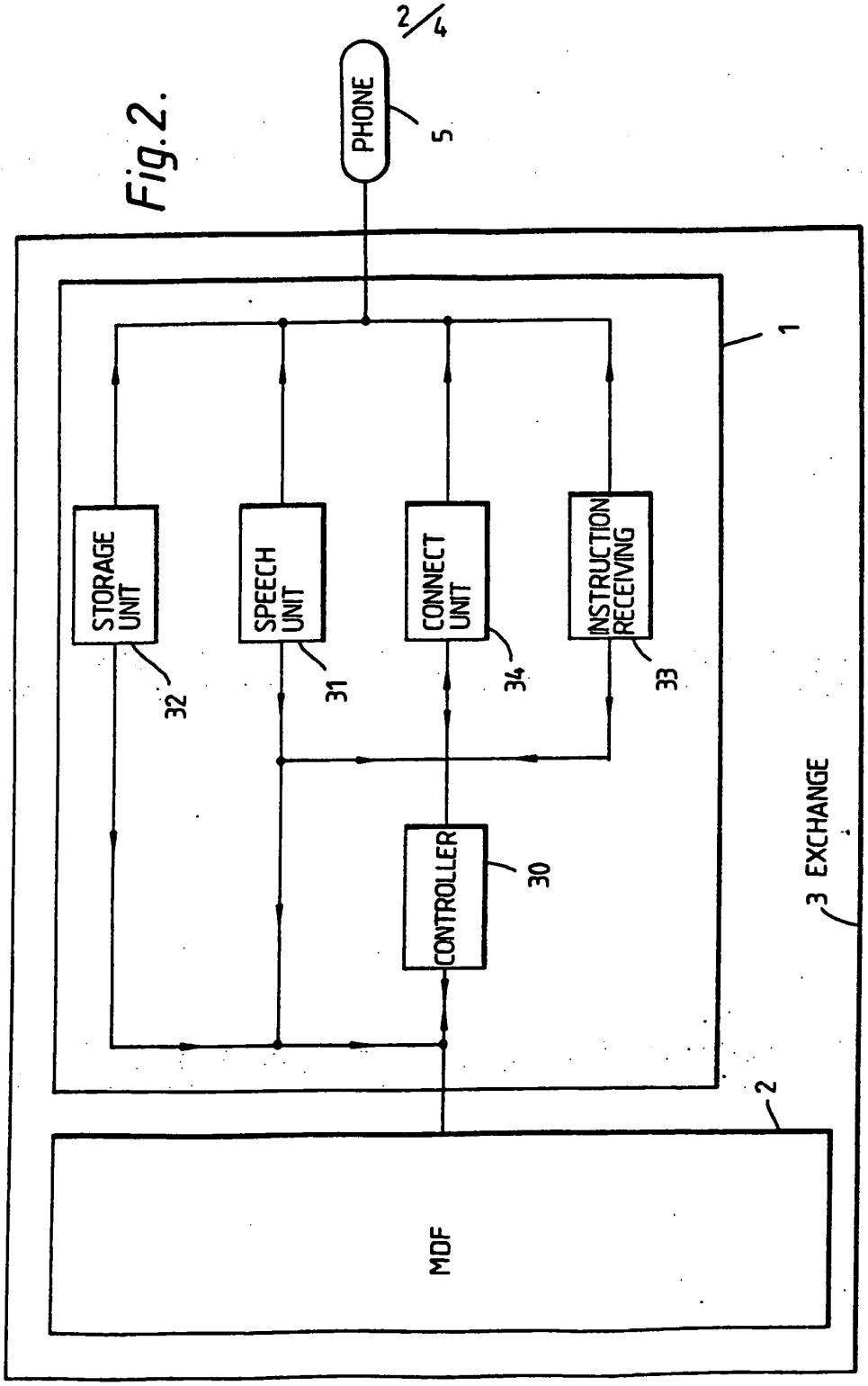
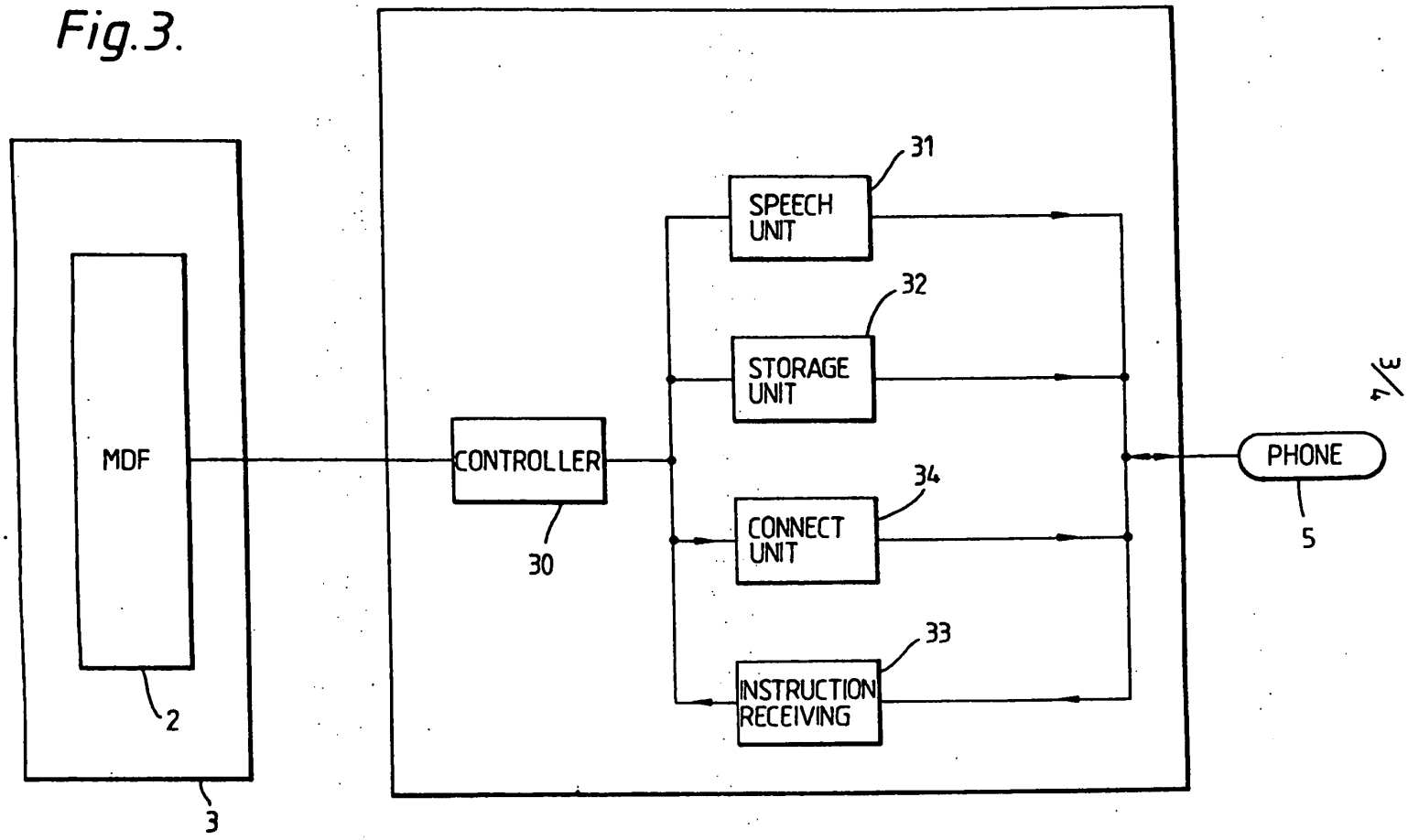

PHONE
5
1
STORAGE UNIT
32
SPEECH UNIT
31
CONNECT UNIT
34
INSTRUCTION RECEIVING
33
CONTROLLER
30
3 EXCHANGE
2
MDF

Fig.3.



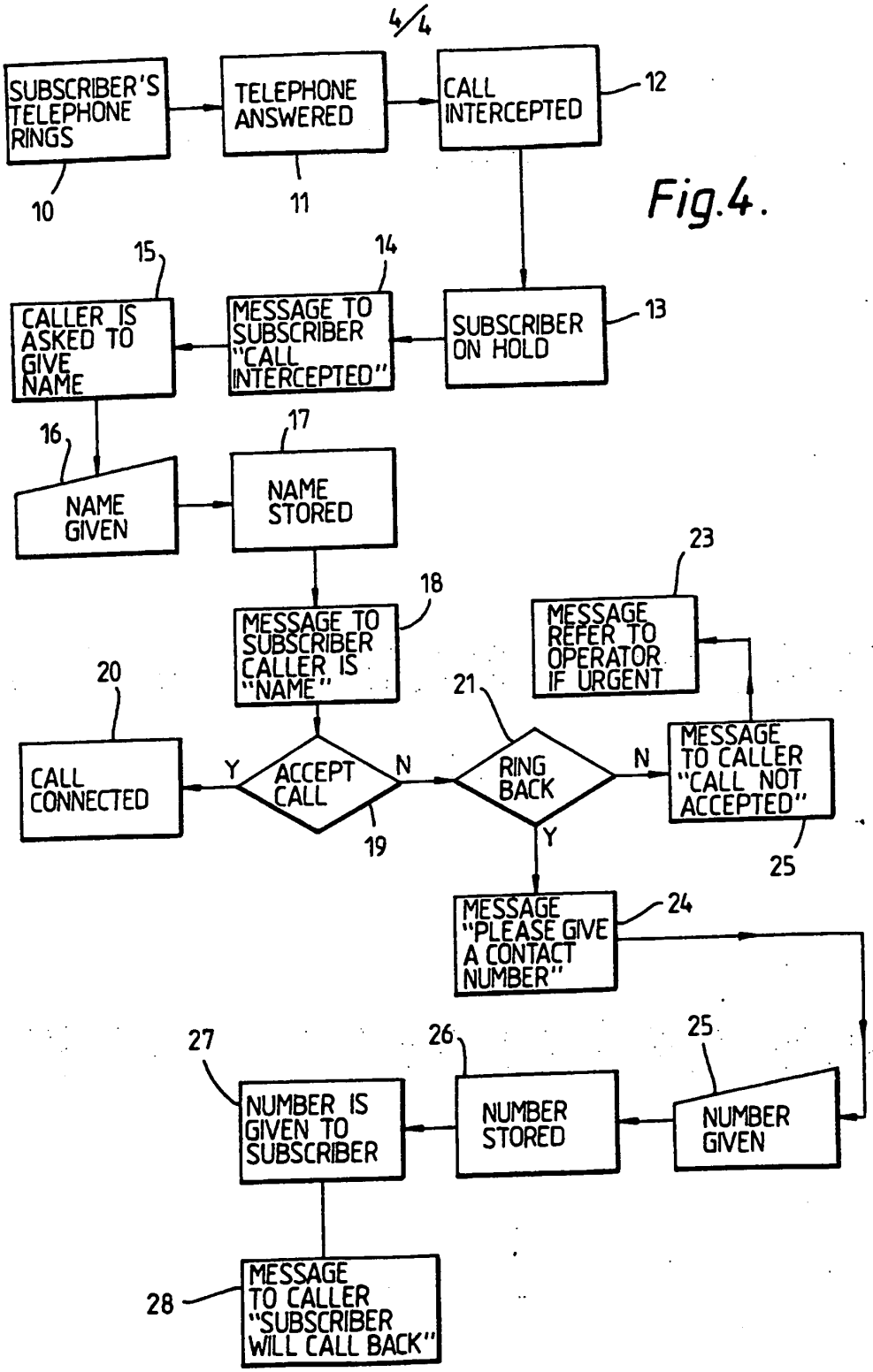

SUBSCRIBER'S TELEPHONE RINGS
10
TELEPHONE ANSWERED
11
CALL INTERCEPTED
12
SUBSCRIBER ON HOLD
13
MESSAGE TO SUBSCRIBER "CALL INTERCEPTED"
14
CALLER IS ASKED TO GIVE NAME
15
NAME GIVEN
16
NAME STORED
17
MESSAGE TO SUBSCRIBER CALLER IS "NAME"
18
ACCEPT CALL
19
Y
N
CALL CONNECTED
20
RING BACK
21
N
Y
MESSAGE REFER TO OPERATOR IF URGENT
23
MESSAGE TO CALLER "CALL NOT ACCEPTED"
25
MESSAGE "PLEASE GIVE A CONTACT NUMBER"
24
NUMBER GIVEN
25
NUMBER STORED
26
NUMBER IS GIVEN TO SUBSCRIBER
27
MESSAGE TO CALLER "SUBSCRIBER WILL CALL BACK"
28

Fig.4.

TELEPHONE CALL INTERCEPT SYSTEM

This invention relates to an automatic telephone call interception facility to allow screening of incoming calls. The invention has a particular use as a deterrent to malicious callers.

Subscribers are often bothered with unwelcome calls which may be malicious or just time consuming, eg from salespeople.

A call intercept facility is available to subscribers troubled by malicious callers. However, this facility has several disadvantages.

This facility involves all the subscriber's calls being diverted to an operator. The operator then asks:

1. the identity of the calling party,
2. the telephone number to which the calling party wishes to be connected,
3. the telephone number of the calling party,
4. who the calling party wishes to speak to.

Once the operator has asked the questions, the caller is then connected to the subscriber's line. There is no guarantee that the subscriber will answer. The operator does not check to see if the subscriber's phone will be answered before asking the questions or attempting to connect the call.

This is a very labour intensive and expensive service to provide. The calling party can get irritated at being asked a lot of seemingly pointless questions each time the subscriber is called. The operator is not able to give the subscriber the option of refusing the call. The service is uneconomical to use simply to screen out unwanted calls.

The object of this invention is to provide an inexpensive and easily implemented system of intercepting and screening incoming calls.

According to the invention there is provided a telephone call interception apparatus comprising first connection means for connecting the apparatus to a party calling a subscriber's telephone associated with the apparatus, interrogation means for interrogating the calling party, recording means for recording the responses given by the calling party to the interrogation, transfer means for transferring the recorded answers to the subscriber's telephone and second connection means for connecting the calling party to the subscriber's telephone, means for accepting signals from the called party to instruct the apparatus to connect the call and means for accepting a password from the operator allowing the apparatus to be bypassed in cases of emergency.

The apparatus preferably incorporates a speech synthesizer in the interrogation means.

The apparatus preferably also includes means for recording the responses given by the calling party to the interrogation. The recording means is preferably through a digital recording means. In a preferred embodiment the invention is a network system based at the local exchange capable of intercepting calls on a plurality of subscriber lines. Another preferred embodiment of the invention is a small portable unit based on the subscriber's premises.

Alternatively the apparatus uses pulse coded modulation (PCM) or linear predictive coding (LPC) to record the responses to the interrogation.

Conveniently the apparatus has means for disconnecting the calling party if the subscriber does not wish to accept the call.

Preferably the apparatus is such that the call is intercepted only if the called party answers.

Conveniently the apparatus incorporates a means for logging intercepted calls.

Advantageously the apparatus incorporates means such that the subscriber can switch the call intercept on or off from the telephone to be protected, or from any telephone using an identifying password or code.

The subscriber based apparatus may incorporate a plug means for plugging into a socket on the subscriber's premises.

The apparatus conveniently also incorporates an alarm means to allow the subscriber to alert the telephone company to the fact that assistance is required.

The apparatus may further comprise means to allow the subscriber to trigger a malicious call alarm.

Preferably the apparatus includes means for accepting a password to allow the apparatus to be overridden. This allows household members to get straight through and also allows an operator to bypass the system in case of emergency.

The apparatus conveniently incorporates a telephone answering apparatus obviating the need for two pieces of equipment attached to the same telephone.

The intercept system could either be at the local exchange connected to a main distribution frame (MDF) where the individual line pairs enter the local exchange, and be a chargeable service or it could take the form of a separate portable unit. The subscriber could buy or rent the unit and it could be plugged into the existing telephone socket.

The present invention will now be described by way of example only and with reference to the accompanying drawings in which:

Figure 1a) is a block diagram of an exchange based system;

Figure 1b) is a block diagram of a subscriber based system.

Figure 2 is a block diagram of a network based system constructed in accordance with the invention.

Figure 3 is a block diagram of a subscriber's premises based system constructed in accordance with the invention.

Figure 4 is a flow diagram showing the manner of operation of a system constructed in accordance with the invention.

Referring to the drawings, Figure 1a shows an intercept apparatus 1 connected to the main distribution frame 2 (MDF) at a local exchange 3. The intercept apparatus 1 is capable of intercepting calls on a plurality of lines (typically 100 or more lines per unit).

On compatible exchanges which allow customer controlled call diversion the subscriber would be able to switch the intercept apparatus on or off as required. Once activated all calls would be intercepted before the called party had answered.

Referring now to Figure 1b, the intercept apparatus 1 is connected to the local exchange 3 via the subscriber's telephone socket 4, the intercept apparatus being positioned between the socket and the subscriber's telephone 5.

Figure 2, shows in more detail the telephone intercept apparatus 1 situated at the local exchange 3. It has a controller 30 which controls the activities of the other parts of the apparatus. When a caller rings a subscriber and the subscriber picks up the receiver to answer the call the call is then intercepted. The controller 30 causes a speech unit 31 to tell both the caller and the subscriber that the call has been intercepted, and asks the caller to give a name. The

speech unit may be a speech synthesizer, or alternatively pre-recorded messages on magnetic tape or other media could be used.

Responses from the caller to questions asked by the speech unit 31, are stored in a storage unit 32, constituted by a digital storage unit eg a RAM. Alternatively, the storage unit 32 could be a simple magnetic storage means.

The controller 30 causes the responses to be transferred to the subscriber at the relevant times in the manner described below with reference to the flow chart of Figure 4.

After information has been transferred to the subscriber the controller 30 alerts an instructions receiving unit 33, to be on standby to receive instructions from the subscriber. The instruction receiving unit 33 could be a speech recognition system with a limited vocabulary or take the form of an MF tone decoder for people with speech or language difficulties.

When the subscriber indicates that the call is accepted the controller 30 signals a call connect unit 34 to connect the call if appropriate.

Where the subscriber does not wish to accept the call, the caller is referred back to the operator at the local exchange or played a suitable message.

The controller 30 and also has means (speech recogniser or an MF tone decoder) for recognising a password or other signal sent from the exchange so that the exchange operator can, upon giving the correct password or other code, override the interception mechanism and be routed directly to the subscribers telephone 5 via the call connect unit 34. Members of the subscriber's household could also have a second password allowing the system to be bypassed. The speech recognition system could be speaker dependent for added security.

The apparatus could incorporate means to allow the subscriber to instruct the apparatus not to connect any further calls from a caller. The apparatus could use a speaker dependent recognition system to recognise unwanted repeat callers.

Where the subscriber does not wish to accept the call and the caller does not hang up, thereby blocking the subscriber's line the apparatus is able to disconnect the call.

An alternative embodiment of the invention is the subscriber based unit shown in Figure 3. This is very similar to the MDF network based system, but as the subscriber based unit only intercepts calls on the subscriber line it is connected to it may be consequently much smaller and less expensive. The controller 30 controls the operation of the unit. The other parts of the unit are the same, a speech unit 31, a storage unit 32, an instruction receiving unit 33 and a call connect unit 34. In the subscriber based unit the call connect unit 34 is not able to disconnect the call if not accepted and the caller does not hang up because calls can only be disconnected by the caller or the local exchange.

Both the network based service and the subscriber's premises based service operate in substantially the same manner, which will now be described with reference to Figure 4.

The subscriber's telephone rings (at 10), and when the subscriber answers (at 11), the call is intercepted (at 12). At this point the subscriber is put on hold (at 13) and informed that the call has been intercepted (at 14). The caller is informed, either by a light on the subscriber based apparatus or a message that the call is being intercepted and logged and asked to give a name (at 15). When the caller gives a name (at 16) this is stored

(at 17) and then transferred to the subscriber (at 18). The subscriber is then given the option of accepting the call or not (at 19). If the subscriber chooses to accept the call, this is indicated to the unit by pressing a dedicated button or by MF signalling, then the call is connected (at 20). Some lower cost models might not have call logging facilities but the caller will not be able to tell whether the apparatus in question can log calls or not.

If the subscriber chooses not accept the call, the apparatus offers the subscriber the possibility of returning a call (at 21). Again the subscriber's intentions can be indicated by dedicated "yes" or "no" buttons or by MF signalling. If the subscriber does not wish to return the call then the caller is informed that the call has not been accepted (at 22) and is referred to the operator in case of emergency (at 23).

If the subscriber does choose to ring the caller back, the operator asks the caller to provide a contact telephone number (at 24). The caller can then give the number (at 25) which is stored (at 26) for transmission to the subscriber (at 27) and the caller is informed that the subscriber will ring back (at 28).

Dedicated buttons with labels and lights would overcome problems experienced by people with speech or language difficulties.

The subscriber based system could intercept internal calls on PABX exchanges which do not go via the local exchange, and so could not be intercepted by the operator or an MDF based system.

The apparatus could incorporate means for allowing subscriber's to hear the information provided by the caller eg name and telephone number, replayed via a loudspeaker instead of through the earpiece from the handset.

CLAIMS

1. Telephone call interception apparatus comprising first connection means for connecting the apparatus to a party calling a subscriber's telephone associated with the apparatus, interrogation means for interrogating the calling party, recording means for recording the responses given by the calling party to the interrogation, transfer means for transferring the recorded answers to the subscriber's telephone and second connection means for connecting the calling party to the subscriber's telephone, means for accepting signals from the called party to instruct the apparatus to connect the call and means for recognising a password from the exchange operator and means responsive to said password causing the apparatus to be by-passed in cases of emergency. A

2. An apparatus as claimed in claim 1, wherein the password recognising means is able to recognise a second password and whereby a caller having a password can cause the apparatus to be by-passed.

3. Apparatus as claimed in claim 2, comprising a multitone frequency decoder system to accept instructions from the called party.

4. Apparatus as claimed in claim 3, further comprising a speech recognition system to accept instructions from the called party.

5. Apparatus as claimed in any one of the preceding claims, wherein a digital recording means constitutes the recording means for recording the responses given by the calling party to the interrogation.

6. An apparatus as claimed in claim 2, where the password accepting means constitutes an MF tone decoder.

7. An apparatus as claimed in claim 2, wherein the password accepting means constitutes a speech recognition system.

8. An apparatus as claimed in claim 2, wherein the password accepting means constitutes a speaker dependent speech recognition system.

9. An apparatus as claimed in any one of the preceding claims, wherein the interrogation means incorporates a speech synthesizer.

10. An apparatus as claimed in any one of the preceding claims, wherein the apparatus only intercepts the call if the called party answers.

11. An apparatus as claimed in any one of the preceding claims, further comprising means for connecting the apparatus to a distribution frame at a local exchange, the apparatus being capable of intercepting calls on a plurality of subscriber lines.

12. An apparatus as claimed in claim 11, further comprising means for disconnecting the calling party if the subscriber does not wish to accept the call.

13. An apparatus as claimed in one of the preceding claims, wherein the apparatus can be switched on or off from any telephone by the subscriber.

14. An apparatus as claimed in any one of the preceding claims, further comprising programmable call rejection means to always reject calls from a certain party.

15. An apparatus as claimed in claim 14, wherein the programmable call rejection means further comprises a speaker recognition system.

16. An apparatus as claimed in any one of claims 1 to 10, further comprising a plug means for plugging the apparatus into a telephone socket on the subscriber's premises.

17. An apparatus as claimed in any one of the preceding claims, further comprising an alarm means to allow the subscriber to alert the telephone company to the fact that assistance is required.

18. An apparatus as claimed in any one of the preceding claims, further comprising means to allow the subscriber to trigger a malicious call alarm.

19. A telephone call interception apparatus substantially as described herein with reference to and as illustrated by the accompanying drawings.

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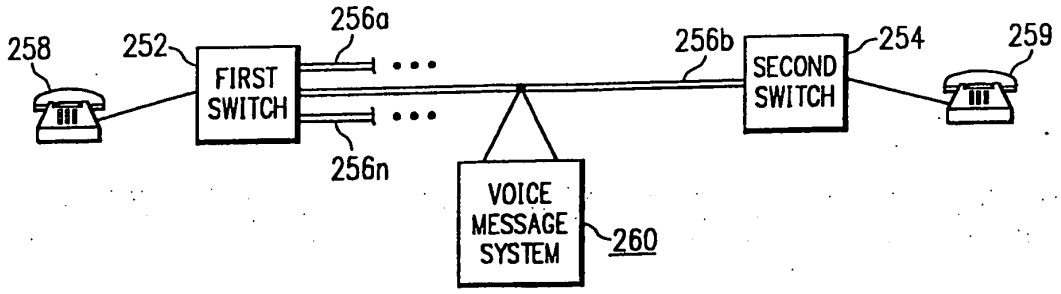
(54) Title: METHOD AND APPARATUS FOR PROVIDING PROACTIVE CALL SERVICES FOLLOWING CALL COMPLETION



(57) Abstract

An apparatus for use in a telephone network (250) having a calling station connectable to a first switch (252) means and a called station connectable to a second switch (254) means, with the first and second switch means being connectable by a link (257). The apparatus comprises an interface having a passive in-line monitor connected in the link for detecting entry of a predetermined service access code by a user of the calling station (258) or a user of the called station (259) after call completion between the calling station and the called station and before either of said users goes on-hook. Upon entry of predetermined service access code, a speech circuit issue a predetermined prompt to the user of the calling station and/or the user of the called station. Processor control (266) circuitry is then responsive to entry of predetermined signaling by one of the users following the issuance of the prompt for providing a predetermined service controlled and paid for by the user requesting the predetermined service.

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METHOD AND APPARATUS FOR PROVIDING PROACTIVE CALL SERVICES FOLLOWING CALL COMPLETION

The present invention relates to telephone systems and more particularly to a method and apparatus for providing a variety of caller-controlled proactive services after a caller has been connected to a called station.

It is known in the prior art to carry telephone calls between local telephone operating companies through the AT&T network or through one or more independent inter-exchange carriers such as MCI or Sprint. The local telephone operating companies operate within a so-called local access and transport area (LATA). When a long distance call is dialed, the call is usually transmitted through an operating company central office to a point of termination in the originating LATA at which it is picked up by the inter-exchange carrier and passed by that carrier on to a termination point in a distant LATA. Upon reaching the destination LATA, the call is then transferred by the inter-exchange carrier to the local operating company central office within that LATA for ultimate connection to the original called station therein. Typically, the termination points of each LATA include suitable switching circuits, e.g., an access tandem, that are interconnected by a digital serial link. Such digital links are also presently used to interconnect virtually all central offices as well as to interconnect operating company switching networks to one or more cell site control switches of a mobile telephone network.

It is also known in the prior art to provide "automatic voice messaging" where, upon the occurrence of a busy/ring-no- answer condition at a called station, the user of the calling station can be connected to a voice message facility for recording a voice message for subsequent delivery to

the called station. The decision to accept or reject the automatic voice messaging service is determined by the caller. Automatic voice messaging operates essentially after a call has been initiated but before the call can be completed to the called station.

It would be desirable to extend the advantages of caller-controlled automatic voice messaging to facilitate the providing of enhanced proactive services after call completion.

It is an object of the invention to provide caller-controlled proactive telephone services to a caller after call completion.

It is another object to provide a unique system architecture that facilitates the offer/acceptance of various ancillary user services to the original caller at the calling station and/or the original called party at the called station after call completion between the calling station and called station.

It is a further object of the invention to describe an apparatus that passively monitors a line between calling and called stations following call completion, detects a request for an ancillary user service, and then controls the providing of such service at the request of either the calling party or the called party.

It is yet another object of the present invention to provide an apparatus having on-line monitoring capabilities for the selective offering and providing of various ancillary services under the control of, and at the cost to, one of the parties to the completed call.

These and other objects of the invention are achieved in a preferred embodiment of the invention describing an apparatus for use in a telephone

network having a calling station connectable to a first switch means and a called station connectable to a second switch means, with the first and second switch means being connectable by a link. Generally, the apparatus comprises an interface having a passive in-line monitor connected in the link for detecting entry of a predetermined service access code by a user of the calling station or a user of the called station after call completion between the calling station and the called station and before either of said users goes on-hook. Upon entry of the predetermined service access code, a speech circuit of the apparatus issues a predetermined prompt to the user of the calling station and/or the user of the called station. Processor control circuitry of the apparatus is then responsive to entry of predetermined signaling by one of the users following the issuance of the prompt for providing a predetermined service controlled and paid for by the user requesting the predetermined service. Alternatively, if the user(s) are aware of the service offering, the speech circuit is not required in order to offer the service. In such alternative embodiments, the speech circuit can be used for a confirmation prompt.

For a more completed understanding of the present invention and the advantages thereof, reference is now made to the following Description taken in conjunction with the accompanying Drawings in which:

FIGURES 1A, 1B and 1C are block diagrams of a digital telephone network in which a proactive call services system is preferably incorporated; and

FIGURE 2 is a detailed block diagram of the preferred embodiment of the proactive call services system of FIGURE 1.

Referring now to FIGURE 1A, a block diagram is shown of a generic digital telephone network 250 in which an automatic voice message system is advantageously provided according to the teachings of copending application Serial No. 07/478,674. The telephone network generally includes a first switch 252, a second switch 254, and a plurality of digital communications links interconnecting the first and second switches 252 and 254 and designated by the reference numerals 256a-n. At least one digital link 256 is preferably a high speed (1.544 MHz) T-1 span over which conventional in-band signaling is provided in a serial fashion; of course, other higher speed links as DS/3 can be used. Link 256, alternatively, is a high speed digital serial link over which digital signals are provided using out-of-band signaling with other communications protocols, such as X.25 or common channel signaling (SS7).

For purposes of generalization, FIGURE 1A shows a calling station 258 connected (or connectable to via a central office or the like) to the first switch 252 and a called station 259 connected (or connectable) to the second switch 254. For the remainder of the discussion, it is assumed that a call to the called station 259 is initiated by a caller at the calling station 258. A proactive call services system 260 is placed across or in a digital link 256 for enabling the offering and acceptance of one or more predetermined call services under the control and at the expense of the caller at the calling station 258 or the caller at the called station.

Without limiting the foregoing, the first and second switches 252 and 254 are access tandems located at termination points between two LATAs.

Alternatively, the first switch 252 is an access tandem and the second switch 254 is a cellular tandem or cell site controller for a mobile telephone system. In this configuration, the network 250 is a cellular telephone network. The first switch 252 may be an operating company central office while the second switch 254 is an access tandem. The first and second switches can interconnect two central offices. The system 260 is bridged across the link.

Referring briefly to FIGURE 1B, in an alternate embodiment the system 260 is placed in a self-contained loop 256C from the first switch 252 (or the second switch 254 (not shown)). A "self-contained" loop means that the system 260 is located internally to the switch or as an adjunct thereto.

Referring now to FIGURE 2, a detailed block diagram is shown of the preferred embodiment of a proactive call services 260 for use in a digital network environment. System 260 preferably includes an interface means including a plurality of interface circuits 262a-n each connected to a multiplexer 264. The multiplexer includes a control bus connected to a control means comprising a processor 266, storage interface 268, storage device 270 and input/output device 272. The processor is controlled in a conventional manner by suitable application programs stored in the storage device 270. Input/output device is used to modify the system operation by entering suitable program commands to the control means.

The system 260 further includes a number of circuits for facilitating various monitor intercept, prompting, conferencing and redirect functions as will be described in more detail below. A scanner

circuit 274 is provided to identify Feature Group D supervision or other similar information depending on the type of signaling used. A service circuit 276 includes a passive line monitor circuit as well as all necessary call progress (e.g., busy/ring-no-answer) detection circuits, speech generation circuits, and service acceptance (e.g., DTMF) detection circuits. The service circuit 276 also preferably includes appropriate circuitry for capturing ANI, DNI and billing information. A first communication interface 278 is provided to receive, interpret, format and transmit SS7 messages as will be described in more detail below. The system preferably also includes a second communication interface 280 connected to a network applications platform 282. The platform 282 includes a billing computer and other appropriate devices such as a database for transaction processing and accounting purposes. The system 260 advantageously includes its own voice/data storage unit 284 for storing voice messages, data or other call conversations as will be described. A storage 286, preferably a disk storage, is connected to the voice/ data storage unit 284. The voice message or data storage may take place either in the voice/data storage unit or in the network applications platform, as is appropriate, to facilitate subsequent delivery.

Each of the circuits 274, 276, 278, 280 and 284 are connected to the processor 266 via the control bus 290. Input/output channel buses 292 and 294 also interconnect these circuits to the multiplexer of the interface means. Preferably, the interface means includes twenty-eight (28) T-1 interface circuits, each of which is connected to two digital links. Each T-1 interface circuit includes first and second T-1 interface circuits 295 and 297, with

the first interface circuit 295 connected to one of the digital links and the second interface circuit 297 connected to the other digital link. The first and second digital links are thus connectable to bypass their respective interface circuit if the first and second T-1 interfaces are interconnected by means of the switch 298. Given this architecture, i.e., with 28 T-1 spans each carrying twenty-four (24) channels, the buses 292 and 294 service 1344 channels.

To provide automatic voice messaging, the scanner 274, service circuit 276 and/or communications interface 278 monitor the received signaling to determine the state of the call progress. Of course, the actual circuit used depends on the type of signaling. If an SS7 protocol is used, communications interface 278 monitors the line. If Feature Group D signaling is used, the Feature Group D information is collected in and processed by service circuit 276; other types of signaling are collected and processed by scanner 274. When call processing is required due to a busy or ring/no answer condition, the processor 266 activates the service circuits 276 to thereby issue a prompt offering (e.g., "Your party is not available; if you would like to leave a message, please press the # key") and monitor the line for acceptance of the service. Processor 266 also controls the circuit 276 to capture ANI, DNI and billing information. If the service is accepted, the service circuit 276 notifies the processor 266, which then controls the service circuit to issue appropriate prompts to the caller to instruct the caller to begin recording the message. The message is then recorded by the voice storage unit 284, and the processor controls the service circuit 276 to

transfer the ANI, DNI, and billing information to the network applications platform 282. Although not meant to be limiting, preferably voice messages are stored in the voice/data storage unit 284 or its associated disk storage, while ANI, billing and other management information resides in the network applications platform.

For message delivery, the network applications platform ships the message routing information (i.e., the ANI, etc.) back to the voice/data storage unit 284, and the processor 266 then locates an open channel on a link for outdialing to the original called station. The service circuit then dials the call. When the call is placed, the scanner 274 watches the call states for answer supervision or on-hook/off-hook detection. If off-hook is detected, the service circuit 276 issues a prompt announcing the message which is then delivered by the voice storage unit 284. When the message is delivered, the processor 266 notifies the network applications platform and the packet is deleted.

If desired, the system 260 is connectable to a remote host computer via a dedicated communications interface which in turn is connected to the remote host via an RS-232 link or the like. This enables messages to be transferred to another location for the subsequent outdial attempts. As an alternate embodiment, the network applications platform 282 is set up to control billing and delivery attempts while the remote host issues the prompt announcing the message and other voice functions. The remote host can alternatively retain all billing information with the voice messager or other call information for a short time; and then passes off all such information to the platform 282 for further processing. It is also possible to have the

voice/data storage unit 284 pass a "packet" (comprising the billing information) downstream to a platform 282, e.g., in a destination delivery area (a destination LATA).

The architecture of FIGURE 2 is quite useful in providing various ancillary "instant" services to the calling station user and/or the called station user after the call between these parties has been completed. As used herein, "call completion" means the calling station has been successfully connected to the called station, i.e., a busy/ring-no-answer has not been encountered by the calling station user upon call initiation to the called station. According to the present invention, one or more such ancillary services are provided after call completion but before either party goes back to an on-hook condition.

One such ancillary service is conference calling. During the call, if either party determines that a conference is needed, that party can enter a predetermined access code (e.g., "2,2") which is detected by the passive on-line monitor circuit in the service circuit 276 of the system. Detection of the predetermined access code causes the processor 266 to control the service circuit to issue a prompt, e.g., "if you would like to add another party to this call, please dial that party's number now" or "if you would like to add a party to this call, please press # and follow the instructions" or the like. Depending on the prompt offering, one of the parties then enters the necessary signaling (dialed digits or the # sign, etc.) to accept the service offering. This signaling is detected by the service circuit 276 at which point the processor seizes an available line and places the call to the party sought to be

conferenced. Such call initiation continues while the originally completed call remains in progress between the calling station and the called station. The system can either mute the ringing signals to the third party or allow such signals to be heard by the parties. Upon call completion to the third party, the processor 266 bridges the calls together to provide the conference. The database in the network applications platform 282 could then provide billing validity information as well as storing the billing information. Generally, the party who accepts the service is billed.

The system of FIGURE 2 thus facilitates call conferencing in a proactive or caller-controlled manner which has heretofore never been available. From the caller's perspective, such ancillary services are provided to the call-in-process unobtrusively. If the parties are familiar with the service offering, a prompt offering may not be necessary following entry of the predetermined access code. In this embodiment, detection of the predetermined access code by the monitor circuit will result in the generation by the service circuit of a "beep" tone or superimposed dialtone (over the existing talkpath) instead of the prompt offering. One of the parties then dials the third party's telephone number or enters the appropriate code for acceptance of the service as the case may be. Confirmation of follow-up prompts may then be provided if necessary.

Yet another ancillary service available through the system of FIGURE 2 is call recording. During the call, one or both of the parties may decide to record the call. Upon detection of a predetermined access code (e.g., a 2,7) by the on-line monitor of the service circuit 276, the circuit signals the

processor 266. Processor 266 in turn connects the voice storage unit on line to immediately begin recording the call. Alternatively, the parties are provided the prompt offering to determine whether the continued conversations are to be recorded. The recording of the call, and the associated information packet containing the requesting party and billing information, is then transferred to the network applications platform 282 after the pathway to the platform is established as previously described. The party requesting the recording can then recall the recorded conversation from the platform 282 using dialup parameters such an entry and verification of security codes. Other collateral services, such as transcription of the recorded call, can thus be arranged and billed to the requesting party.

Another ancillary service is silent call recording. In this embodiment, a predetermined service access code is detected by the passive on-line monitor but not sent down the line to the party at the called station. The recording of the call is then carried out privately without the other party's knowledge. With this service, there is no need to provide a prompt offering, however, a one-way confirmation (to either the calling party or the called party) superimposed over a muted line (to the other party) is provided if desired. Although not meant to be limiting, the silent recording feature alternatively can be invoked by using a second band of an ISDN telephone, by transmitting out-of-band information, or by transmitting a combination of in-band and out-of-band signaling to a special "notch" filter.

According to the present invention, either the calling party and/or the called party can invoke one

or more of the above-identified services by entry of the appropriate code. Service may be offered at the destination either by subscription or as a basic service by the destination service provider. Generalizing, and with reference to FIGURE 1C, conceptually the service offerings can be provided in numerous locations in and around the network. In particular, FIGURE 1C shows a public telephone network with alternative pickup points, alternative central office switching points and alternate delivery processors. The system of FIGURE 2 can be implemented at the various positions indicated in FIGURE 1C.

Although not shown in detail, it should be appreciated that the architecture of FIGURE 2 is quite powerful and enables the service provider to provide numerous ancillary call services that have heretofore been unavailable to users except in only limited ways behind a private branch exchange or the like and without the capability of providing such services in a proactive, caller-controlled and billed manner as described herein.

It should be appreciated by those skilled in the art that the specific embodiments disclosed above may be readily utilized as a basis for modifying or designed other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims.

CLAIMS

What is claimed is:

1. In a telephone network having a calling station connectable to a first switch means and a called station connectable to a second switch means, with the first and second switch means being connectable by a link, the improvement comprising:

an interface connected in the link to monitor for entry of a predetermined service access code by a user of the calling station or a user of the called station after call completion between the calling station and the called station and before either of said users goes on-hook; and

control means connected to the interface and responsive to entry of the predetermined access code for controlling offer and acceptance of one or more predetermined services controlled and paid for by the user requesting the service.

2. In the telephone network as described in Claim 1 wherein the service is call conferencing.

3. In the telephone network as described in Claim 1 wherein the service is call recording.

4. In the telephone network as described in Claim 1 wherein the service is silent call recording.

5. Apparatus for use in a telephone network having a calling station connectable to a first switch means and a called station connectable to a second switch means, with the first and second switch means being connectable by a link, comprising:

an interface connected in the link to monitor for entry of a predetermined service access code by a user of the calling station or a user of the

called station after call completion between the calling station and the called station and before either of said users goes on-hook; and

speech means responsive to entry of the predetermined service access code for issuing a predetermined prompt to the user of the calling station and/or the user of the called station; and

control means connected to the interface and responsive to entry of predetermined signaling by one of the users following the issuance of the prompt for providing a predetermined service controlled and paid for by the user requesting the predetermined service.

6. Apparatus for use in a telephone network having a calling station connectable to a first switch means and a called station connectable to a second switch means, with the first and second switch means being connectable by a link, comprising:

an interface connected in the link to monitor for entry of a predetermined service access code by a user of the calling station or a user of the called station after call completion between the calling station and the called station and before either of said users goes on-hook; and

control means connected to the interface and responsive to entry of predetermined signaling by one of the users for providing a predetermined service controlled and paid for by the user requesting the predetermined service.

7. Apparatus for use in a telephone network having a calling station connectable to a first switch means and a called station connectable to a second switch means, with the first and second switch means being connectable by a link, comprising:

an interface in the first switch means to monitor for entry of a predetermined service access code by a user of the calling station or a user of the called station after call completion between the calling station and the called station and before either of said users goes on-hook; and

control means connected to the interface and responsive to entry of predetermined signaling by one of the users for providing a predetermined service controlled and paid for by the user requesting the predetermined service.

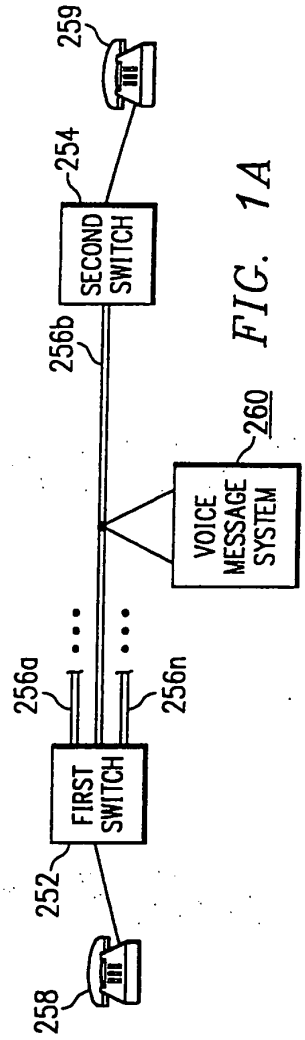

FIG. 1A

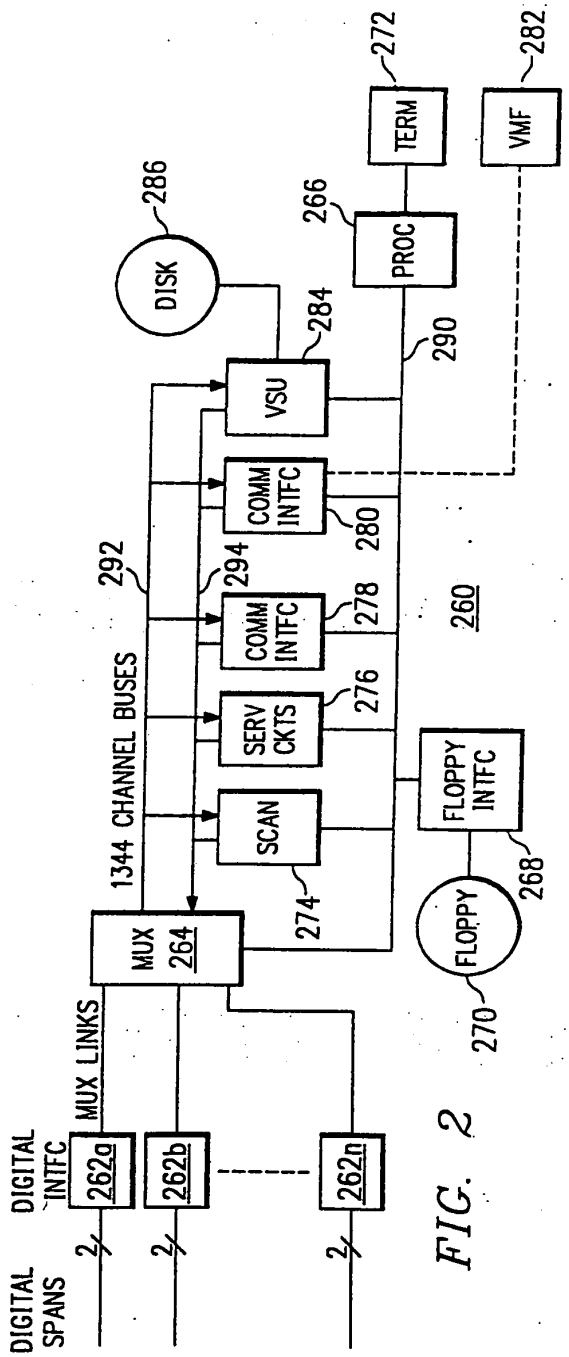

FIG. 2

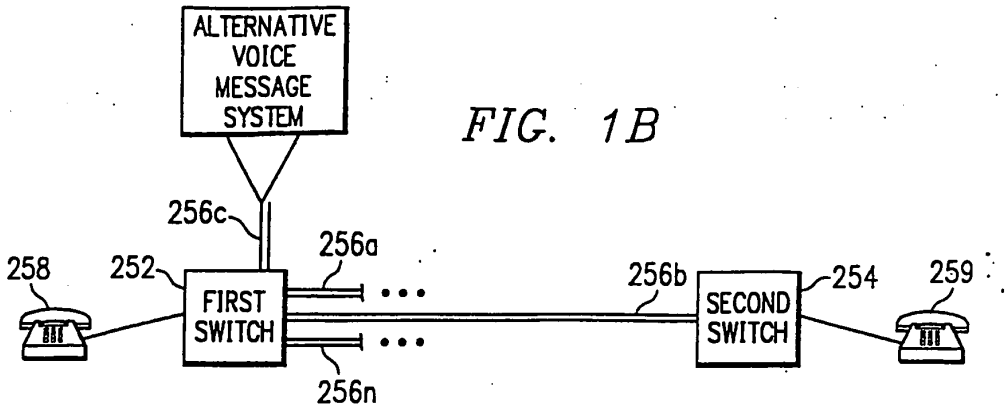

FIG. 1B

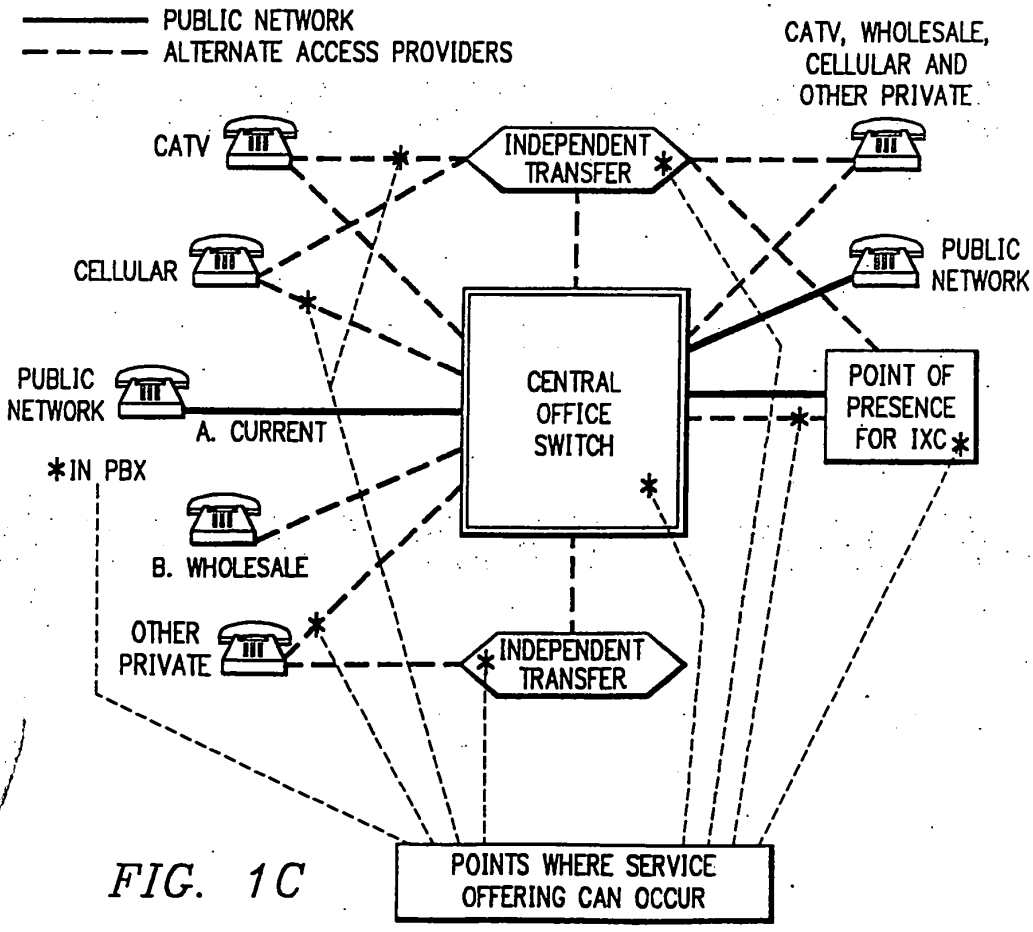

FIG. 1C

SUBSTITUTE SHEET

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US91/03469

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

US 379/67
IPC(5) H04M 3/50

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
U.S.	379/67,84,88,89,97,201,204,205,207,210,211,212,213,214

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X,P	US, a, ,4959,855 (DAUDELIN) 25 SEPTEMBER 1990 See column 2 lines 60-68, column 3 lines 1-19, column 4 lines 22-65, column 5 lines 38-47, column 8 lines 54-57	1-7

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
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International Searching Authority	**Signature of Authorized Officer**
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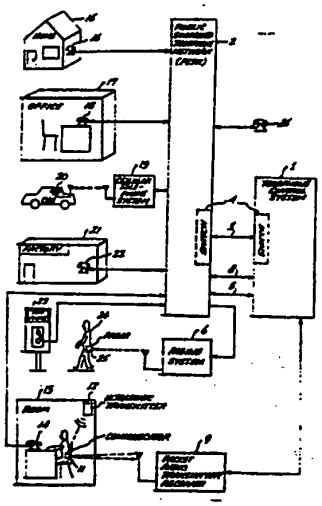
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: REMOTE ACCESS TELEPHONE CONTROL SYSTEM



(57) Abstract

A telephone control system (1) which enhances the accessability of system subscribers by providing a variety of call-handling modes, and various ways of programming by which those subscribers can tailor the system. In operation, subscribers are each assigned a telephone number (ACCESS NUMBER) which can be dialed from any location via the Public Switched Telephone Network (PSTN) (2). The control system determines which subscriber a call is intended for, and by referring to a data base determines the method of call handling which has been preselected by that subscriber (e.g. switching a call to another telephone number). The switching function (4) may be located in the control system itself, or located in the PSTN but under the control of the control system. Hence, the ACCESS NUMBER may be used as the sole telephone number for a subscriber. Callers need not know the subscribers specific whereabouts nor the subscriber's various location-specific telephone numbers such as home, office, car phone, and so forth.

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REMOTE ACCESS TELEPHONE CONTROL SYSTEM

TECHNICAL FIELD

The present invention pertains to the telephone equipment art and, more particularly, to a telephone control system which allows subscribers to remotely control a plurality of call handling utilities to predeterminedly direct incoming calls.

INCORPORATION BY REFERENCE

The subject matter disclosed and claimed in U.S. Application Patent No. 4,893,335, issued January 9, 1990, entitled "Remote Access Telephone Control System", invented by the same inventors and assigned to the applicant of the instant application, is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

Despite the availability of numerous telephone central exchange provided functions, such as "call-forwarding", "three-way calling", "call-waiting" and "speed-dialing", as well as the advent and availability of paging and mobile telephone systems, the completion of a call to a system subscriber can often be a complicated, time consuming and tedious task. Unless the telephone subscriber is located at the telephone which receives calls to his assigned phone number, completion of a call from a calling party, despite the aforementioned services, generally involves the calling party leaving a message and awaiting a call back by the subscriber. Even if the subscriber is accessible via mobile telephone or a paging system, human intervention is commonly required to look up and dial specific mobile telephone or paging numbers to attempt to contact the subscriber. Thus, additional delays and costs are incurred.

In addition, even if the subscriber is on a paging system, the successful direction of a message to the subscriber requires that the subscriber manually inform the system of his whereabouts.

Finally, existing telephone control systems offer very limited control to either the subscriber or the calling party with respect to the processing of calls.

SUMMARY OF THE INVENTION

In summary, the present invention is directed to a control system which is connected to a telephone exchange and wherein each user of the system is assigned a unique telephone number with the control system routing calls to the user via a user controlled number. The control system comprises an input/output device which is adapted for connection to the telephone exchange trunks or lines to input and output telephone calls. A switching control means controllably connects a call on one line to a different line. Provided memory controllably stores and recalls electronic signals. An electronic processing means is provided for accessing the memory, switching control means and input/output device to direct the flow of input and output calls. The electronic processing means includes means for: a) identifying a call to the system from a caller directed to a specific user, b) recalling from the memory a forwarding number for the user, c) implementing a call to the forwarding number, d) switching the caller's call to the forwarding number, e) identifying a call to the system from a specific user, f) changing the specific user's memory stored forwarding number responsive to a command from the specific user, g) processing calls to the system directed to a specific user in a selected one of a plurality of modes and, h) changing a users call processing mode responsive to a command from the user.

In accordance with one feature of the invention, the control system may forward incoming calls for a subscriber to a telephone number that has been preselected by the subscriber. The call may be directly forwarded, or may be preceded by a brief announcement informing the caller that the call is being forwarded.

In accordance with another feature of the invention, the control system may first screen incoming calls before causing them to be forwarded. The call may be screened by any of several methods, including a 'priority-screen' which allows the caller to determine whether or not the call should be forwarded to the subscriber, a 'VIP code-screen' which will only forward calls if the caller enters a preselected code, and a 'voice-screen' which records the caller's name and business, places the

caller on hold while contacting the subscriber, plays the recorded message, and allows the subscriber to determine if he wishes to be connected to the caller. With any of these screening methods, should the call not ultimately be forwarded to the subscriber, then the call may be delivered to a 'message center', where a message may be left for later pickup by the subscriber.

In accordance with another feature of the invention, the control system may cause the subscriber's pager to be activated in conjunction with forwarding of a call. In this way, the subscriber is given notice that the call is being forwarded to the pre-selected telephone number.

In accordance with another feature of the invention, the control system may, prior to forwarding a call, provide a courtesy message to the caller such as "..when the call is answered, please ask for your party by name..", or alternately inform the caller "..when the call is answered, please ask for extension number 1234."

In accordance with another feature of the invention, the control system may send all calls to a 'message center' where all messages may be left for later pickup by the subscriber. In this way the call is handled without disturbing the subscriber.

In accordance with another feature of the invention, the control system may handle calls via a 'branch-routing' mode. In this mode, callers may choose from a directory of options. As an example, the caller may be told: "You have reached ABC Real Estate. Please touch 1 to speak to Mr. Smith, 2 to speak to Mr. Jones, or hold the line to speak to the receptionist." Depending on the programming of the system, each of these selections may cause the call to be forwarded to a specific telephone number, or to another access number. No command may cause the system to follow a predetermined default method for disposing of the call.

In accordance with another feature of the invention, the control system may handle calls via a 'meet-me' mode. In this mode, the caller is placed on hold after being told that the user is being paged to a phone. The control system then pages the user. The user then may call the access system, and enter a code to be connected to the caller. In addition, the caller may be given the opportunity to touch 9 to leave a message if he does not wish to wait. If the caller chooses to leave a message, then

when the subscriber calls in, he will be informed that the caller did not wait and instead left a message. If the caller hangs up without leaving a message, then the subscriber will be so informed.

In accordance with another feature of the invention, the call-handling modes and other features of the control system may be programmed by the subscriber by accessing a command mode by dialing the access number from a touch-tone phone, entering a Personal Identification Number (PIN) code, and then following a series of menu items to select the desired feature, call-handling mode, or forwarding number. This process is further simplified by providing the subscriber with 'mode memories' which contain the most often used call handling modes, and 'number memories' which contain often used telephone numbers such as home phone, office phone, car phone, and so on.

In accordance with another feature of the invention, the subscriber may invoke a 'feature timer' which will cause a new call handling mode to take effect at the expiration of a selected time interval.

In accordance with another feature of the invention, the subscriber may invoke a 'weekly schedule' which will cause the current call-handling mode to be automatically selected from a pre-programmed list of call-handling modes, based upon the time-of-day and day-of-week.

In accordance with another feature of the invention, the subscriber may cause his calls to be forwarded to him at his current location, without the subscriber needing to enter the telephone number of the current location. Instead, the telephone number of the location is automatically received by the control system as an Automatic Number Identification (ANI) via ANI-capable facilities from the Public Switched Telephone Network (PSTN). The subscriber need only call the control system, enter his PIN code, and select a forwarding mode.

In accordance with another feature of the invention, the subscriber may program the operation of the control system by picking up a preregistered phone such as his office or home telephone and touching a 2 or 3 digit speed-dial code. In combination with the ANI capability described above this makes programming very

simple. By way of example, if a subscriber is at home, he may pick up the phone and dial 10#. This causes the telephone company central office to memory dial an 800 number with an NNX that points to ANI-capable trunks connected to the control system. The control system recognizes the ANI as belonging to the home phone of one of it's subscribers. The control system then causes all calls to that subscriber to be priority-screen forwarded to the home. If the subscriber had dialed 11#, an 800 number with the same NNX but different last four digits would be dialed, which would cause the control system to select voice-screened forwarding to the home, and so forth.

In accordance with another feature of the invention, the subscriber may elect to make an 'outside call' while in the control system command mode, by touching 9 and dialing the desired telephone number.

The control system is further enhanced by the addition of a communicator feature. This feature allows a subscriber to move from place to place and have his calls follow him without the need for him to call into the control system. The communicator is a portable device carried on the subscriber's person. The device contains an RF transmitter, an RF receiver, an ultrasonic receiver, a keypad, a 'beeper', and control circuitry. The communicator receives ultrasonic messages from small wall mounted ultrasonic transmitters. These transmitters contain the phone number, and optionally the extension number, of the nearest telephone or a mode appropriate for the location such as do not disturb in a hospital operating room. The communicator also receives radio frequency messages from the control system indicating, or paging, an incoming call for the user. The communicator device can send various radio frequency messages back to the control system, including a message containing the phone number received from the ultrasonic transmitter, a message acknowledging receipt of the page, and messages in response to keypad selections by the subscriber indicating a desire to select a new mode of call handling.

A feature of the present invention provides a telephone control system which allows subscribers to access the system, even remotely, and implement any of a number of utilities for the handling of subscriber directed calls.

Another feature of the invention provides a telephone control system wherein each subscriber is assigned one telephone number and calls to the system on that number are automatically directed to the subscriber regardless of his location.

Another feature of the invention provides the above described telephone control system wherein the system interfaces with callers and subscribers via courtesy messages which minimize or eliminate the need for users to recall complicated control commands.

Another feature of the invention provides the above described control system wherein subscribers are provided with portable pager-like communicators which include RF transmitters for transmission directly to the paging system.

Another feature of the present invention provides the above described control system wherein the communicator devices automatically respond to remote locater transmitters to transmit back to the control system the phone number of a telephone proximate the user.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram illustrating the various modes of operation and interfacing equipment for the preferred embodiment of the telephone control system;

Figure 2 is a block diagram illustrating the principle components of the telephone control system;

Figure 3 is a block diagram of the Communicator;

Figure 4 is a block diagram of the Ultrasonic Transmitter;

Figure 5 is a block diagram of the Call Processing facility;

Figure 6 is a flowchart illustrating operation of the E & M Control Circuit;

Figure 7 is a diagram illustrating the Subscriber Master Record;

Figure 8 is a diagram illustrating the Mode Memory;

Figure 9 is a flowchart of the Main Task for the Call Processing facility;

Figure 10 is flowchart of the Code Processing Facility-Network Message Task;

Figure 11 is a flowchart of the Code Processing Facility-Call Termination

Task;

Figure 12 is a flowchart of the Call Processing Facility-Call Handler Task;

Figure 13 is a flowchart of the Call Processing Facility-Dynamic Mode Assignment;

Figure 14 is a flowchart of the Call Processing Facility-Direct Forwarding Function;

Figure 15 is a flowchart of the Call Processing Facility-Announced Forwarding Function;

Figure 16 is a flowchart of the Call Processing Facility-Priority/Urgent Screen Function;

Figure 17 is a flowchart of the Call Processing Facility-VIP Code Screen Function;

Figure 18 is a flowchart of the Call Processing Facility-Branch Routing Function;

Figure 19 is a flowchart of the Call Processing Facility-Caller Message Center Function;

Figure 20 is a flowchart of the Call Processing Facility-Voice-Screen Function;

Figure 21 is a flowchart of the Call Processing Facility-Meet Me Caller Function;

Figure 22 is a flowchart of the Call Processing Facility-'Send Page' Subroutine;

Figure 23 is a flowchart of the Call Processing Facility-Command Mode Function;

Figure 24 is a flowchart of the Call Processing Facility-Command Message Center Function;

Figure 25 is a flowchart of the Call Processing Facility-Command Forwarding Number Function;

Figure 26 is a flowchart of the Call Processing Facility-Command Feature Timer Function;

Figure 27 is a flowchart of the Call Processing Facility-Command Memory Function;

Figure 28 is a flowchart of the Call Processing Facility-Command Outside Call Function;

Figure 29 is a flowchart of the Call Processing Facility-Command Help Function;

Figure 30 is a flowchart of the Call Processing Facility-Command Meet Me Function;

Figure 31 is a flowchart of the Call Processing Facility-Command Branch Route Function;

Figure 32 is a flowchart of the Call Processing Facility-Command Advanced Features Function;

Figure 33 is a block diagram illustrating the principle components of the Meet Me Facility;

Figure 34 is a flowchart of the Meet Me Facility Main Task;

Figure 35 is a block diagram illustrating the principle components of the Subscriber Access Facility;

Figure 36 is a flowchart illustrating operation of the E & M Control Circuit for the Subscriber Access Facility;

Figure 37 is a flowchart of the Subscriber Access Facility Main Task;

Figure 38 is a block diagram illustrating the principle components of the Communicator Access Facility;

Figure 39 is a flowchart of the Communicator Access Facility Main Task;

Figure 40 is a flowchart of the Communicator Main Task;

Figure 41 is a block diagram illustrating the principle components of the Pager Dialing Facility;

Figure 42 is a flowchart of the Pager Dialing Facility Main Task;

Figure 43 is a block diagram illustrating the principle components of the Client Services Facility; and;

Figure 44 is a flowchart of the Client Services Facility Main Task.

OVERVIEW OF THE INVENTION

FIG. 1 illustrates in block diagram form, the manner in which the Telephone Control System may be used to enhance the accessibility of it's subscribers. As is shown, the Telephone Control System 1 connects with the PSTN 2 via facilities 3. The Telephone Control System 1 may control switch 4, causing it to connect incoming and outgoing trunks.

As is shown, alternate preferred embodiments exist with respect to switch 4.

In the first preferred embodiment, the switch 4 is actually part of the PSTN 1. In this embodiment, the facilities 3 must be capable of transmitting switch control signals from the Telephone Control System 1 to the switch 4. An example of this type of facility is a CENTREX line, which allows the transmission of switch control signals in the form of 'hookswitch flashes' and touch tones to initiate call-conferencing and call-transfer. A recently available variation of the CENTREX facility is a CENTREX DID trunk, which not only has the 'hookflash' capability, but also provides the called number in the form of Direct-Inward-Dialing digits. This is the form of facility 3 which is referred to in the detailed description of the preferred embodiment. Another variation of the CENTREX facility provides the called number via a separate data-link known as Simplified Message Desk Interface (SMDI).

U.S. Patent 4,893,335, which issued January 9, 1990, incorporated by reference herein, describes in detail a system for controlling the PSTN switch.

In an alternate preferred embodiment, the switch 4 is part of the Telephone Control System 1. In this embodiment, the facilities 3 need only include standard DID trunks for the incoming calls, and standard outgoing trunks. The access control system 1 controls switch 4 directly, causing it to connect paths between various incoming and outgoing trunks as required.

Again referring to FIG. 1, the Telephone Control System 1 also connects to the PSTN 2 via standard tip-ring phone lines 5, for purposes of communicating with Paging System 6. The Paging System may be any of the commonly known paging

systems such as those comprised of transmitters such as Motorola's PACE or Quintron model QT250B and paging terminals such as Glenayre model GL3000XL or BBL System 3, which send encoded messages via radio frequency to cause a unique pager, or beeper, worn by a paging system subscriber, to sound an alert, produce a message in a display, activate a light, vibrate, or produce any of a variety of other alerting mechanisms. Typically, these paging systems will cause a pager to be alerted in response to another individual dialing a phone number which corresponds to that individual's pager. This phone number is routed via the PSTN 2 to a paging terminal via facilities 7, which in turn determines, typically via DID digits, who the call is intended for, and then sends a radio frequency message to alert that individual's pager. To cause a subscriber's pager to be activated, the Telephone Control System 1 then need only come off hook on one of the lines 5, and dial the phone number that corresponds to the subscriber's pager. Although not described in this preferred embodiment, it is anticipated that the Telephone Control System 1 could also interface to a paging system directly via a dedicated data link.

An additional facility 5 connects the Telephone Control System 1 to the PSTN 2. This facility is a trunk which provides the Automatic Number Identification (ANI) of the calling party. An example of such a trunk is the Feature Group D (FGD) trunk which is commonly used by interexchange carriers. The interexchange carriers use the ANI information to properly bill the calling party. The Telephone Control System 1 uses this ANI information in a new and different manner. As will be described in further detail herein, subscribers of the Telephone Control System 1 may program the Telephone Control System 1 by calling it through trunking facilities 5. The access control system 1 automatically acquires the ANI, or phone number of the calling party. This allows the access control system 1 to program the forwarding number for the subscriber without the subscriber needing to manually enter it. Although not described in the preferred embodiment, it is anticipated that other types of facilities which provide ANI information may also be used for this purpose. An example of another type of facility which provides ANI is a CENTREX line with an SMDI data link, which is now available from several types of central offices. The

SMDI data link is capable of passing both the called party number and the calling party number (ANI).

Still referring to FIG. 1, The Telephone Control System 1 is also connected to a Packet Radio Transmitter/Receiver 9 via data-link 10. The Packet Radio Transmitter/Receiver 9 may consist of any of the commonly known radio transceivers such as YAESU FT-470 and ICOM IC-u 4AT, equipped with a packet radio interface such as HEATHKIT HK-21. As will be described in further detail herein, the Packet Radio Transmitter/Receiver 9 is used by the Telephone Control System 1 to interface with the portable Communicator device 11, carried by an Telephone Control System subscriber. The Communicator 11 may both send and receive DATA messages via radio frequency. The Communicator 11 may also receive ultrasonic messages from fixed ultrasonic transmitter 12, shown located in room 13. Ultrasonic transmitter 12 continuously transmits the phone number, and, if appropriate, the extension, of the phone 14 located in the same room or a signal indicating an appropriate call control mode for a given situation such as do not disturb in a hospital operating room. It should be noted that, although the preferred embodiment disclosed herein describes transmitter 12 as ultrasonic, it is anticipated that an infrared transmitter may also be used. The ultrasonic transmitter has the advantage that it will pass signals through a layer of clothes, which would be important for example if the subscriber were carrying the Communicator 11 in a shirt pocket.

To aide in the discussion of the illustrative examples which follow, FIG. 1 also shows a subscriber's home 15, with a home phone 16; a subscriber's office 17, with an office phone 18; a cellular telephone system 19, which interfaces to a subscriber's car-phone 20; a factory 21, with a factory phone 22; a pay telephone 23; a subscriber 24 with pager 25; and a caller's telephone 26.

The illustrative examples which follow are intended only to clarify some of the concepts, features, and objects of the invention, and do not define the scope of the invention.

Methods of Call-Handling

Following are several illustrative examples of the various call-handling modes of the Telephone Control System 1.

Direct Forwarding

For the sake of this example, assume that a caller at phone 26 wishes to speak to a subscriber to the access control system 1, and further assume that the subscriber is at home 15, and that he has preprogrammed the system to 'direct forward' his calls to him at his home phone 16. The caller dials the access number for the subscriber, and the PSTN delivers the call to the Telephone Control System 1 via facilities 3. The facilities 3 provide the access control system 1 with the called party information (DID) digits. The Telephone Control System then refers to it's internal database to determine how to handle the call. The access control system determines that calls for this subscriber are to be handled via 'direct forwarding' mode, and that the call is to be forwarded to the subscriber's home. The access control system then dials the subscriber's home on an outgoing facility 3, and instructs the switch 4 to connect the incoming facility to the outgoing facility to complete the call. The PSTN 2 then delivers the call to home phone 16, causing it to ring, and the subscriber may pick up the phone and connect to the caller. Note that this mode of call-handling is referred to as 'direct forwarding' because the call is forwarded without any announcement or prompting from the Telephone Control System 1.

Announced Forwarding

Assume again that a caller at phone 26 wishes to speak to a subscriber to the Telephone Control System 1. Also assume that the subscriber is at home 15, and that this time he has preprogrammed the system to 'Announce-forward' his calls to him at his home phone 16. Again, the caller dials the access number for the subscriber, and the PSTN delivers the call to the Telephone Control System 1 via facilities 3. Upon receiving the DID digits for this subscriber, the Telephone Control System 1 determines that calls for this subscriber are to be handled via 'announced forwarding' mode, and that the call is to be forwarded to the subscriber's home. The access

control system then plays a brief greeting to the caller: "Hello, you have reached the **ACCESSLINE** for Mr. Jones. We're Connecting your call." The Telephone Control System then dials the phone number for phone 16 on an outgoing facility 3, and instructs the switch 4 to connect the incoming facility to the outgoing facility to complete the call. The PSTN 2 then delivers the call to home phone 16, causing it to ring, and the subscriber may pick up the phone and connect to the caller.

Forwarding with Page

Assume again that a caller at phone 26 wishes to speak to a subscriber to the Telephone Control System 1. Also assume again that the subscriber is at home 15, and that this time he has preprogrammed the system to 'Forward with page' his calls to him at his home phone 16. Again, the caller dials the access number for the subscriber, and the PSTN delivers the call to the Telephone Control System 1 via facilities 3.

Upon receiving the DID digits for this subscriber, the access control system 1 determines that calls for this subscriber are to be handled via 'forward with page' mode, and that the call is to be forwarded to the subscriber's home. The access control system then plays a brief greeting to the caller: "Hello, you have reached the **ACCESSLINE** for Mr. Jones. We are sending a page to inform your party of the call. Please stay on the line." The Telephone Control System 1 then dials the phone number for the pager corresponding to this subscriber and informs the caller "We have sent a page to alert your party and will connect you momentarily." The access control system then dials the phone number for phone 16 on an outgoing facility 3, and instructs the switch 4 to connect the incoming facility to the outgoing facility to complete the call. The PSTN 2 then delivers the call to home phone 16, causing it to ring, and the subscriber may pick up the phone and connect to the caller. The subscriber, having been alerted to the incoming call by his pager, was ready to receive it.

Message Center

In some cases the subscriber may not be able to take calls and may wish that his callers simply leave a message. In these cases, the subscriber may program the access control system 1 to connect calls to the subscriber's preselected 'message center'. The Telephone Control System 1 may connect calls to either an 'internal message center' or an 'external message center'. The 'external message center' is simply a phone number that the Telephone Control System 1 will forward calls to if in this mode. This may be the phone number for an answering service, a receptionist, a voice mail system, or any other appropriate location as desired by the subscriber. If the subscriber elects to use the 'internal message center', then an example of a typical call may be as follows.

Assume that a caller at phone 26 wishes to speak to a subscriber to the Telephone Control System 1. Also assume that the subscriber does not wish to be disturbed and that he has preprogrammed the system to 'internal message center' mode. The caller dials the access number for the subscriber, and the PSTN delivers the call to the Telephone Control System 1 via facilities 3. Upon receiving the DID digits for this subscriber, the Telephone Control System 1 determines that calls for this subscriber are to be handled via 'internal message center' mode. The Telephone Control System then plays a brief greeting to the caller: "Hello, you have reached the **ACCESSLINE** for Mr. Jones. Your party is not readily available at the moment, however we will connect you to your party's message center where you may leave a detailed message.....Please leave your message at the tone." The Telephone Control System 1 then records the callers message and saves it for later playback by the subscriber. In addition, should the subscriber have so elected, the access control system 1 may dial the phone number corresponding to the subscriber's pager, to alert the subscriber to the message.

Priority-Call Screening

Assume again that a caller at phone 26 wishes to speak to a subscriber to the

Telephone Control System 1. This time assume that the subscriber is at his office 17, and that he has preprogrammed the system to send his calls to him at his office via 'priority call-screening', with a message asking the caller to ask for extension 123, which in this example is the extension number of the phone 18 on his desk. Again, the caller at phone 26 dials the access number for the subscriber, and the PSTN 2 delivers the call to the access control system 1 via facilities 3. Upon receiving the DID digits for this subscriber, the Telephone Control System 1 determines that calls for this subscriber are to be handled via 'priority call-screening' mode, and that the call is to be forwarded to the subscriber's office. The access control system 1 then plays a brief greeting to the caller: "Hello, you have reached the **ACCESSLINE** for Mr. Jones. Your party is not readily available at the moment. If this call is urgent then please touch 0 now and we will attempt to connect you to your party. Otherwise, please hold the line and we will connect you to your party's message center where you may leave a detailed message." If the caller does not touch 0, then the call is delivered to the 'message center' as described above. If the caller does touch 0, then the Telephone Control System 1 may inform the caller: "Please standby while we connect your call. When the call is answered please ask for extension number 123." The access control system then dials the preprogrammed lead phone number for the subscriber's office 17 on an outgoing facility 3, and instructs the switch 4 to connect the incoming facility to the outgoing facility to complete the call. The PSTN 2 then delivers the call to the receptionist at office 17, causing it to ring. When the receptionist answers, the caller will ask for extension 123, as he was instructed by access control system 1, and the receptionist may connect the call to the subscriber's desk phone 18.

VIP Code Screening

Assume again that a caller at phone 26 wishes to speak to a subscriber to the Telephone Control System 1. This time assume that the subscriber is in his car, and that he has preprogrammed the system to send his calls to him at his car-phone 20 via 'VIP code-screening'. In this mode, only those callers who have been told a special

VIP code will be able to reach the subscriber. All other callers will be sent to the message center. Again, the caller at phone 26 dials the access number for the subscriber, and the PSTN 2 delivers the call to the Telephone Control System 1 via facilities 3.

Upon receiving the DID digits for this subscriber, the access control system 1 determines that calls for this subscriber are to be handled via 'VIP code-screening' mode, and that the call is to be forwarded to the subscriber's car phone 20. The Telephone Control System 1 then plays a brief greeting to the caller: "Hello, you have reached the **ACCESSLINE** for Mr. Jones. Your party is not readily available at the moment. Please enter your VIP code now, or hold the line and we will connect you to your party's message center where you may leave a detailed message." If the caller does not enter the correct VIP code, then the call is delivered to the 'message center' as described above. If the caller does enter the VIP code, then the Telephone Control System 1 may inform the caller: "Please standby while we connect your call." The Telephone Control System then dials the telephone number for car-phone 20 on an outgoing facility 3, and instructs the switch 4 to connect the incoming facility to the outgoing facility to complete the call. The PSTN 2 then delivers the call to the cellular telephone system 19, which in turn delivers the call to the car-phone 20.

Voice-Screening

Assume again that a caller at phone 26 wishes to speak to a subscriber of the Telephone Control System 1. This time assume that the subscriber, Mr. Jones, is visiting his client's factory 21, and that he has preprogrammed the system to send his calls to him at this location via 'voice-screening'. Again, the caller at phone 26 dials the access number for the subscriber, and the PSTN 2 delivers the call to the access control system 1 via facilities 3. Upon receiving the DID digits for this subscriber, the Telephone Control System 1 determines that calls for this subscriber are to be handled via 'voice-screening' mode, and that the call is to be forwarded to his client's factory 21. The access control system 1 then plays a brief greeting to the caller:

"Hello, you have reached the **ACCESSLINE** for Mr. Jones. Please state your name and the purpose of your call at the tone. After the tone, please stay on the line while we attempt to locate your party and connect your call." The access control system 1 then records the caller's name and business, and then responds: "Thank you, please standby." The access control system then dials the telephone number for factory 21 on an outgoing facility 3, leaving the incoming call on hold. The PSTN 2 then delivers the outgoing call to the lead telephone number of factory 21, which is answered by the factory's receptionist. The Telephone Control System tells the receptionist "We have a call holding for Mr. Jones. Please locate the party." The receptionist pages Mr. Jones via the factory's speaker system, informing him of the call. Mr. Jones then answers the call at phone 22, and enters his Personal Identification Number (PIN) code. The access control system 1 then plays back the callers name and business. The Telephone Control System 1 then asks Mr. Jones: "Please touch 1 to connect the call, 2 to send the caller away, or 3 to send the caller to your message center." In this example, Mr. Jones wishes to speak to the caller, so he touches 1. The Telephone Control System 1 instructs the switch 4 to connect the incoming facility to the outgoing facility to complete the call.

Branch-Routing

Assume again that a caller at phone 26 wishes to speak to a subscriber of the Telephone Control System 1. This time assume that the subscriber is not a person, but a business; the ABC Factory Company 21, and that the Telephone Control System 1 has been preprogrammed to handle their calls via 'branch-routing' mode. Again, the caller at phone 26 dials the access number for the subscriber, and the PSTN 2 delivers the call to the Telephone Control System 1 via facilities 3. Upon receiving the DID digits for this subscriber, the Telephone Control System 1 determines that calls for this subscriber are to be handled via 'branch-routing' mode. The Telephone Control System 1 then refers to it's memory and plays a pre-recorded 'branch-routing' greeting to the caller: "Hello, you have reached the ABC Factory Company. Please touch 1 to speak to the manufacturing manager, 2 to speak to

accounts receivable, 3 to speak to accounts payable, 4 to speak to purchasing, or hold the line to speak to the receptionist." Should the caller need help, he will hold the line for a moment, and the Telephone Control System 1 responds: "Please standby." The Telephone Control System then dials the telephone number for the factory's reception phone 22 on an outgoing facility 3, and instructs the switch 4 to connect the incoming facility to the outgoing facility to complete the call.

Meet-Me

Assume again that a caller at phone 26 wishes to speak to a subscriber to the Telephone Control System 1. This time assume that the subscriber, Mr. Jones, is away from the office today, and that he has preprogrammed the system to handle his calls via 'meet-me' mode. Again, the caller at phone 26 dials the access number for the subscriber, and the PSTN 2 delivers the call to the Telephone Control System 1 via facilities 3. Upon receiving the DID digits for this subscriber, the Telephone Control System 1 determines that calls for this subscriber are to be handled via 'meet-me' mode. The Telephone Control System 1 then responds by producing audible ringback to the caller, while dialing the phone number for the pager corresponding to this subscriber on facilities 5. The Telephone Control System 1 then plays a brief message to the caller: "Hello, you have reached the **ACCESSLINE** for Mr. Jones. We are paging your party to a phone, please standby. If you are unable to wait you may touch 9 to leave a message. Otherwise please hold the line." The Telephone Control System 1 then places the caller on hold and waits for the subscriber to call in. Meanwhile the subscriber 24 has received the page via his pager 25, and is proceeding to pay phone 23 to answer the call. The subscriber dials his own access number and the PSTN 2 delivers the call to the Telephone Control System 1 via facilities 3. The subscriber then enters his own PIN code and is informed "You have a caller holding for you on your meet-me service. Please touch 4 to be connected to the caller." It is also anticipated that if the caller had hung up or left a message in the meantime, that the subscriber would be so informed. Assuming that the caller is still holding, and that the subscriber touches 4, the access

control system 1 instructs the switch 4 to connect the incoming facility to the outgoing facility to complete the call.

Methods of Programming

Although various methods of 'remotely programmable call forwarding' have been attempted in the prior art, these have proven to have limited widespread appeal due to the complicated and inflexible methods by which the users were required to program the systems. By contrast, the access control system employs a variety of different methods to allow the subscriber to easily and effectively program the operation of the Telephone Control System. Following are several illustrative examples of the various methods a subscriber may employ to program the Telephone Control System 1.

Command Mode

To use the Command Mode method of programming, the subscriber simply dials his own access number from any telephone, and enters his PIN code. The PSTN 2 delivers the call to the Telephone Control System 1 via facilities 3. The Telephone Control System 1 then informs the caller of the current feature which is selected, and then provides the subscriber with a simple menu of options by which he can choose a new feature. For example, in response to the entry of the PIN code, the subscriber may be prompted: "Hello Mr. Jones. Your calls are currently being VIP code screened to your office. Touch 1 to check messages, 2 to change your forwarding number, 3 to select a memory, 8 for advanced features, 9 to make a call, or touch 0 for help." The subscriber may then make his desired selection. Please note that although the preferred embodiment herein discusses the use of touch tone as the signalling method by which the subscriber controls the Command Mode of the access control system, the inventors anticipate that other signalling methods may also be employed, including, but not limited to, rotary dial pulse detection and voice recognition.

Another feature of the Telephone Control System Command Mode allows the

subscriber to program 'mode memories' which contain the most often used call handling methods for that subscriber. For example, a subscriber may program memory 10 to be announced forwarding to his office, memory 20 to be voice screened forwarding to his home, memory 30 to be message center mode, and so forth.

Weekly Schedule

Subscribers who have some routine to their weekly activities may soon grow weary of constantly calling the Telephone Control System and selecting the same call handling methods at the same time, day after day. For this reason, the weekly schedule feature provides a very real benefit to the subscriber. As an example, let us assume that a subscriber, Mr. Jones, starts work at 8:00 AM every morning, and leaves for home at 5:00 PM in the evening. Let us further assume that he takes an hour for lunch from 12:00 to 1:00PM each day. The weekly schedule for this subscriber might be pre-programmed into the Telephone Control System's database to be:

DAY	TIME	MODE MEMORY	FEATURE
Mon-Fri	7:30am	30	Message Center
Mon-Fri	8:00am	10	Announced forwarding to office
Mon-Fri	12:00noon	30	Message center
Mon-Fri	1:00pm	10	Announced forwarding to office
Mon-Fri	5:00pm	20	Voice screen forwarding to home

As calls are received by the Telephone Control System for this subscriber, the Telephone Control System 1 refers to this database and determines the correct call handling method for the day of week and time of day, and delivers the call accordingly.

Another feature of the weekly schedule allows the subscriber to override the weekly schedule should his schedule deviate from the preprogrammed sequence. In

this way the subscriber can move freely about his routine activities, and only he needs to program the access control system should his schedule change from the normal.

Feature Timer

To illustrate the use of the Feature Timer capability of the Telephone Control System, assume that a subscriber is visiting a client's office for a one hour appointment, and wishes to have his calls forwarded to him at this location during that time. He may use the Command Mode as described above to select announced forwarding mode and change the forwarding number to be the telephone number of his client's phone. When he leaves he intends to change the call handling mode back to his message center. However, if the subscriber forgets to call the Telephone Control System as he is leaving the client's office, then the client may still continue to receive calls intended for the subscriber. To overcome this problem, the subscriber may have instead used the Feature Timer function when he first called the access control system when he got to the client's office. In this example, the subscriber could have called the access control system, and used Command Mode to select announced forwarding to his client's office. However, instead of hanging up at that point, he could have activated the Feature Timer, programming it to maintain the current mode for one hour and then automatically change the call handling mode to message center mode. In this way, the subscriber would not have to remember to call the Telephone Control System as he leaves the client's office, and the client would not be bothered with the subscriber's calls after he left.

Programming a Forwarding Number Using ANI

One difficulty in prior art implementations of remotely programmable call forwarding devices, is that it takes quite a few digits for the user to call the system, enter an access code, and then enter the forwarding number. One means by which the invention described herein overcomes this difficulty is by employing special trunks which provide the called party number, also referred to as ANI. To see how this improves the ease of programming, consider the following example. Assume that the

subscriber is visiting factory 21, and that this is a location that he does not visit regularly, and therefore does not have it's telephone number preprogrammed into the Telephone Control System 1. Further assume, as was discussed earlier, that the access control system 1 is connected to the PSTN with Feature Group D trunks 8 which provide ANI, and which can be reached by dialing an 800 number. To cause his calls to get to him at the factory 21, the subscriber in this example would pick up telephone 22 and dial the 800 number which corresponds to the Feature Group D trunk. The PSTN 2 would deliver the call to the Telephone Control System 1 and the Telephone Control System 1 would receive the ANI information digits containing the telephone number of telephone 22. The subscriber then need only enter his PIN code and the call handling feature memory he wishes to use, which might be memory 40, announced forwarding. The subscriber could then hang up and the Telephone Control System 1 would program the database to send all calls for that subscriber to telephone 22 via announced forwarding. As should be obvious, the sequence of digits entered by the subscriber was shorter than if he had to actually enter the phone number. It should also be pointed out that another advantage of this method of programming is that the same sequence of digits is used to program the system each time. In other words, if the subscriber went to another location and wanted his calls to be sent to him via announced forwarding, he could pick up a phone and dial the exact same sequence of digits as was described above. This makes the programming of the Telephone Control System less demanding on the subscriber since he only has to memorize one sequence to accomplish this function. It is also anticipated by the inventors that a subscriber to this service may employ a 'pocket dialer' preprogrammed with this fixed digit sequence, thereby even further simplifying the ease of programming.

Programming the Telephone Control System using Speed Calling and ANI

A well known service offered by many telephone companies is 'Speed Calling'. This service allows users to preprogram often used telephone numbers into

memories which can be recalled by dialing a one, two, or three digit code. To see how subscribers can use this service to improve the ease of programming the Telephone Control System, consider the following example. Assume that an Telephone Control System subscriber, who lives at home 15, has preprogrammed the access control system with his home phone number 16. Let us further assume, as was discussed earlier, that the Telephone Control System 1 is connected to the PSTN 2 with Feature Group D trunks 8 which provide ANI, and which can be reached by dialing an 800 number, and assume further that an entire 800-NNX has been dedicated to this trunk group, in this example 800-999-XXXX. By this invention, the last four digits of the 800 number will be used to signify the mode memory which is being selected. In this example, also assume that the subscriber has preprogrammed his telco speed dialing feature so that the sequence 2# causes the telephone number 1-800-999-0010 to be dialed, and that the sequence 3# causes the telephone number 1-800-999-0011 to be dialed. In this example, when the subscriber picks up telephone 16 and dials 2#, the speed dialing feature will cause the number 1-800-999-0010 to be dialed. The PSTN 2 will deliver the call to the access control system 1 via Feature Group D trunks 8. The access control system 1 will receive the ANI digits, and referring to it's database recognize the call as originating at the home telephone of one of it's subscribers. It then will invoke the preprogrammed mode memory 10 for that subscriber, which in this example might be voice-screened forwarding to his home phone. As a further example, if the subscriber had dialed 3#, the Telephone Control System 1 would have invoked memory 11 for that subscriber.

Communicator

As described earlier, the Communicator is a portable device carried on the subscriber's person. This example demonstrates some of the ways by which the Communicator can simplify the call handling and programming operations for the Telephone Control System subscriber. Still referring to FIG. 1, assume that the subscriber is carrying a communicator 11 on his belt, and that he has just entered room 13. Also assume that he has selected the 'automatic phone number' mode of

operation for the Communicator 11. When he enters the room, the Communicator 11 detects a signal from the fixed ultrasonic transmitter 12 located near the ceiling. This signal is decoded by the Communicator 11 and is determined to contain a phone number, which in this example happens to correspond to the phone instrument 14 located in the same room 13. Upon receipt of the ultrasonic signal, the Communicator 11 transmits a brief packet message via radio frequency. This message contains the subscriber's access number and the phone number just received form the ultrasonic transmitter 12. This radio frequency message is detected by packet radio transceiver 9 and passed on to the access control system 1 via data link 10. The Telephone Control System 1 then changes the forwarding number for this subscriber to be the new number.

Assume now that a caller at phone 26 wishes to speak to this subscriber. The caller dials the access number for the subscriber, and the PSTN delivers the call to the access control system 1 via facilities 3. Upon receiving the DID digits for this subscriber, the Telephone Control System 1 determines that calls for this subscriber are to be handled via 'direct forwarding' mode, and that the call is to be forwarded to the subscriber at telephone 14. The access control system 1 then sends a page message to the packet radio transceiver 9 via data-link 10. The packet radio transceiver 9 in turn transmits a radio frequency packet message to Communicator 11, causing the beeper in the Communicator 11 to alert the subscriber to the incoming call. The Communicator 11 may also then send an acknowledgment message back via radio frequency to the packet radio transceiver 9. Meanwhile, the Telephone Control System 1 has begun to dial the phone number for phone 14 on an outgoing facility 3, and instructs the switch 4 to connect the incoming facility to the outgoing facility to complete the call. The PSTN 2 then delivers the call to phone 14, causing it to ring, and the subscriber may pick up the phone and connect to the caller. Continuing the illustrative example, assume that the subscriber completes the call and leaves the room 13. Communicator 11 detects the loss of signal from ultrasonic transmitter 12, and realizes therefore that the subscriber has left the room and is no longer able to receive calls at this location. The Communicator 11 then transmits a

brief packet message via radio frequency. This message contains the subscriber's access number and a special message indicating that no phone number is available and that a default mode memory is to be used for call handling. This radio frequency message is detected by packet radio transceiver 9 and passed on to the Telephone Control System 1 via data link 10. The Telephone Control System 1 then changes the method of call handling for this subscriber to the default mode, which may typically be message center mode. It should be obvious now that if the subscriber were to reenter room 13, or to enter another room with a similar ultrasonic transmitter, that a similar sequence of events would occur causing the calls for this subscriber to be routed to the appropriate room. In this way, without any specific action or effort on the part of the subscriber, his calls will follow him from location to location and be handled automatically and properly.

Another feature of the Communicator allows the subscriber to enter a 'manual phone number' mode whereby the Communicator will ignore the messages received from the ultrasonic transmitters, maintaining the last used mode or forwarding number.

Another feature of the Communicator allows the subscriber to select a new method of call-handling by touching keys on the Communicator's keypad. This will cause the Communicator 11 to transmit a 'new mode memory request' packet message via radio frequency to the packet radio transceiver, which in turn will send the message to Telephone Control System 1 via data-link 10, causing the Telephone Control System 1 to change the call handling method for that subscriber.

DETAILED DESCRIPTION

FIG. 2 is a block diagram of the telephone control system 1. The preferred embodiment of the telephone control system 1 consists of a variety of subsystems, or facilities. A Call Processing Facility (CPF) 100 is shown connected to trunks 3. A Pager Dialing Facility (PDF) 105 is shown connected to telephone lines 5. A Subscriber Access Facility (SAF) 110 is shown connected to trunks 8. A Meet-Me Facility (MMF) 115 is shown connected to lines 120. A Communicator Access

Facility (CAF) 125 is shown connected to datalink 10. A Client Services Facility (CSF) 130 is also shown. Each of these facilities is connected to high speed data network 150.

A block diagram of the Communicator 11 is shown in FIG. 3. The operation of the Communicator 11 is controlled by microprocessor 200, which in the preferred embodiment is a single chip microprocessor containing it's own Read-Only-Memory (ROM) and Random-Access-Memory (RAM). A keypad 205, and display 210 are shown connected to microprocessor 10. A transmit data output port 215 is provided by the microprocessor 200. This transmit data is passed to packet data encoder 220 which formats the data into packets before sending the packets to antenna 230 via radio frequency transmitter 225. Radio frequency receiver 235 receives data packets from antenna 230 and passes them to packet data decoder 240, which removes the packet format and passes the raw received data to the receive data input port 245 on microprocessor 200. Output port 250 may be used to apply a tone signal to beeper driver 255 which supplies sufficient current to drive beeper 260 to produce an alerting sound. A transducer 265, capable of receiving signals in the ultrasonic frequency range, passes these signals to a 40 Kilohertz filter and amplifier 270. The resulting signal is applied to detector 275 which removes the 40 Kilohertz component from the signal and passes the resulting serial data to input port 280 of microprocessor 200. Also shown is a crystal oscillator 285 which controls the timing of all operations of the microprocessor 200. Power for the Communicator 11 is supplied by battery 290. Improvements that currently exist in the ART may be made to the ultrasonic transmitter and detector to enhance its ability to communicate the ultrasonic data in the presence of multi-path echoes. These improvements include, but are not limited to: frequency shift keying; the transmission of synchronized data and the use of a clock recovery logic to extract the clock timing over a long integration period resulting in a clock move resistant to echoes; the use of error detecting and correcting codes; and the use of sampling and voting techniques to determine the correct bit value after multiple samples during a bit period, the bit period being determined by the clock recovery logic above. In addition, multiple transmitters may be used as a

method of obtaining increased coverage and area transmission diversity.

A block diagram of the Ultrasonic Transmitter 12 is illustrated in FIG. 4. Oscillator 300 provides a 40 Kilohertz signal to one input of AND gate 305. The output of crystal oscillator 310 is applied to divider 311 which produces a 75 Hertz signal to the clock input of 6-bit counter 315. The 6 outputs of counter 315 are applied to the address inputs of Read-Only-Memory 320. Memory 320 is pre-programmed with data representing the phone number of the nearest telephone. This data may contain the area code plus seven digits and the extension number if appropriate. With each digit represented by 4 bits, 14 digits and 8 bits of checksum may be transmitted. Only the least significant bits in ROM 320 need be programmed, as the LSB output 325 is used to apply this data to a second input of AND gate 305. As can be seen, the serial data at 325 will continuously output the phone number at a rate of 75 bits per second. AND gate 305 combines the serial data 325 and the 40 Kilohertz signal from oscillator 300 producing a resultant signal which is applied to transducer driver 330. The output of driver 330 is then applied to transducer 335. As should be obvious, the transducer will be generating a 40 Kilohertz signal while the serial data output 325 is high, and will be generating no signal while the serial data output 325 is low. The data is therefore modulated on the 40 Kilohertz carrier at a rate of 75 baud. The 64 bits from the ROM 320 are thus transmitted in a period of 0.853 seconds. This is adequate for the transmission of a phone number and extension. Although this baud rate is relatively low, it has the advantage of reducing the effect of multipath (reflections of the ultrasonic signal arriving at the receiver at different times and phases), and thus improves the reliability of transmission as compared with higher baud rates.

A block diagram of the Call Processing Facility (CPF) 100 is shown in FIG. 5.

Referring to FIG. 5, CPF trunk interface 400 interfaces the CPF 100 with trunk 3. As was discussed earlier, the preferred embodiment of the telephone control system 1 employs a CENTREX DID trunk. In this embodiment trunk 3 is provided via a 4-wire E&M trunk provisioned with TYPE I signalling, which is well known

in the art. This type of trunk provides a 2-wire balanced transmit audio connection,shown terminated by line termination 405. This type of trunk also provides a 2-wire balanced receive audio connection, shown terminated by line termination 410. The E-Lead of trunk 3 is shown connected to the current limiting and over voltage protection at reference 415. In a similar fashion, the M-Lead of trunk 3 is shown connected to the current limiting and over voltage protection at reference 420. 2-to-4 wire convertor 425 takes the separate balanced transmit and receive signals from line terminators 405 and 410 and combines them into one single-ended signal at reference 430, which is applied to call processor 435. The E-Lead signal from limiter/protector 415 is passed to current detector 440. As is shown, current detector 440 provides a path for the E-Lead signal through to the negative battery reference of -48 volts at 445. Current Detector 440 also provides an "E-Lead Detect" logic signal indicating the presence of current via the E-lead. This signal is applied to E&M lead control circuit 450. The M-Lead signal for limiter/protector 420 is passed to M-Lead relay 455. This relay is controlled by a "M-Lead Control" signal from control circuit 450. By activating or deactivating relay 455, control circuit 450 is able to take the M-Lead on-hook or off-hook, as the M-Lead will be connected either to -48 volts or to ground. The control circuit 450 outputs an "Incoming Call" signal 470 to buffer 460, and outputs a "Loop Status" signal 475 to call processor 435. The control circuit 450 has as additional inputs a "DID Received" signal 480 from latch 465, and an "On/Off-Hook Control" signal 485 from call processor 435. The output of buffer 460, and the input of latch 465 is applied to CPF internal data bus 490.

Still referring to FIG. 5, the CPF internal data bus 490 connects CPF trunk interface 400, call processor 435, precision busy/ring detector 437, Central Processing Unit (CPU) 495, Random Access Memory (RAM) 500, Disk memory 505, and data network interface 510. Call processor 435 performs the functions of voice record and playback, dual-tone-multi-frequency (DTMF) detection and generation, and call control. The functions of call processor 435 are well known in the art and many products, such as the Model D41B manufactured by Dialogic

Corporation, exist commercially which can accomplish these functions. A voice recognition module 436 is shown connected to call processor 435. Voice recognition module 436 allows call processor 435 to detect, on a speaker-independent basis, a simple set of spoken commands from callers. The simple set consists of 16 words including the digits '0' through '9'. This capability, in combination with the DTMF detection capability of the call processor 435, allows caller to either speak their commands, or enter them from a DTMF phone. A commercially available product which performs this voice recognition function is the Model VR/10 manufactured by Dialogic Corporation.

A precision busy/ring detector 437 is shown connected to the audio signal 430 from CPF trunk interface 400. This detector may be used to perform a rapid detection of precise busy and precise ringing signals, even in the presence of voice. Unlike the busy and ring detection functions of Call Processor 435 which require a cadence match as well as a frequency match, precision busy/ring detector 437 does not require a cadence match and is therefore capable of rapidly detecting precise busy and ringing signals even if a party is conferenced in and speaking on the line. This capability is useful in providing the 'busy/no-answer option' as will be described later. The functions of precise busy/ring detector 437 are well known in the art, and may be typically implemented as follows. The incoming audio signal is applied to the inputs of several identical circuits, each with center frequencies set to detect a different component of the expected busy or ringing signal. Each of these circuits contains a low Q bandpass filter. This filter prevents out-of-band signals such as voice from interfering with the detection function. The output of the bandpass filter is fed to a zero crossing detector. The output of the zero crossing detector is then fed to a high Q bandpass filter again set at the frequency to be detected. The output of the bandpass filter is then sent to a level detector which provides a positive indication if the incoming signal is above a preset amplitude. The output of the busy/ring detector 437 may be read by CPU 495 via the CPF internal data bus 490. CPU 495 controls all functions of CPF 100. The software program which the CPU 100 uses is loaded into RAM 500, from disk memory 505. The disk 505 also is used to store

a variety of other data including the subscriber database for the telephone control system 1. A data network interface 510 is used to connect the CPF 100 to the other subsystems of the telephone control system 1. Data network interface 510 passes data messages between the CPU 495 and these other subsystems. The functions of data network interface 510 are well known in the art, and many products, such as the Model COM4i from Digiboard Corporation, exist commercially which can accomplish these functions. Although only one trunk interface 400, one trunk 3, and one call processor 435 are shown in FIG. 5, it should be readily evident to one skilled in the art that additional trunk interfaces and call processors may be added to support additional trunks.

A flowchart of the operation of E&M control circuit 450 is shown in FIG. 6. At reference 600, the control circuit 450 idles waiting for an indication from current detector 440 that the E-Lead has gone off-hook. When the E-Lead does go off-hook, as shown at reference 605, an "Incoming Call" signal is sent to CPU 495 via buffer 460. The control circuit 450 then idles at 610, waiting for an off-hook signal from call processor 435, signifying that the CPU 495 is ready to accept the call. When the off-hook signal is received, the "Loop Status" 475 is set active as shown at reference 615. The M-Lead is then winked by taking M-Lead relay 455 momentarily off-hook, as shown at reference 620. The control circuit 450 then idles again at 625, waiting for the receipt of the "DID Received" signal 480 from CPU 495 via latch 465. Call processor 435 detects the incoming DID digits on it's audio line 430 and decodes the digits passing the digit sequence on to CPU 495. This DID digit sequence represents the 'called number' or ACCESS NUMBER of a subscriber to the telephone control system 1. When the CPU 495 receives the DID digits from call processor 435, the CPU 495 sets the "DID Received" signal 480 active, and the control circuit 450 takes the M-Lead off-hook as shown at reference 630. At this point a call has been established, and the control circuit 450 must now wait until either CPU 495 terminates the call, as signified by on/off-hook control signal 485 going on-hook, or by the calling party terminating the call as signified by the E-Lead detect from current detector 440 going on-hook. These functions are accomplished by control circuit 450

as illustrated at references 635 through 670. At 635 a check is made to determine if on/off-hook control signal 485 is on-hook. If it is still off-hook then a check is made at 640 to determine if the E-lead detect signal is on-hook. If it is on-hook, then the calling party has hung up, and the control circuit 450 sets the "Loop Status" 475 inactive at 645, signalling the call processor 435 that the call is terminated. The call processor 435 may in turn signal CPU 495 that the call is terminated. Control circuit 450 then waits as shown at reference 650 for the "DID Received" signal 480 to become inactive, signifying that the CPU 495 is completed with the call and is ready to accept a new call. When the "DID Received" signal 480 goes inactive, control passes to step 675 where the M-Lead is placed on hook. Control then returns to step 600 where the control circuit 450 restarts it's sequence at reference 600. Returning again to reference 635, if the On/off-hook control signal 485 were found to be on-hook, then a 1.5 second timer is started as shown at reference 655. This timer is used to distinguish between a 'hookflash' signal, which is typically less than 1.5 seconds, and an on hook command which should be at least 1.5 seconds. At 660, the control circuit 450 causes the M-Lead relay 455 to place the M-Lead on-hook. At 665 a check is made to determine if the 1.5 second timer has expired. If it has expired, then the signal was a true on-hook command, and control passes to reference 645 for the termination of the call. If at 665 it is determined that the 1.5 second timer has not expired, then a check is made at 670 to determine if the on/off-hook control 485 is still on-hook. If it is still on-hook then the timer is tested again at 665. If the on/off-hook control 485 is off-hook again, then the command was a flash, and control returns to reference 630, where the M-Lead is taken off-hook once more.

A diagram of the Subscriber Master Record, reference 700, is illustrated in FIG 7. The subscriber master record contains information regarding a given subscriber's chosen method of call handling. This information is used by the Telephone Control System 1 to determine how to process thecall. One unique subscriber master record exists for each subscriber to the Telephone Control System 1. All subscriber master records are stored in disk 505 and, upon initialization of the Telephone Control System 1, are copied to a common database in RAM memory 500

by CPU 495. This facilitates fast retrieval of this information, which is necessary for the real-time processing of calls to the access control system 1.

Still referring to FIG. 7, the subscriber master record 700 contains as its first element an access (DID) number, shown at reference 701. As described earlier, this access number 701 is the unique phone number which is used to reach a given subscriber via the Public Switched Telephone Network 2. A PIN code, which is used by the subscriber to identify himself to the Telephone Control System 1, is shown at 702. At 703, a call handling mode is shown. The call handling mode defines the basic method of call handling which has been chosen by the subscriber. Possible call handling modes include direct forwarding, announced forwarding, message center, voice screen forwarding, urgent screen forwarding, VIP code screen forwarding, and branch-routing. At 704, a standard greeting type is shown. The standard greeting type, 704, defines the courtesy greeting announcement which the subscriber has selected for the Telephone Control System 1 to use when first answering a call. At 705, an options field is shown. This options field is used to contain several miscellaneous option flags which may be used to modify the operation of the basic call handling mode. Options 705 include 'page option' which causes a page to be sent when a call is forwarded, an 'emergency/urgent' option which modifies the operation of the priority or urgent screen forwarding mode, a 'busy/no-answer' option which causes calls to be sent to the message center if a busy or no-answer condition is detected, and a voice screen hold off option which modifies the operation of the voice screen forwarding mode. A transfer message type is shown at reference 706. The transfer message type, 706, defines the courtesy announcement which the subscriber has selected for the access control system 1 to use as a call is being transferred. A transfer number is shown at 707. This is the number which the access control system 1 will use when forwarding, or transferring calls for this subscriber. At 708 an extension number is shown which may be used by the Telephone Control System 1 to announce to a caller the extension number of the phone at which the subscriber is located. The subscriber's message center number is shown stored at 709. The subscriber's pager number is shown stored at 710. The subscriber's office

number is shown stored at 711. The subscriber's home number is shown stored at 712. The subscriber's mobile phone number is shown stored at 713. At 714 a VIP screen code is shown. The VIP screen code is a code which may be used by a caller to cause his call to be forwarded to the subscriber, when the subscriber has selected VIP code screened forwarding mode. The number of the current feature memory which is being used is shown stored at 715. At 716 a pager message display number is shown. This is the number which the subscriber wishes to appear in the display of his pager when the access control system 1 has taken a message from a caller. At 717 a pager forwarding display number is shown. This is the number which the subscriber wishes to appear in the display of his pager when the Telephone Control System 1 is in the process of forwarding a call to the subscriber. At 718 a communicator dynamic mode display number is shown. This is the number which the subscriber wishes to appear in the display of his communicator 11 when the Telephone Control System 1 has a call holding, and requires that the subscriber select a method of call handling to dispose of the call. The time and date that the last caller abandoned a meet-me call by hanging up without leaving a message is shown stored at 719. The time and date that the last caller abandoned a meet-me call by leaving a message is shown stored at 720. A count of the number of calls which have been transferred to an external message center by the Telephone Control System 1 is shown stored at 721. Shown generally at 722 are the branch routing numbers 0 through 9. These fields contain the phone numbers to which a call should be transferred if a caller touches one of the digits 0 to 9 when the access control system 1 is processing a call using branch-routing mode. The branch-routing default transfer number is shown stored at 723. This is the number to which the call is transferred should a caller not enter one of the digits 0 to 9. Shown stored at 724 is the feature timer duration. This value determines when the feature timer expires. Shown stored at 725 is the feature timer termination mode. This field contains the mode memory which the subscriber wishes to use upon expiration of the feature timer. The fields necessary to implement the weekly schedule function are shown generally at reference 726. In the preferred embodiment the weekly schedule may contain up to 32 events

(steps). For each step, the subscriber master record 700 stores a time and date, and a mode memory number to be used at that time and date. The current step number (1 to 32) is shown stored at 727. A flag which indicates to Telephone Control System 1 that the weekly schedule is on, is shown stored at 728. A flag which informs the Telephone Control System 1 as to whether the subscriber is allowed to make multiple outside calls is shown stored at 729. A flag indicating that the subscriber has selected to use his communicator 11 in the 'dynamic mode assignment' mode is shown stored at 730. A count of the number of calls made to this ACCESS NUMBER is shown stored at 731.

A diagram of a Mode Memory, reference 800, is illustrated in FIG 8. As described previously, the mode memories are used by subscribers of the Telephone Control System 1 to store their commonly used call handling modes and options. As with the subscriber master records 700, the mode memories 800 are stored in disk 505 and, upon initialization of the Telephone Control System 1, are copied to a common database in RAM memory 500 by CPU 495. Each mode memory is unique to an individual subscriber, and is identified by storing the subscriber's ACCESS NUMBER as part of the mode memory, as shown at reference 801. In the preferred embodiment, the subscriber may have up to 90 mode memories. Each mode memory is identified by a unique mode memory number, 10 through 99. This mode memory number is shown stored as part of the mode memory 800 at reference 802. Shown generally at reference 803, are the various fields which the subscriber has selected to store in the mode memory 800. As can be seen, these are a subset of the fields which are stored in the subscriber master record 700. To invoke a mode memory, the Telephone Control System 1 need only copy the fields from the mode memory 800 to the corresponding fields in the subscriber master record 700. The access control system 1 also copies the mode memory number 802 to the current feature memory field 715 of the subscriber master record 700.

A flowchart of the Main Task for the Call Processing Facility (CPF) 100 is shown in FIG. 9. This flowchart represents the instructions, or steps, followed by CPU 495, as it controls functions of CPF 100. The starting point for the CPF -

MAIN TASK is shown at reference 900. At step 901 the CPU 495 performs initialization processes. These processes are well known in the art and include such activities as using a boot PROM to load the operational program from disk, checking for memory errors, performing hardware diagnostics, etc. The subscriber master records 700 are read from disk 505 and copied to a database in memory 500, as shown at step 902. In a similar manner, the mode memories 800 are read from disk and copied to a database in memory, as shown at step 903. At step 904, the multitasking processes are established. The multitasking allows the software to perform more than one process simultaneously. Multitasking techniques are well known in the art. As an example, UNIX is a widely used multitasking operating system. Other well known techniques allow a pseudo-multitasking function to be accomplished on a non-UNIX based operating system by constructing a 'round-robin' scheduler, by which a main process allocates 'time slices' to each of a number of sub-processes. At step 905 a process for the Network Message Task is initialized, and at step 906 control is passed to the CPF - Network Message Task. At step 907 a process for the Call Handler Task for the first trunk 3 is initialized, and at step 908 control is passed to the CPF - Call Handler Task. In a similar fashion, at step 909 a process for the Call Handler Task for the last trunk 3 is initialized, and at step 910 control is passed to the CPF - Call Handler Task. At step 911 a process for the Call Termination Task is initialized, and at step 912 control is passed to the CPF - Call Termination Task.

A flowchart of the CPF - Network Message Task is illustrated in FIG. 10. The function of this task is to receive and process messages received by Data Network Interface 510 from other facilities of the access control system 1. The CPF - Network Message Task is entered at step 1000. At step 1001 a determination is made as to whether a "request master record" message has been received. If this message has been received, then at step 1002 the subscriber master record 700 which corresponds the DID number, ANI number, or PIN code provided in the message is searched for in the database of memory 500. Upon finding this subscriber master record, at step 1003 a message containing a copy of this subscriber master record is

sent back to the requesting facility via data network interface 510. Control then returns to step 1000. Should it be determined at step 1001, that no "request master record" message has been received, then at step 1004 a check is made to determine if an "update master record" message has been received. If such a message has been received, then at step 1005 a master record for a subscriber is recovered from the message and copied to the subscriber's master record 700, at which point control returns to step 1000. If an "update master record" message is not detected at step 1004, then at step 1006 a check is made to determine if a "clear dynamic mode assignment flag" message has been received. If such a message has been received, and the message identifies a specific subscriber DID number, then the dynamic mode assignment flag 730 in the subscriber master record 700 for this subscriber is cleared at step 1007, and control returns to step 1000. If a "clear dynamic mode assignment flag" message is not detected at step 1006, then at step 1008 a check is made to determine if a "set dynamic mode assignment flag" message has been received. If such a message has been received, and the message identifies a specific subscriber DID number, then the dynamic mode assignment flag 730 in the subscriber master record 700 for this subscriber is set at step 1009, and control passes to step 1000. If a "set dynamic mode assignment flag" message is not detected at step 1008, then at step 1010 a check is made to determine if "change to new mode memory" message has been received. If such a message has not been received, then control passes to step 1014. If such a message has been received, and the message identifies a specific subscriber DID number, then at step 1011 a check is made to determine if the message was sent by the Communicator Access Facility (CAF) 125. If the message was not from the CAF 125, then control passes to step 1013. If the message was from the CAF 125, then at step 1012 an indication is sent to the CPF - Dynamic Mode Assignment routine (shown in FIG. 13), that this message was received, and control passes to step 1013. At step 1013, the mode memory number and the subscriber's DID number are removed from the message, and the corresponding mode memory 800 is copied to the corresponding subscriber's subscriber master record 700. Control then returns to step 1000. If at step 1010 it is determined that a

'change to new mode memory message' is not received, then control passes to step 1014, where a determination is made as to whether a 'mode memory inquiry' message is received, and if this is the case then control passes to step 1015 where the mode memory 800 identified in the message for the subscriber identified in the message is retrieved from the database of memory 500 and a message is constructed and sent back to the requesting facility via data network interface 510. Control then returns to step 1001. If at step 1014 it is determined that a 'mode memory inquiry message is not received, then control passes to step 1016, where a determination is made as to whether a 'mode memory update' message is received, and if this is the case, then control passes to step 1017 where the new mode memory contents are retrieved from the message, and the mode memory is copied to the appropriate mode memory 800 in the database of memory 500. Control then returns to step 1001. If at step 1016, it is determined that a 'mode memory update' message is not received, then control passes to step 1018 where a determination is made as to whether a 'create new subscriber' message is received, and if this is the case then control passes to step 1019 where the DID number is retrieved from the message, a subscriber master record 700 is created for this DID number 701, and a set of mode memories 800 are created for this DID number 701. Control then returns to step 1001. If at step 1018 it is determined that a 'create master record' message is not received, then control returns to step 1001.

A flowchart of the CPF - Call Termination Task is illustrated in FIG. 11. The purpose of this task is to monitor the loop status signal 475 for each trunk interface 400, and to terminate any call in progress should the loop status become inactive. In this way the system detects if the calling party has hung up. The CPF - Call Termination Task is entered at step 1100. At step 1101 a trunk pointer is set to a value of 1. At step 1102 the loop status signal 475 for the trunk pointed to by the trunk pointer is read via call processor 435. At step 1103, a determination is made as to whether the loop status signal 475 is active. If the signal is active, then control passes to step 1106. If the signal is not active, then the caller must have hung up, and at step 1104 the trunk is placed on hook by call processor 435 via on/off hook

control signal 485. Then at step 1108 a determination is made as to whether this trunk was processing the "CPF-Meet Me Caller" function, and if this is the case then control passes to step 1109 where the current time and date is stored in the "last meet-me abandon" field 719 of the subscriber master record 700. Control then passes to step 1105. Control also passes to step 1105 if at step 1108 it is determined that the trunk was not processing the "CPF-Meet Me Caller" function. At step 1105 the CPU 495 signals the multitasking process 907 controlling the call handler task for this trunk to return to it's entry point 908, thereby terminating any activity on that trunk. Control then passes to step 1106, where a check is made to determine if the trunk pointer is pointing to the last trunk. If the trunk pointer is pointing to the last trunk, then control returns to step 1101. If the trunk pointer is not pointing to the last trunk, then at step 1107 the trunk pointer is incremented and control returns to step 1102.

A flowchart of the CPF - Call Handler Task is illustrated in FIG. 12. The function of this task is to respond to an incoming call on a trunk 3, receive the DID digits identifying the subscriber's ACCESS NUMBER being dialed, determine the method of call handling as specified in the database of memory 500 by subscriber master record 700 which corresponds to that ACCESS NUMBER, and then cause the call to be processed accordingly. The CPF - Call Handler Task is entered at step 1200, a connection point labelled "CPF IDLE" is passed at reference 1201, and at step 1202 the DID received signal 480 is cleared, allowing trunk interface 400 to receive a new call. Control then remains at step 1203 until an incoming call signal 470 is received from the trunk interface 400, at which point control passes to step 1204 causing the call processor to issue an off hook signal via it's on/off hook control line 485. Then at step 1205, incoming DID digits are decoded and accepted by the DTMF detector of call processor 435. Then at step 1206,after the DID digits have been received, the DID received signal 480 is set, causing E & M control circuit 450 to force the M-Lead active, thereby seizing the trunk. Control then passes through a connection point labelled "CPF VIRTUAL TRANSFER" at reference 1207. At step 1208 the subscriber master record 700 which corresponds to the received DID

number is retrieved from the database of memory 500. At step 1209 the call count 731 is incremented in the subscriber master record 700. At step 1210 a check is made to determine if the feature timer is active. This is accomplished by checking the feature timer duration 724. The feature timer is active if the feature timer duration 724 is non zero. If the feature timer is not active, then control passes to step 1213. If the feature is active, then another check is made at step 1211 to determine if the feature timer has expired since the last call. This is determined by comparing the feature timer duration 724 with the current time and date maintained by CPU 495. The feature timer has expired if the feature timer duration 724 does not extend beyond the current time and date. If the feature timer has not expired, then control passes to step 1213. If the feature timer has expired, then at step 1212 the mode memory 800 specified by the feature timer termination mode 725 is copied to the subscriber master record 800, and the feature timer duration 724 is cleared to zero. Control then passes to step 1213. A determination is made at step 1213 as to whether the weekly schedule is active by checking the status of the weekly schedule active flag 728. If the weekly schedule is not active, then control passes to step 1217. If the weekly schedule is active, then a determination is made a step 1214 as to whether the current step of the weekly schedule is correct. This is accomplished by finding the current step of weekly schedule 726 as pointed to by the weekly schedule current step 727, and comparing the time and date of the next step with the current time and date. If the current time and date fall between the current step and the next step, then the current step is correct. If, by this process, it is determined that the current step is correct, then control passes to step 1217. Otherwise, at step 1215, the weekly schedule current step 727 is incremented to point to the next step. Then at step 1216, the mode memory number corresponding to the new step of the weekly schedule 726 is found, the corresponding mode memory 800 is copied to the subscriber master record 700, and then control passes to step 1217. At step 1217 the status of the dynamic mode assignment flag 730 is checked, and if it is found to be active, control is passed at step 1218 to the CPF - Dynamic Mode Assignment. Otherwise, control passes through a connector labelled " CPF MODE" at reference 1219, and then

passes to step 1220. At step 1220 a determination is made as to whether the current call handling mode 703 is set for 'direct forwarding', and if so control is passed via step 1221 to the CPF - Direct Forwarding. Otherwise a determination is made at step 1222 as to whether the current call handling mode 703 is set for 'announced forwarding' and if not control passes to step 1230. If the call handling mode 703 is set for 'announced forwarding', then at step 1223 a further check is made to determine if the transfer number 707 is set for meet-me, and if not control passes to step 1230. If the transfer number 707 is set for meet-me, then at step 1224 one audible ring is played to the caller by call processor 435. Then at step 1225, the 'pager display digits' are set to be equal to the DID number, prior to the "send page" subroutine being called at step 1226. Upon receiving a page with his own DID number in the display, the subscriber may recognize this as a meet-me call. Then a 4 second delay is initiated at step 1227, another ring is generated at step 1228, and another 4 second delay is initiated at step 1229, before passing control to step 1230. As can be seen, the effect of steps 1224 to 1229 is to simulate the typical ringing cadence expected by a caller, and in addition allow some time for the page sent at step 1225 to reach the subscriber's pager. Because the caller must wait for the subscriber to get to a phone when the subscriber is using meet-me, the sequence of steps 1224 to 1229 has the effect of reducing the delay perceived by the caller. At step 1230, an audible ring is generated towards the caller by call processor 435. Then at step 1231 a determination is made as to whether the caller has entered the PIN code 702. If the PIN code has been entered, then the caller must be the subscriber, and therefore control passes to the CPF - Command Mode via step 1233. If the PIN code has not been entered, then the control passes to step 1270 where a determination is made as to whether the 'message center access code' has been entered by the caller. In the preferred embodiment the 'message center access code' consists of the digits "*9" and is the same for all subscribers. This code may be used by callers who simply wish to leave a message and do not need to speak with the subscriber. If the 'message center access code' has been entered by the caller, then control passes to the "CPF - Caller Message Center" function as shown at step 1271.

If the 'message center access code' has not been entered, then control passes to connector label "CPF GREETING" as shown at reference 1232.

Still referring to FIG. 12, control passes through the connector labelled "CPF GREETING" at reference 1233 to step 1234, where a determination is made as to whether the call handling mode 703 is set for 'branch-routing', and if so control passes through a connector labelled "CPF PIN" at reference 1235. Otherwise, at step 1236 the standard greeting type 704 is retrieved from the subscriber master record 700. If the standard greeting type is 'stock' as determined at step 1237, then control passes to step 1238 where a stock generic greeting is played to the caller: "Hello, you have reached your party's telephone control system." Control then passes through a connector labelled "CPF PIN" at reference 1239. If the standard greeting type is not determined to be 'stock' at step 1237, then a further check is made at step 1240 to determine if the standard greeting type is 'drop-in', and if not the control is passed to step 1245. If the standard greeting type is 'drop-in' then at step 1241 the subscriber's prerecorded drop-in name is retrieved from disk 505. Then at step 1242 the call processor 435 plays the greeting: "Hello, you have reach the telephone control system for....", and then at step 1243 completes the greeting by playing back the pre-recorded name of the subscriber retrieved form disk in step 1241. Control then passes through a connector labelled "CPF PIN" at 1244. As was described earlier, if the standard greeting type was found not to be 'drop-in' at step 1240 then control passed to step 1245. At step 1245, a check is made to determine if the standard greeting type is 'personalized', and if not control passes to step 1238, described earlier. Otherwise, control passes to step 1246 where the subscriber's pre-recorded personalized greeting is retrieved from disk 505, and is then played back to the caller at step 1247 by call processor 435. Control then passes through connector labelled "CPF PIN" at reference 1248 and a check is made at step 1249 to determine if the caller has entered a PIN code. If the PIN code has been entered, then the caller must be the subscriber, and therefore control passes to the CPF - Command Mode via step 1250. If the PIN code has not been entered, then the control passes to step 1272 where a determination is made as to whether the 'message center access

code' has been entered by the caller. As was described earlier, in the preferred embodiment the 'message center access code' consists of the digits "*9" and is the same for all subscribers. This code may be used by callers who simply wish to leave a message and do not need to speak with the subscriber. If the 'message center access code' has been entered by the caller, then control passes to the "CPF - Caller Message Center" function as shown at step 1273. If the 'message center access code' has not been entered, then control passes to step 1251, where the call handling mode 703 is retrieved from the subscriber master record 700. Then at step 1252 a check is made to determine if the call handling mode 703 is set for 'announced forwarding', and if so a further check is made at step 1253 to determine if the transfer number 707 is set for meet-me. If the transfer number is not set for meet-me then control passes to CPF - Announced Forwarding via step 1254. If the transfer number is set for meet-me, then control passes to CPF - Meet-Me Caller via step 1255. If at step 1252 it was determined that the call handling mode was not set for 'announced forwarding', then control passes to step 1256. At step 1256 a check is made to determine if the call handling mode 703 is set for 'urgent screen forwarding', and if so control passes to CPF - Urgent Screen via step 1257. Otherwise, at step 1258 a check is made to determine if the call handling mode 703 is set for 'VIP code screen forwarding', and if so control passes to CPF - VIP Code Screen via step 1259. Otherwise, at step 1260 a check is made to determine if the call handling mode 703 is set for 'voice screen forwarding', and if so control passes to CPF - Voice Screen via step 1261. Otherwise, at step 1262 a check is made to determine if the call handling mode 703 is set for 'branch-routing', and if so control passes to CPF - Branch-Routing via step 1263. Otherwise control passes to CPF - Message Center via step 1264.

A flowchart of the CPF - Dynamic Mode Assignment is illustrated in FIG. 13. The purpose of this function is to process calls for a subscriber who is using a Communicator 11, and who has selected the dynamic mode assignment mode of operation. The dynamic mode assignment mode of operation allows a subscriber to chose dynamically, with each incoming call, the call handling mode to be used for

the call. The subscriber is alerted via his Communicator 11 that an incoming call is present, and the subscriber may then transmit a 'new mode memory' message from his Communicator 11 thereby informing the Telephone Control System 1 as to how thecall should be handled. The CPF - Dynamic Mode Assignment function is entered at step 1300, and at step 1301 the 'pager display digits' are set equal to the communicator dynamic mode display number 718. At step 1302, the 'send page' subroutine is called, causing a page to be sent to the subscriber's Communicator 11. At step 1303, a ring count is set to a value of 4. At step 1304 an audible ring is played to the caller by call processor 435, and at step 1313 a determination is made as to whether the caller has entered the PIN code 702. If the PIN code has been entered, then the caller must be the subscriber, and therefore control passes to the CPF - Command Mode via step 1314. If the PIN code has not been entered, then the control passes to step 1315 where a determination is made as to whether the 'message center access code' has been entered by the caller. As was described earlier, in the preferred embodiment the 'message center access code' consists of the digits "*9" and is the same for all subscribers. This code may be used by callers who simply wish to leave a message and do not need to speak with the subscriber. If the 'message center access code' has been entered by the caller, then control passes to the "CPF - Caller Message Center" function as shown at step 1316. If the 'message center access code' has not been entered, then at step 1305 a 4 second delay is initiated, thus creating a typical ring cadence. At step 1306 a check is made to determine if the Network Message Task (Fig. 10) has received a 'new mode memory' message from the Communicator 11 belonging to this subscriber. If such a message has been received, then the control passes to connector labelled "CPF MODE" as indicated at reference 1307. If message was not received, then the ring count is decremented at step 1308, and at step 1309 a check is made to determine if the ring count is 0. If the ring count is not '0, then control returns to step 1304 and the ring cycle is repeated. If the ring count is 0, indicating four rings cycles have been generated without the subscriber responding, then control passes to step 1310, labelled "CPF SORRY" by the connector at reference 1311, and the caller is informed, via call

processor 435: "I'm sorry, your party is not available at the moment. We will connect you to your party's message center where you may leave a detailed message." Control then passes to CPF - Caller Message Center via step 1312.

A flowchart of the CPF - Direct Forwarding function is illustrated in FIG. 14. The purpose of this function is to process calls for a subscriber who has selected the 'direct forwarding' call handling mode. In this mode, calls are transferred without any announcement. Low amplitude 'confidence tones' are generated just prior to the transfer so that the subscriber may have an opportunity to enter his PIN Code. The CPF - Direct Forwarding function is entered at step 1400, and 'confidence tones' are generated at step 1401 by call processor 435. The 'confidence tones' are a prerecorded sequence of tones which are designed to sound similar to the interoffice multifrequency signalling tones that callers are familiar with. In this way the caller has no clear indication that the call is being answered and transferred, and yet at the same time the subscriber is given an indication as to when he may enter his PIN Code. At step 1402, a determination is made as to whether the subscriber has entered his PIN code. If the PIN code has been entered, then control passes to CPF - Command Mode via step 1403. Otherwise control passes to step 1416 where a determination is made as to whether the 'message center access code' has been entered by the caller. As was described earlier, in the preferred embodiment the 'message center access code' consists of the digits "*9" and is the same for all subscribers. This code may be used by callers who simply wish to leave a message and do not need to speak with the subscriber. If the 'message center access code' has been entered by the caller, then control passes to the "CPF - Caller Message Center" function as shown at step 1417. If the 'message center access code' has not been entered, then control passes to a connector labelled "CPF DIAL TRANSFER" at reference 1404 to step 1405, where a check is made to determine if the transfer number 707 contains a reference to a reserved phone number (a tag) or a reference to a mode memory. Tags may be used as follows:

TAG DIGIT RESERVED PHONE NUMBER

1 message center number 709
2 pager number 710
3 office number 711
4 home number 712
5 mobile phone number 713
6 meet-me tag
7 'externally entered' number

As will be described in more detail later in this discussion, if a mode memory 800 has a transfer number 707 that is an 'externally entered' number tag, then when that mode memory is invoked, the transfer number is not changed from the previous value. Also, if a mode memory which contains a transfer number 707 that is an 'externally entered' number tag can be invoked remotely by the subscriber via a Feature Group D trunk, causing the ANI number received by the trunk to be used as the transfer number 707. The reference to the mode memory may be in the form of the two digit mode memory number 10 - 99. Therefore, at step 1405, if the transfer number 707 contains the digits 1 through 6, or the digits 10 through 99, then control will pass to step 1406. Otherwise, control will pass to step 1409. At step 1406 a determination is made as to whether the transfer number 707 contains the meet-me tag (ie. digit 6). If the meet-me tag is found, then control passes to the CPF - Meet-Me Caller Function via step 1407. If the meet-me tag is not found at step 1406, then control passes to step 1408, where the tag or mode memory is expanded to a real phone number which can be dialed. If the transfer number 707 contains a tag, then the corresponding reserved phone number per the table above is used as the expanded number to be dialed. If the transfer number 707 contained a mode memory number, then the transfer number 707 from the corresponding mode memory 800 is used as the expanded number to be dialed. Control then passes to step 1409, where a determination is made as to whether the transfer number to be dialed can be found as the ACCESS NUMBER 801 in any of the subscriber master records 700. If so, then it is not necessary to do a physical transfer, and the call can be continued on the

same trunk by passing control through the connector labelled "CPF VIRTUAL TRANSFER" at reference 1410. Otherwise, at step 1411 a flash is generated by call processor 435 by producing a 700 millisecond on hook signal on the on/off hook control line 485. This flash places the calling party on hold and causes a second dial tone to be returned on trunk 3 by the serving central office of the PSTN 2. At step 1412 a brief pause is introduced to allow time for the dial tone to appear on the trunk, and then at step 1413 the transfer number is dialed via the DTMF generator of call processor 435. Then at step 1418 the 'busy/no-answer' option flag of options 705 of subscriber master record 700 is checked. The function of this option is to handle calls which are being sent to a subscriber even if the subscriber's line is busy or does not answer. If this option is active then at step 1419 a flash is generated by call processor 435 causing the calling party to be taken off hold and connected to the call being placed to the transfer number. The calling party will thus be able to hear the progress of the call and will therefore hear the subscriber answer if the subscriber does indeed answer. At step 1420 a determination is made as to whether the call was local or long distance. If the transfer number was longer than 7 digits, or if the 7 digit number contained a prefix which is long distance in this area, then the call was long distance and a 40 second timer is started at step 1422. If the transfer number was less than or equal to 7 digits, then the call was local and a 25 second timer is started at step 1421. Then at step 1423 a determination is made as to whether precision busy/ring detector 437 is detecting busy signal, and if not control passes to step 1424. If a busy signal is detected at step 1423, indicating that the subscriber's line is busy, then control passes to step 1429 where a flash is generated by call processor 435 causing the call attempt to be dropped but leaving the calling party connected to the telephone control system 1. Control then passes to a connector labelled "CPF - Sorry" as shown at step 1430, which causes the caller to be sent to the subscriber's message center function. If at step 1423 a busy signal was not detected, then control passes to step 1424 where a determination is made as to whether the timer has expired. If the timer has expired, indicating that neither busy or ringing where detected, then control passes to 1414. If at step 1424 it is

determined that the timer has not expired, then control passes to step 1425 where a determination is made as to whether precision busy/ring detector 437 is detecting a first ringing signal, and if not control returns to step 1423. If the first ringing signal is detected at step 1426, then control passes to step 1426, where a determination is made as to whether this is the fourth ring signal, and if so, indicating that the subscriber is not answering the call, then control passes to step 1429 causing the caller to be ultimately routed to the subscriber's message center function as was described earlier. If at step 1426 it is determined that this is not the fourth ring, then control passes to step 1427 where control idles until an end-of-ring is detected by precision busy/ring detector 437. Control then passes to step 1428 where a 6 second 'inter-ring timer' is started. Control then passes to step 1431 where a determination is made as to whether precision busy/ring detector 437 is detecting ringing signal and if so control returns to step 1426. If however at step 1431 it is determined that ringing signal is not being detected, then control passes to step 1432 where the 'inter-ring timer' is checked. If the 'inter-ring timer' has not expired then control returns to step 1431. If the 'inter-ring timer' has expired, indicating the subscriber has answered the call, then control passes to step 1414. At step 1414 an on hook signal is generated on the on/off hook control line 485, causing the call to be transferred to the dialed number, and freeing up the trunk 3 to handle another incoming call. Control then passes to the connector labelled "CPF IDLE" at reference 1415.

A flowchart of the CPF - Announced Forwarding function is illustrated in FIG. 15. The purpose of this function is to process calls for a subscriber who has selected the 'announced forwarding' call handling mode. In this mode, callers are greeted with a brief courtesy announcement prior to being transferred. In addition, if a 'page option' has been selected, then a page is sent to the subscriber's pager prior to transferring the call. The CPF - Announced Forwarding function is entered at step 1500 and at step 1501, a determination is made as to whether the page flag of options 705 is set, and if it is not set, then control passes to the connector labelled "CPF AF2" at reference 1502. If the page flag is set, the control passes to step 1503

where the display digits are set equal to the pager forwarding display number 717. At step 1504 the 'send page' subroutine is called causing a page to be sent to the subscriber's pager. Then at step 1505, the call processor 435 plays to the caller the message: "We are sending a page to inform your party of your call. Please stay on the line." At step 1506 a delay is initiated to allow the pager sufficient time to receive the page. Then at step 1507, another message is played to the subscriber: "We have sent a page to your party and we will connect your call momentarily. Please stay on the line." At step 1508 an additional delay is initiated to allow the subscriber the opportunity to get to a phone. Control then passes to the connector labelled "CPF AF2" at reference 1509. The connector labelled "CPF AF2" at reference 1510 passes control to step 1511, where the transfer message type 706 is retrieved from subscriber master record 700. Then at step 1512, a check is made as to whether the transfer message type is '0'. If the transfer message type is '0', indicating no transfer message is to be played, then control passes to the connector labelled "CPF DIAL TRANSFER" at reference 1520. If the transfer message type is not '0', then control passes to step 1513 where a check is made to determine if the transfer message type is '1'. If the transfer message type is '1', then at step 1514 the call processor 435 plays to the caller the message: "We're connecting your call", and then control passes to the connector labelled "CPF DIAL TRANSFER" at reference 1520. If the transfer message type is not '1', then control passes to step 1515 where a check is made to determine if the transfer message type is '2'. If the transfer message type is '2', then at step 1516 the call processor 435 plays to the caller the message: "We're connecting your call. When thecall is answered, please ask for your party by name", and then control passes to the connector labelled "CPF DIAL TRANSFER" at reference 1520. If the transfer message type is not '2', then control passes to step 1517 where a check is made to determine if the transfer message type is '3'. If the transfer message type is '3', then at step 1518 the call processor 435 plays to the caller the message: "We're connecting your call. When the call is answered, please ask for extension number...." Then at step 1519, the extension number 708 is retrieved from the subscriber master record 700 and is voiced to the

caller by call processor 435. Control then passes to the connector labelled "CPF DIAL TRANSFER" at reference 1520.

A flowchart of the CPF - Urgent Screen function is illustrated in FIG. 16. The purpose of this function is to process calls for a subscriber who has selected the "priority screen" or 'urgent screen' call handling mode. The CPF - Priority/Urgent Screen function is entered at step 1600, and control passes to step 1601, where call processor 435 plays to the caller the message: "Your party is not readily available at the moment. If this call is..." Control then passes to step 1602 where the urgent/emergency flag of the options 705 is checked. If the flag is set for 'urgent', then the call processor 435 plays to the caller "...urgent...", and if the flag is set for emergency then call processor 435 plays to the caller "...an emergency..." Control then passes to step 1603 where the call processor completes the sentence by playing the message "...then touch 0 now and we will attempt to connect your call. Otherwise, we will connect you to your party's message center where you may leave a detailed message." Then at step 1604, a 5 second timer is started. At step 1605 a determination is made as to whether the caller has touched 0. If the caller has touched 0, then control passes to the CPF - Announced Forwarding function via step 1606. If the caller has not touched 0, then at step 1607 a determination is made as to whether the 5 second timer has expired. If the 5 second timer has not expired then control returns to step 1605. If the 5 second timer has expired, then at step 1608 the caller is informed: "Please standby". Control then passes to the CPF - Caller Message Center function via step 1609.

A flowchart of the CPF - VIP Code Screen function is illustrated in FIG. 17. The purpose of this function is to process calls for a subscriber who has selected the 'VIP code screen' call handling mode. The CPF - VIP Code Screen function is entered at step 1700 and control is passed to step 1701 where the call processor 435 plays to the caller the message: "Your party is not readily available at the moment. Please enter your code now, or we will connect you to your party's message center where you may leave a detailed message. "Control then passes to step 1702 where a 5 second timer is started. At step 1703 a determination is made as to whether the

caller has entered the VIP screen code 714 as stored in the subscriber master record 700. If the caller has entered the correct VIP screen code, then control passes to the CPF - Announced Forwarding function via step 1704. If the caller has not entered the VIP screen code 714, then at step 1705 a determination is made as to whether the 5 second timer has expired. If the 5 second timer has not expired then control returns to step 1703. If the 5 second timer has expired, then at step 1706 the caller is informed: "Please standby". Control then passes to the CPF - Caller Message Center function via step 1707.

A flowchart of the CPF - Branch Routing function is illustrated in FIG. 18. The purpose of this function is to process calls for a subscriber who has selected the 'branch-routing' call handling mode. The CPF - Branch Routing function is entered at step 1800, and control passes to step 1801 where the prerecorded branch-routing greeting is retrieved from disk 505. Then at step 1802, the playback to the caller of the branch-routing greeting is begun by call processor 435. At step 1803 a determination is made as to whether the caller has entered a digit. If the caller has not entered a digit then at step 1804 a determination is made as to whether the call processor 435 has completed the playback of the branch-routing greeting, and if an additional 5 second shave expired. If this is the case then control passes to step 1805. If this is not the case, then control returns to step 1803. If at step 1803 it is determined that the caller has entered a digit, then control passes to step 1806 where a determination is made as to whether there exists a branch-routing number 722 in the subscriber master record 700 which corresponds to the digit entered by the caller. For example, if the subscriber entered digit 4, then a determination is made as to whether the subscriber master record holds a phone number entry in the branch routing number4 position at 722. If an entry is found in such a manner, then control passes to step 1807. Otherwise, control passes to step 1805 where a the branch routing default number 723 is retrieved for the subscriber master record 700, and is set up to be used as the transfer number for this call. Control then passes to the connector labelled "CPF DIAL TRANSFER" at reference 1808. Should the caller have entered a digit which corresponded to a branch routing number 722, then at step

1807 the corresponding branch routing number 722 is retrieved form the subscriber master record 700, and is setup to be used as the transfer number for this call. Control then passes to the connector labelled "CPF DIAL TRANSFER" at reference 1808.

A flowchart of the CPF - Caller Message Center function is illustrated in FIG. 19. The purpose of this function is to process calls for a subscriber who has selected the 'message center' call handling mode. The CPF - Caller Message Center function is entered at step 1900 and control passes to step 1901 where a determination is made as to whether an external message center has been selected. This determination is made by examining the message center number 709 in the subscriber master record 700. If the message center number 709 contains a phone number, then external has been selected. If the message center number 709 does not contain a phone number, then internal message center has been selected. The subscriber may choose an external voice mail system, an answering service, his secretary, or any other appropriate phone number for the external message center number 709. If, at step 1901, it is determined that the subscriber has selected the internal message center, then control passes to step 1902, where the caller is prompted:"Please leave your message at the tone ...BEEP." Then at step 1903 the callers message is recorded by call processor 435 and stored on disk 505. At step 1904 a determination is made as to whether the caller has completed leaving the message. This is accomplished by call processor 435 determining if there has been at least 3 seconds of silence on the line since the last sound. If the caller has not completed leaving a message then the recording continues at step 1903. If the caller has completed leaving a message, then control passes to step 1905, where the caller is prompted: "Thank you for calling. Good-bye." Then at step 1906 the trunk is placed on hook by call processor 435 via on/off hook control signal 485. Control then passes to step 1907, where a decision is made as to whether a message was actually left. A message is determined to be left if at least 3 seconds of non-silence has been recorded, as determined by call processor 435. If a message was not left, then control passes to connector labelled "CPF IDLE" at reference 1908. If a message

was left by the caller, then control passes to step 1909, where the 'display digits' are set equal to the pager message center display number. The 'send page' subroutine is then called at step 1910, and control passes to a connector labelled "CPF IDLE" at reference 1911. Returning now to step 1901, if a determination is made, in the manner described above, that an external message center is selected, then control passes to step 1912 where the party is informed by call processor 435: "Please standby," then control passes to step 193 where a flash is generated by call processor 435 by producing a 700 millisecond on hook signal on the on/off hook control line 485. This flash places the calling party on hold and causes a second dial tone to be returned on trunk 3 by the serving central office of the PSTN 2. At step 1914 a brief pause is introduced to allow time for the dial tone to appear on the trunk, and then at step 1915 the message center number 709 is dialed via the DTMF generator of call processor 435. The message center number may contain special dialing characters, including characters for pausing, waiting for tones, and waiting for answer. Thus a sequence of dialing characters may be constructed to allow the Telephone Control System 1 to transfer calls to a voice mail system requiring the entry of a subscriber ID. For example, an external message center dialing sequence for a typical voice mail system may be: 7 digit phone number of voice mail system + Wait for answer + 4 digit voice mail subscriber ID. Continuing now, at step 1916 an on hook signal is generated on the on/off hook control line 485, causing the call to be transferred to the dialed number, and freeing up the trunk 3 to handle another incoming call. Control then passes to step 1917 where the 'external message center count' 721 in the subscriber master record 700 is incremented. Control then passes to steps 1909 and 1910 where a page is generated as described above, before returning control to the connector labelled "CPF IDLE" at reference 1911.

A flowchart of the CPF - Voice Screen function is illustrated in FIG. 20. The purpose of this function is to process calls for a subscriber who has selected the 'voice screen' call handling mode. The CPF - Voice Screen function is entered at step 2000 and control passes to step 2001 where the caller is prompted by call processor 435: "Please state your name and business at the tone. After the tone

please stay on the line while we attempt to locate your party and connect your call....BEEP." Control then passes to step 2090 where a determination is made as to whether the caller has entered the 'VIP screen code' 714, and if so control passes to the "CPF - Announced Forwarding" function as shown at step 2091. In this way, a caller who knows the 'VIP screen code' is able to be forwarded directly to the subscriber without being voice-screened. If, however, at step 2090 it is determined that the caller has not entered the 'VIP screen code' 714 then control passes to step 2002 where the caller's message is recorded by call processor 435 and stored temporarily on disk 505. At step 2003, the call processor 435 determines that the caller has completed stating his name and business, by detecting the sound of the voice followed by approximately 3 seconds of silence, at which point the call processor 435 prompts the caller: "Thank you, please standby." A flash is generated at step 2004, causing the caller to be placed on hold by the switch 4, and at step 2005 a pause is initiated to allow time for the switch 4 to provide a dial tone, at which point the transfer number 707 is dialed by the DTMF generator of call processor 435. At step 2006, an 'answer timer' is started. At step 2007 a determination is made by call processor 435 as to whether the call has been answered. If the call has not been answered, then at step 2008 a decision is made as to whether a time-out or non-answer signal such as a busy, reorder, or operator intercept has been detected by call processor 435. If so, then control proceeds through a connector labelled "CPF VSCRN FLASH" at reference 2009, to step 2010. Otherwise control returns to step 2207. At step 2010, a flash is generated, causing switch 4 to temporarily conference the caller through to the non-answer signal, and at step 2011 a 2 second pause is invoked. Then at step 2012 another flash is generated causing switch 4 to drop the conference and restore a simple 2-way connection between the caller and the trunk 3. Control then passes to a connector labelled "CPF SORRY" at reference 2013, resulting in the caller being connected to the subscriber's message center as described earlier in FIG. 13. Returning the discussion now to step 2007, if a determination is made that the call is answered, then control passes to step 2014 where the 'voice screen PIN code hold-off flag' of options 705 of the master record 700 is checked.

If this flag has been set, it means that the subscriber wishes to require that a PIN code be entered by the answering party before the called party's message is played. This is very useful if the subscriber is having his calls voice-screen forwarded to his office, for example, where the receptionist may answer the call. In this case the receptionist would connect the call to the subscriber and the subscriber would enter his PIN code to hear the calling party's message before determining whether he wishes to be connected to the calling party. If this flag is set, then control passes to step 2015, where call processor 435 prompts the answering party: "We are trying to reach...". Then at step 2016, the subscriber's prerecorded 'drop-in' name is retrieved from disk 505 and played back to the answering party. At step 2017, the answering party is informed: "Please locate the party or enter your PIN code." Then at step 2018, a 5 second delay is introduced, and at step 2019, a determination is made as to whether the answering party has entered the PIN code 702. If the PIN code is entered, then control passes to step 2021. Otherwise, control passes to step 2020, where a determination is made as to whether the sequence of steps 2015 through 2020 has been repeated ten times. If not, then control returns to step 2015, and the sequence is repeated again. However, if this is the tenth repeat, then control passes to the connector labelled "CPF VSCRN FLASH" at reference 2009, and the calling party is sent to the subscriber's message center as described earlier. If, at step 2014, it is determined that the 'voice screen PIN code hold-off flag' is not set, or if it is set and the PIN code has been entered as determined at step 2019, then control passes to step 2021, where the answering party is informed by call processor 435: "We have a call holding for...", and then to step 2022 where the subscriber's 'drop-in' name is retrieved from disk and played. Then at step 2023, which is identified by the connector labelled "CPF VSCRN LISTEN" at reference 2024, the caller's message which was originally recorded at step 2002 is retrieved from disk 505 and played by call processor 435 to the subscriber. Then at step 2025, which is identified by the connector labelled "CPF VSCRN MENU" at reference 2026, the subscriber is prompted: "Please touch 1 to connect the call, 2 to send the caller to your message center, 3 to politely send the caller away, 4 to listen to the caller's message again.

5 to place the caller on hold for 1 minute, 6 to transfer the call elsewhere, or 7 to ask the caller not to call again." Control then passes through a connector labelled "CPF VSCRN LOOP" at reference 2027. At reference 2028, the connector labelled "CPF VSCRN LOOP" passes control to step 2029 where a 10 second timer is started. Then at step 2030, a determination is made as to whether a digit has been entered by the subscriber, and if so control passes to step 2033. Otherwise, control passes to step 2031 where the 10 second timer is checked, and if it has not expired control returns to step 2030. If the timer has expired, then control is passes to the connector labelled "CPF VSCRN FLASH" at reference 2032, and the caller is connected to the message center as described earlier. If a digit has been entered by the subscriber, then at step 2033, the digit is checked and if it is not '1', control is passes to step 2043. If the digit is '1', then control passes to step 2034, where a flash is generated causing the calling party and the subscriber to be conferenced by switch 4. Then at step 2035 a determination is made as to whether dial tone is present on the line. If so this would indicate that the conference failed, most likely because the calling party had hung up. If this is the case, then control passes to step 2039. Otherwise, if dial tone is not detected, then at step 2036, both the calling party and the subscriber hear call processor 435 play the prompt: "Go ahead please.", and at step 2037, the trunk 3 is placed on hook causing the switch 4 to transfer the call allowing the calling party and the subscriber to continue their conversation, while at the same time freeing up trunk 3 to handle another incoming call by passing control back to the CPF - Call Handler Task via the connector labelled "CPF IDLE" at reference 2038. If the caller had hung up as determined by the detection of dial tone at step 2035, then at step 2039 another flash is generated to cause switch 4 to take the subscriber off of hold. Then at step 2040, the subscriber is informed: "I'm sorry, your party has hung up", and at step 2041 trunk 3 is placed on hook and control is returned to the CPF - Call Handler Task via the connector labelled "CPF IDLE" at reference 2042. If, as described earlier, at step 2033 it is determined that the digit is not '1', then control is passes to step 2043 where it is determined whether the digit is a '2', and if so control is passes to the connector labelled "CPF VSCRN FLASH" at reference 2044

causing the calling party to be connected to the message center as was described earlier. If the digit is not '2', then control passes to step 2045, where it is determined if the digit is a '3', and if not control passes to step 2052. If the digit is a '3', then control passes to step 2046, where a flash is generated causing switch 4 to temporarily conference the calling party and the subscriber. Then. after a 2 second pause at step 2047, another flash is generated at step 2048 causing switch 4 to terminate the conference by dropping the subscriber, leaving just the calling party connected to trunk 3. Then at step 2049, the calling party is informed by call processor 435: "I'm sorry, your party is unable to take your call at this time. Thank you for calling. Good-bye." Then at step 2050, the trunk 3 is placed on hook thereby disconnecting the calling party and control is returned to the CPF - Call Handler Task via the connector labelled "CPF IDLE" at reference 2051. If, as described earlier, at step 2045 it is determined that the digit is not '3', then control is passes to step 2052 where it is determined whether the digit is a '4', and if so control is passes to the connector labelled "CPF VSCRN LISTEN" at reference 2053, allowing the subscriber to again hear the calling party's message as described earlier. If at step 2052 it is determined that the digit is not a '4', then control passes to step 2054 where the digit is checked to determine if it is a '5', and if it is not control passes to a connector labelled "CPF VSCRN DIGIT" at reference 2060. If the digit is a '5, then control passes to step 2055 where a one minute timer in started. Then at step 2056 a determination is made whether any further digits have been entered by the subscriber, and if not control passes to step 2058 where the one minute timer is checked. If the timer is found to have expired, then control passes to a connector labelled "CPF VSCRN MENU" at reference 2059, causing the menu of step 2025 to be replayed to the subscriber. If the timer is found to have not expired, then control returns to step 2056 where a determination is again made as to whether any digits have been entered by the subscriber, and if so control passes to a connector labelled "CPF VSCRN LOOP" at reference 2057, thereby allowing the digit to be processed. The connector labelled "CPF VSCRN DIGIT6" at reference 2061 causes control to be passed to step 2062 where a determination is made as to whether the digit pressed

by the subscriber is a 6, and if not control passes to step 2075. If the digit is a '6', then control passes to step 2063 where the subscriber is prompted by call processor 435: "Please enter the telephone number you wish to have this call transferred to." Then at step 2064, the control idles, waiting for a telephone number to be entered by the subscriber. If a phone number is entered, then control passes to step 2065, where the subscriber is prompted: "Number accepted. Please hang up now." Then at step 2066 a flash is generated causing switch 4 to temporarily conference the calling party and the subscriber. Then, after a 2 second pause at step 2067, another flash is generated at step 2068 causing switch 4 to terminate the conference by dropping the subscriber, leaving just the calling party connected to trunk 3. Then at step 2069 the calling party is prompted by call processor 435: " Please standby." Then at step 2070 a flash is generated causing switch 4 to place the calling party on hold and providing a dial tone to the trunk 3. Then, after a pause for dial tone at step 2071, the phone number detected in step 2064 is dialed at step 2072, and at step 2073 trunk 3 is placed on hook causing switch 4 to transfer the calling party to the phone number dialed, and control is returned to the CPF - Call Handler Task via the connector labelled "CPF IDLE" at reference 2074. If, as described earlier, at step 2062 it is determined that the digit entered by the subscriber is not a '6', then control passes to step 2075. At step 2075, a determination is made as to whether the digit is a '7', and if not then control passes to a connector labelled "CPF VSCRN LOOP" at reference 2076 thereby allowing the subscriber to enter another digit. If the digit entered is a '7', as determined at step 2075, then control passes to step 2077 where a flash is generated causing switch 4 to temporarily conference the calling party and the subscriber. Then, after a 2 second pause at step 2078, another flash is generated at step 2079 causing switch 4 to terminate the conference by dropping the subscriber, leaving just the calling party connected to trunk 3. Then at step 2080 the calling party is prompted by call processor 435: "Your party is not interested in your call. Please remove this party from your list and do not call again. Good-bye." Then at step 2081 trunk 3 is placed on hook causing switch 4 to disconnect the calling party, and control is returned to the CPF - Call Handler Task via the connector labelled

"CPF IDLE" at reference 2082.

A flowchart of the CPF - Meet Me Caller function is illustrated in FIG. 21. The purpose of this function is to process calls for a subscriber who has chosen to have his calls handled by the meet-me function. In the preferred embodiment these calls are handled by conferencing the caller on a trunk 3 of the CPF 100 with a line 120 on the Meet-Me Facility (MMF) 115. Then when the subscriber calls in to be connected, he is also conference from a trunk 3 of the CPF 100 with a line 120 on the MMF 115. The CPF may then hang up on both the caller's trunk 3 and then subscriber's trunk 3, thereby transferring the caller and subscriber to the MMF lines 120. The lines 120 are provisioned with the CENTREX features of 'call transfer' and 'barge-in', so that the caller and subscriber may then be connected as follows: The line 120 which is connected to the caller dials the CENTREX barge-in command (*77) followed by the CENTREX 'intercom code' for the line 120 which is connected to the subscriber. The caller and the subscriber are thus connected, and the line 120 which connects to the subscriber may then go on hook, transferring the subscriber to the caller's line 120. The conversation may then take place and only one line of line 120 is used. To fully understand the explanation of the CPF - Meet Me Caller function which follows, it is necessary to also review the explanations which are associated with FIG. 30 (CPF - Command Meet Me), FIG. 33 (MMF block diagram), and FIG. 34 (Meet Me Facility Main Task). Referring now to FIG. 21, the CPF - Meet Me Caller function is entered at step 2100 and control passes to step 2101 where the calling party is informed by call processor 435: "We are paging your party to a phone. Please stay on the line." Then at step 2102 a flash is generated causing switch 4 to place the calling party on hold and generate a dial tone on trunk 3. Then at step 2103 the call processor 435 dials the phone number which is associated with one of the lines 120 which are connected to the Meet-Me Facility (MMF) 115, and at step 2104 a 15 second timer is initiated. Then at step 2105, a determination is made as to whether DTMF '*' tone has been detected by call processor 435, indicating that the MMF 115 has answered. If the '*' tone is not detected, then control passes to step 2106 where the 15 second timer is checked, and

if found to have not expired then control returns to step 2105. If the 15 second timer is found to have expired, then control passes to step 2107, where a flash is generated causing switch 4 to temporarily conference the calling party to the number dialed above. Then after a 2 second pause at step 2108, another flash is generated at step 2019, causing switch 4 to drop the dialed number from the conference, leaving just the calling party connected to trunk 3. Then at step 2110, a check is made to determine if dial tone is present on trunk 3. If dial tone is found to be present, indicating that the sequence of steps 2107 through 2109 had failed to restore the calling party possibly because the conference thought to be created at step 2107 was not allowed by switch 4, then another flash is generated at step 2111, which is identified by a connector labelled "CPF MM FLASH" at reference 2134. This flash causes switch 4 to reconnect the calling party to trunk 3, and then control passes via a connector labelled "CPF MM MSSG" at reference 2112 to step 2113. If dial tone is not detected at step 2110, then control passes directly to step 2113. At step 2113, the current time and date is stored in the 'last meet-me message left' field 720 of the subscriber master record 700, and then control passes to the connector labelled "CPF SORRY" at reference 2114, causing the caller to be connected to the message center as was described earlier. If at step 2105, the '*' tone is detected, indicating that the MMF 115 has answered, then control passes to step 2115 where call processor 435 dials the digit '00' signifying that this is a caller, not a subscriber. Then at step 2116, the call processor 435 dials the subscriber's DID number 701, to identify to the MMF who the calling party is waiting for. Then at step 2117, a flash is generated, causing switch 4 to conference the calling party through to this line 120 of the MMF 115, and at step 2118 a 2 second timer is initiated. Then at step 2119, a determination is made as to whether another '*' tone is detected by call processor 435, indicating the conference was successful. If the '*' tone is not detected, this implies that the conference was not successful, most likely because the calling party has hung up. In this case the 2 second timer is checked at step 2120, and if it is found not to have expired control returns to step 2119. If the 2 second timer has expired, then control passes via a connector labelled "CPF MM ABANDON" at

reference 2121 to step 2122 where the current time and date are stored in the 'last meet-me abandon' field 719 of the subscriber master record. Then control passes to step 2123 where the trunk 3 is placed on hook and control is returned to the CPF - Call Handler Task via the connector labelled "CPF IDLE" at reference 2124. If at step 2119 the '*' tone is detected, then control passes to step 2125 where a repeat count is set to a value of 3. Then at step 2126, the calling party is informed by call processor 435: "We have sent a page to alert your party of the call. Your party is currently proceeding to a phone and we will connect you momentarily. If you are unable to wait, you may touch 9 at any time to leave a detailed message which we will relay to your party as soon as they pick up the line." Then at step 2127, the call processor 435 plays a 'music on-hold' selection of duration 40 seconds. Then at step 2128 a determination is made as to whether the subscriber has called in, by checking the CPF - Call Handler Tasks controlling the other trunks 3 connected to the CPF 100. If the subscriber is found, and if he has entered his PIN code 702 and touched 4 indicating he wishes to be connected to the caller, then step 2128 will return a positive indication causing control to pass to the connector labelled "CPF MM SUBCALL" at reference 2129. If a negative indication is returned at step 2128, then control passes to step 2130 where a determination is made as to whether the caller has entered '9'. If the caller does enter '9', then control passes to step 2111, causing the caller to be connected to the message center as describer earlier. If the caller has not entered '9', then control passes to step 2131, where a determination is made as to whether the 40 second music-on-hold selection is complete. If it is not complete, then control returns to step 2128. If the selection is complete, then control passes to step 2132 where the repeat count is decremented. Then at step 2133 a determination is made as to whether the value of the repeat count is now zero. If the value is zero, then control passes to step 2111, causing the caller to be connected to the message center as describer earlier. If the value of the repeat count is not yet zero, then control returns to step 2127, where the sequence of steps 2127 through 2133 is repeated once more. The connector labelled "CPF MM SUBCALL" at reference 2135 causes control to be passed to step 2136 where the DTMF fourth column tone

digit 'd' is dialed by call processor 435 to inform the MMF 115 that the subscriber has arrived. Then at step 2137, the call processor 435 prompts the calling party: "Your party has picked up the line. One moment and we will connect you." Then at step 2138, a 20 second timer is initiated, and at step 2139 the call processor 435 begins to play audible ringing, with a cadence of 2 seconds on, 4 seconds off, to the caller. Then at step 2140, the 20 second timer is checked, and if it is found to have expired, indicating that the subscriber did not connect to the MMF 115, then control passes to the connector labelled "CPF MM FLASH" at reference 2141, causing the caller to be connected to the message center as was described earlier. If the 20 second timer has not expired, then control passes to step 2142 where a determination is made as to whether the subscriber has connected to the MMF 115, as determined by checking with the CPF - Call Handler Task that was found to be controlling the trunk 3 connected to the subscriber. If the subscriber has not connected to the MMF 115, then control returns to step 2140. If the subscriber has connected to the MMF 115, then the trunk 3 is placed on hook causing switch 4 to transfer the calling party to the line 120 of the MMF 115, and control is returned to the CPF - Call Handler Task via the connector labelled "CPF IDLE" at reference 2144.

A flowchart of the CPF - Send Page Subroutine is illustrated in FIG. 22. The purpose of this subroutine is to send page messages via the high speed data network 150 from the CPF 100 to either the PDF 105, or the CAF 125. These messages contain the pager number and any digits which are to be transmitted to the display of the pager. The CPF - Send Page Subroutine is entered at step 2200 and control passes to step 2201 where the pager number 710 for this subscriber is retrieved from the subscriber master record 700. Then at step 2202, a message is constructed consisting of the pager number 710, and the display digits which were identified as this subroutine was called. Then at step 2203 a determination is made as to whether the pager number 710 represents a communicator. In the preferred embodiment, each communicator 11 is identified by a pager number 710 which starts with the digits '000'. If the pager number 710 is found to be that of a communicator 11, then control passes to step 2204, and the data network interface 510 is instructed to send

the message via network 150 to the Communicator Access Facility (CAF) 125, and then control is returned from this subroutine to the calling program, as represented at step 2206. If the pager number 710 is not found to be that of a communicator 11, then control passes to step 2205, where the data network interface 510 is instructed to send the message via network 150 to the Pager Dialing Facility (PDF) 105, and then control is returned from this subroutine to the calling program, as represented at step 2206.

A flowchart of the CPF - Command Mode function is illustrated in FIG. 23. The CPF - Command Mode function is entered at step 2300 and control passes to step 2301 where the subscriber's pre-recorded 'drop-in' name is retrieved from disk 505. Then at step 2302, the call processor 435 prompts the subscriber: "Hello..", and then plays the back the 'drop-in' name. Then at step 2303, a determination is made as to whether a meet-me call is currently holding for this subscriber. This is determined by checking the CPF - Call Handler Tasks which control the other trunks 3 connected to CPF 100. If a meet-me call is found to be holding for this subscriber, then at step 2304, the subscriber is prompted: "A call is holding on your meet-me service. Touch 4 to be connected to the caller." Control then passes to step 2317. If a meet-me call is not holding for this subscriber, then control passes to step 2305 where a determination is made as to whether a meet-me caller was recently holding, but hung up without leaving a message. If the time and date stored in the 'last meet me abandon' field 719 of the subscriber master record 700 is not more than 20 minutes older than the current date and time, then it is determined that a meet-me caller recently abandoned a call, and control passes to step 2306 where the subscriber is prompted: "A call was recently holding on your meet-me service, however the caller chose not to wait and hung up without leaving a message." Control then passes to step 2307 where the 'last meet-me abandon' field 719 of the subscriber master record 700 is cleared. Control then passes to step 2308. Control also passes to step 2308 if, at step 2305, it is determined that a meet-me caller did not recently abandon a call. At step 2308, a determination is made as to whether a meet-me caller is currently leaving a message for the subscriber. This is determined by checking the CPF - Call

Handler Tasks which control the other trunks 3 connected to CPF 100. If it is determined that a meet-me caller is currently leaving a message for this subscriber, then control passes to step 2309, where the subscriber is prompted: "A call was recently holding on your meet-me service, however the caller chose not to wait and is currently leaving you a message. When the message is complete we will connect you to your message center, or you may touch * now to skip this." Control then passes to step 2310 where 'music-on-hold' is played to the subscriber by call processor 435. Control then passes to step 2311 where a determination is made as to whether the meet-me caller has finished leaving the message. If the message is complete, then control passes to the CPF - Command Message Center function as shown at reference 2313. If the caller is still leaving the message, then control passes to step 2312 where a determination is made as to whether the subscriber has entered the '*' digit. If the '*' digit is not entered, then control returns to step 2311. If the '*' digit is entered, then control passes to step 2317. If at step 2308, a determination is made that a meet-me caller is not currently leaving a message for this subscriber, then control passes to step 2314, where a determination is made as to whether a meet-me caller recently left a message for this subscriber. If the time and date stored in the 'last meet me message left' field 720 of the subscriber master record 700 is not more than 20 minutes older than the current date and time, then it is determined that a meet-me caller recently left a message, and control passes to step 2315 where the subscriber is prompted: "A call was recently holding on your meet-me service, however the caller chose not to wait and instead left you a message." Control then passes to step 2316 where the 'last meet-me message left' field 720 of the subscriber master record 700 is cleared. Control then passes to step 2317. Control also passes to step 2317 if, at step 2314, it is determined that a meet-me caller did not recently leave a message. At step 2317, a determination is made as to whether the subscriber has selected an external message center. As described earlier, this determination is made by examining the message center number 709 in the subscriber master record 700. If the message center number 709 contains a phone number, then external has been selected. If the message center number 709 does not contain a phone number,

then internal message center has been selected. If, at step 2317, it is determined that the subscriber has selected an external message center, then control passes to step 2318, where the caller is prompted: "We have transferred...". Control then passes to step 2319 where the 'external message center transfer count' 721 is retrieved from the subscriber master record 700, and is voiced to the subscriber by call processor 435. Control then passes to step 2320, where the prompt is completed by playing: "...since you last checked messages." Control then passes to the connector labelled "CPF MODE DESCR" at reference 2323. If, at step 2317, it is determined that the subscriber had selected the internal message center, then control passes to step 2321 where the number of messages currently stored for this subscriber on disk 505 is determined. At step 2322 then, the call processor 435 prompts the subscriber: "You have X messages.", where X is the number determined above. Control then passes to the connector labelled "CPF MODE DESCR" at reference 2323. The connector labelled "CPF MODE DESCR" at reference 2324, causes control to be passed to step 2325, where a description is played of the current call handling mode. This description includes the current mode memory number 715, the current call handling mode 703, and the current transfer number 707, if appropriate. For example, the subscriber may hear: "Your calls are currently being handled by mode memory 10, urgent-screened forwarding to 555-1111." If the transfer number 707 is the tag for the subscriber's home, office, pager, mobile-phone, or message center, then this would be voiced in words, ie: "..to your home." After playing a description of the current call handling mode, then control passes to step 2326, where a determination is made as to whether the feature timer is currently active. As was described earlier, this determination is made by checking the feature timer duration 724. If the feature timer is found to be active, then it's status is voiced to the subscriber at step 2327. For example, the subscriber may be prompted: "The feature timer is currently active and will cause mode memory 10 to be invoked at 5:30 today." Control then passes to step 2328. Control also passes to step 2308 if the feature timer was found to be inactive at step 2326. At step 2328, a determination is made as to whether the weekly schedule is active. This determination is made by checking the weekly

schedule active flag 728 of the subscriber master record 700. If the weekly schedule is found to be active, then the status of the weekly schedule is voiced to the subscriber at step 2329. For example, the subscriber may be prompted: "The weekly schedule is on, and the next step will cause memory 20 to be invoked at 7:30 PM on Tuesday." Control then passes via connector labelled "CPF MAIN DIRECTORY" at reference 2330 to step 2331. Control also passes via connector 2330 to step 2331 if the weekly schedule is found to be inactive at step 2328. At step 2331 the call processor 435 prompts the subscriber: "Main Directory. Enter 1 to check messages, 2 to change your forwarding number, 3 to select a memory, 9 to make a call, or 0 for help." Control then passes to a loop consisting of steps 2332 through 2339. At each of these steps a determination is made as to whether a particular digit has been entered by the subscriber. If the result is positive on any of these steps, then control is passed to another function. If the digit '1' is found at step 2332, then control passes to the CPF - Command Message Center function, as shown at reference 2340. If the digit '2' is found at step 2333, then control passes to the CPF - Command Forwarding Number function, as shown at reference 2341. If the digit '3' is found at step 2334, then control passes to the CPF - Command Memory function, as shown at reference 2342. If the digit '9' is found at step 2335, then control passes to the CPF - Command Outside Call function, as shown at reference 2343. If the digit '0' is found at step 2336, then control passes to the CPF - Command Help function, as shown at reference 2344. If the digit '4' is found at step 2337, then control passes to the CPF - Command Meet Me function, as shown at reference 2345. If the digit '5' is found at step 2338, then control passes to the CPF - Command Branch Route function, as shown at reference 2346. If the digit '8' is found at step 2339, then control passes to the CPF - Command Advanced features function, as shown at reference 2347.

A flowchart of the CPF - Command Message Center function is illustrated in FIG. 24. The CPF - Command Message Center function is entered at step 2400 and control passes to step 2401 where a determination is made as to whether the subscriber has selected an external message center. As described earlier, this

determination is made by examining the message center number 709 in the subscriber master record 700. If the message center number 709 contains a phone number, then external has been selected. If the message center number 709 does not contain a phone number, then internal message center has been selected. If, at step 2401, it is determined that the subscriber has selected an external message center, then control passes to step 2402, where the caller is prompted: "Please standby." Control then passes to step 2403 where a flash is generated causing switch 4 to place the subscriber on hold a apply a dial tone to trunk 3. Then, after pausing for dial tone at step 2404, the message center number 709 is dialed by call processor 435 at step 2405. Then at step 2406, the trunk 3 is placed on hook, causing switch 4 to transfer the subscriber to the message center number. Then at step 2407, the 'external message center transfer count' 721 of the subscriber master record 700 is cleared. Control is then returned to the CPF - Call Handler Task via the connector labelled "CPF IDLE" at reference 2408. If, at step 2401, it is determined that the subscriber has selected internal message center, then control passes to step 2409, where a determination is made as to whether the subscriber has any messages stored on disk 505. If there are no messages stored for this subscriber, then control passes to step 2410, where the subscriber is informed: "You have no messages." Then at step 2411, the subscriber is prompted: "Enter 8 to return to the main directory." Control then passes to step 2412, where a determination is made as to whether the digit '8' has been entered, and if it has not been entered, then control returns to step 2410. If the digit '8' has been entered, then control passes to the connector labelled "CPF MAIN DIRECTORY" at reference 2413, allowing the subscriber to make additional selections from the main directory of the command mode. If at step 2409, the determination is made that the subscriber does have messages stored on disk 505, then control passes to step 2414, where one of the stored messages is played back to the subscriber, and the subscriber is given the opportunity to save or delete the message by entering the digits '1' or '2' respectively. Control then passes to step 2415, where a determination is made as to whether the digit '9' has been entered. If the digit '9' is entered, then control passes to the CPF - Command Outside Call function as shown at reference 2416, where the

subscriber is given the opportunity to make a call, perhaps returning a call to the person who left the message. If the digit '9' was not entered, then control passes to step 2417, where a determination is made as to whether any more messages are stored on the disk 505. If more messages exist, then control is returned to step 2414. If no more messages exist, then control passes to step 2418, where the subscriber is prompted: "You have no more messages. Enter 8 to return to the main directory." Control then passes to step 2419, where a determination is made as to whether the digit '8' has been entered, and if it has not been entered, then control returns to step 2418. If the digit '8' has been entered, then control passes to the connector labelled "CPF MAIN DIRECTORY" at reference 2413, allowing the subscriber to make additional selections from the main directory of the command mode.

A flowchart of the CPF - Command Forwarding Number function is illustrated in FIG. 25. The CPF - Command Forwarding Number function is entered at step 2500 and control passes to step 2501 where a determination is made as to whether the current call handling mode 703 for this subscriber is 'message center' or branch routing'. Since it is not logical to change a forwarding number in a mode that does not require a forwarding number, if it is determined that either of these modes are active, then control will pass to step 2502, where the subscriber will be prompted: "Invalid command." Control then passes to the connector labelled "CPF MAIN DIRECTORY" at reference 2503, allowing the subscriber to make additional selections from the main directory of the command mode. If, at step 2501, it is determined that the current call handling mode 703 is not 'message center' or 'branch routing', then control passes to step 2504, where a determination is made as to whether the transfer number 707 is set equal to the 'meet-me tag'. If so, then control passes to step 2505, where the subscriber is prompted: "Your calls are currently being forwarded to you via your meet me service." Control then passes to step 2508. If, at step 2504, it is determined that the forwarding number is not equal to the 'meet-me tag' then control passes to step 2506, where the subscriber is prompted: "Your calls are currently being forwarded to..." Control then passes to step 2507, where the transfer number 707 is retrieved from the subscriber master record 700,

and voiced to the subscriber. Control then passes to step 2508, where the subscriber is prompted: "Please enter your new forwarding number, or enter * to skip this, or enter 6 to use your meet-me service." Control then passes to step 2509, where a determination is made as to whether the subscriber has entered a valid phone number, or a tag for home, office, or mobile phone. If so, then control passes to step 2510, where the phone number is stored as the new transfer number 707 in the subscriber master record 700, and the subscriber is prompted: "Accepted, your calls are currently being forwarded to..." , and the transfer number 707 is voiced. Control then passes to the CPF - Command Feature Timer function as shown at reference 2511. If it is determined at step 2509 that the subscriber has not entered a phone number, then control passes to step 2512, where a determination is made as to whether the subscriber has entered the digit '6', and if so control passes to step 2513 where the 'meet-me tag' is stored as the transfer number 707 in the subscriber master record 700, and the subscriber is prompted: "Accepted, your calls are currently being forwarded to you via your meet-me service." Control then passes to the CPF - Command Feature Timer function as shown at reference 2511. If it is determined at step 2512 that the digit '6' has not been entered, then control passes to step 2514, where a determination is made as to whether the digit '*' has been entered, and if not control returns to step 2509. If the digit '*' has been entered, then the transfer number 707 remains unchanged, and control passes to the CPF - Command Feature Timer function as shown at reference 2511.

A flowchart of the CPF - Command Feature Timer function is illustrated in FIG. 26. The CPF - Command Feature Timer function is entered at step 2600 and control passes to step 2601 where the subscriber is prompted: "Please enter the length of time you wold like your current feature to be in effect, or enter * to skip the feature timer." Control then passes to step 2602, where a determination is made as to whether the digit '*' has been entered by the subscriber. If the digit '*' has been entered, then control passes to step 2603, where the subscriber is prompted: "Accepted, your feature will be in effect until further notice." Control then passes to the connector labelled "CPF MAIN DIRECTORY" at reference 2613, allowing the

subscriber to make additional selections from the main directory of the command mode. If at step 2602, it is determined that the digit '*' has not been entered, then control passes to step 2604 where a determination is made as to whether a valid duration has been entered. This duration must be in the form of hours first followed by minutes. For example, to enter 1 hour and 20 minutes, the subscriber must enter '1 2 0'. If a valid duration is not found to be entered at step 2604 then control returns to step 2602. If a valid duration is entered, then control passes to step 2605, where the duration is stored as the 'feature timer duration' 724 of the subscriber master record 700, and the subscriber is prompted: "Accepted,..." and the duration time is voiced. Control then passes to step 2606 where the subscriber is prompted: "Please enter the memory number you wish to invoke upon termination of the feature timer, or enter * to use the previous mode, or touch 9 to use the schedule." Control then passes to step 2607, where a determination is made as to whether the subscriber has entered the digit '*', and if so then at step 2608 the previous mode memory is saved in temporary mode memory 0, mode memory 0 is stored as the feature timer termination mode 725 of the subscriber master record, and the subscriber is prompted: "Accepted, your feature will be in effect until (time) at which time the previous mode will be invoked.", where the value of (time) corresponds to the current time plus the feature timer duration 724. Control then passes to the connector labelled "CPF MAIN DIRECTORY" at reference 2613, allowing the subscriber to make additional selections from the main directory of the command mode. If at step 2607 it is determined that the digit '*' has not been entered, then control passes to step 2609, where a determination is made as to whether the digit '9' is entered, and if so control passes to step 2610 where the weekly schedule is saved in temporary mode memory 0, mode memory 0 is stored as the feature timer termination mode 725 of the subscriber master record, and the subscriber is prompted: "Accepted, your feature will be in effect until (time) at which time the weekly schedule will be invoked.", where the value of (time) corresponds to the current time plus the feature timer duration 724. Control passes to the connector labelled "CPF MAIN DIRECTORY" at reference 2613, allowing the subscriber to make additional

selections from the main directory of the command mode. If at step 2609 it is determined that the digit '9' has not been entered, then control passes to step 2611, where a determination is made as to whether a valid mode memory 10 through 99 is entered, and if so control passes to step 2612 where the mode memory is stored as the feature timer termination mode 725 of the subscriber master record, and the subscriber is prompted: "Accepted, your feature will be in effect until (time) at which time mode memory XX will be invoked.", where the value of (time) corresponds to the current time plus the feature timer duration 724. Control passes to the connector labelled "CPF MAIN DIRECTORY" at reference 2613, allowing the subscriber to make additional selections from the main directory of the command mode.

A flowchart of the CPF - Command Memory function is illustrated in FIG. 27. The CPF - Command Memory function is entered at step 2700 and control passes to step 2701 where the subscriber is prompted: "Your calls are currently being handled via mode memory XX.", where XX is the current mode memory number 715 of the subscriber master record. Control then passes to step 2702, where a description of the mode is voiced to the subscriber. This description includes the current call handling mode 703, and the current transfer number 707, if appropriate. For example, the subscriber may hear: "Your calls are currently being urgent-screened forwarded to 555-1111." If the transfer number 707 is the tag for the subscriber's home, office, pager, mobile-phone, or message center, then this would be voiced in words, ie: "..to your home." Control then passes to step 2703 where the subscriber is prompted: "Please enter a new mode memory number or enter * to skip this." Control then passes to step 2704 where a determination is made as to whether the digit '*' has been entered. If the digit '*' is entered, then control passes to the CPF - Command Feature Timer function as shown at reference 2722. If at step 2704, it is determined that the '*' digit has not been entered, then control passes to step 2705, where a determination is made as to whether a valid 2 digit mode memory number has been entered, and if such a mode memory number has not been entered, then control returns to step 2703. If a valid mode memory number is entered, then control passes to step 2706, where the mode memory number is stored

as the current mode memory number 715 of the subscriber master record 700, the corresponding mode memory 800 is copied to the subscriber master record, the subscriber is prompted: "Accepted, you have selected mode memory XX, which causes your calls to be...", and then control passes to step 2707. At step 2707, the prompt is completed by playing a brief description of the selected mode memory. The description includes the call handling mode 703, and the transfer number 707 if appropriate. For example, at step 2707 the remainder of the prompt may be: "...handled by your message center." At step 2708 a determination is made as to whether the selected mode memory requires an 'externally entered number'. This is determined by checking the transfer number field 707 of the selected mode memory, to determine if it contains an 'externally entered number' tag. If this is the case, then the subscriber must enter a transfer number after selecting this memory. If the externally entered number is not required, then control passes to the CPF - Command Feature Timer function as shown at reference 2722. If it is determined at step 2708 that an externally entered number is required, then control passes to step 2710, where the subscriber is prompted: "Please enter your new forwarding number or enter * to skip this and use....". Control then passes to step 2711 where the previous transfer number is voiced to the subscriber. Control then proceeds to step 2712 where the subscriber is further prompted with: "..or enter 6 to use your meet-me service." Control then passes to step 2713 where a determination is made as to whether the digit '*' has been entered. If the digit '*' has been entered then control passes to step 2716. Otherwise, control passes to step 2714 where a determination is made as to whether a phone number or tag has been entered by the subscriber. If not, then control returns to step 2710. If a phone number or tag has been entered, then control passes to step 2715 where the phone number is stored as the transfer number 707 of the subscriber master record 700, the subscriber is prompted: "Accepted...", and the phone number or tag is voiced. Control then passes to step 2716, where a determination is made as to whether the memory has an extension number in the extension number field 708 of the subscriber master record 700. If an extension number does not exist in this field, then control passes to the CPF - Command

Feature Timer function as shown at reference 2722. If at step 2716 it is determined that an extension number does exist, then control passes to step 2717 where the subscriber is given an opportunity to modify the extension number. At step 2717 the subscriber is prompted: "Please enter your new extension number or enter * to skip this and use ....". Control then passes to step 2718 where the phrase is completed by voicing the current extension number 708. Control then passes to step 2719 where a determination is made as to whether a new extension number has been entered, and if so, then control passes to step 2720 where the extension number is stored in the extension number field 708, the subscriber is prompted: "Accepted,..", the new extension number is voiced, and control passes to the CPF - Command Feature Timer function as shown at reference 2722. If at step 2719 it is determined that an extension number has not been entered then control passes to step 2721, where a determination is made as to whether the digit "*" is entered, and if the "*" digit is not entered then control returns to step 2717. If at step 2721 it is determined that the "*" digit is entered then control passes to the CPF - Command Feature Timer function as shown at reference 2722.

A flowchart of the CPF - Command Outside Call function is illustrated in FIG. 28. The CPF - Command Outside Call function is entered at step 2800 and control passes to step 2801 where the call processor 435 plays a 'stutter dial tone' to the subscriber. Control then passes to step 2802 where a determination is made as to whether the subscriber has entered the '#' digit. If the '#' digit has been entered, then control passes to the connector labelled "CPF MAIN DIRECTORY" at reference 2803, allowing the subscriber to make additional selections from the main directory of the command mode. If at step 2802 it is determined that the subscriber has not entered the '#' digit, then control passes to step 2804 where a determination is made as to whether the subscriber has entered a phone number that he wishes to be connected to. If a phone number has not been entered, then control returns to step 2802. If at step 2804 it is determined that a phone number has been entered, then control passes to step 2805, where a flash is generated, causing switch 4 to place the subscriber on hold, and applying a dial tone to the trunk 3. Then, after a pause for

dial tone at step 2806, the call processor 435 dials the phone number at step 2807, which had been entered by the subscriber. Control then passes to step 2808, where the 'multiple outside calls allowed' flag 729 of the subscriber master record 700 is checked. If this flag is not active, then control passes to step 2809 where the trunk 3 is placed on hook, causing switch 4 to transfer the subscriber to the dialed number, and control is returned to the CPF - Call Handler Task via the connector labelled "CPF IDLE" at reference 2810. If at step 2808 it is determined that the 'multiple outside calls allowed' flag 729 is set, then control passes to step 2811, where a flash is generated which causes the subscriber to be conferenced to the dialed number while maintaining trunk 3 in the connection. In this way the subscriber may make additional calls, or later return to the main directory without hanging up and calling back. After the flash is generated at step 2811, control passes to step 2812 where a loop is entered waiting for the subscriber to enter the digit sequence '##'. When trying to detect DTMF digits while conversation may be present, as is the case in this situation, requiring the two digits in sequence reduces the likelihood of falsing on voice. If the subscriber enters '##', then control passes to step 2813 where a flash is generated causing switch 4 to disconnect the third party from the conference, leaving only the subscriber connected to trunk 3. Control then returns to step 2801, where the subscriber may make another call, or enter '#' to return to the main directory.

A flowchart of the CPF - Command Help function is illustrated in FIG. 29. The purpose of this function is to provide help to the subscriber who is using the Command Mode features of the Telephone Control System. This is accomplished by allowing the subscriber to enter the digit '0' for help from any of the command mode functions. Once the digit '0' is entered, the subscriber is provided with an explanation of the function which was being accessed at that moment. The subscriber may also touch another digit '0' to reach a live client services representative. The CPF - Command Help function is entered at step 2900 and control passes to step 2901 where the step number of the function from which the CPF - Command Help was requested is saved for later use. Then at step 2902, the subscriber is prompted:

"You have selected the help function. You may enter 0 to be connected to a client services operator, 8 to return to the main directory, or # to return to the point where you were when you entered the help function." Control then passes to step 2903, where a context sensitive help prompt is played, based on the step number saved in by step 2901. For example, if the saved step number indicated that the help function was accessed while in the CPF - Command Forwarding Number function, then the call processor 435 would play the prestored help prompt associated with that function: "When you selected the help function you were in the process of changing your forwarding number." Control then passes to step 2904 where a determination is made as to whether the digit '0' has been entered, and if so, control then passes to step 2905 where a flash is generated, causing switch 4 to place the subscriber on hold, and applying a dial tone to the trunk 3. Then, after a pause for dial tone at step 2906, the call processor 435 dials the phone number at block 2907, which is associated with a client services representative. Control then passes to step 2908 where the trunk 3 is placed on hook, causing switch 4 to transfer the subscriber to the dialed number, and control is returned to the CPF - Call Handler Task via the connector labelled "CPF IDLE" at reference 2909. If at step 2904 it is determined that the digit '0' is not entered, then control passes to step 2910 where a determination is made as to whether the digit '8' has been entered, and if so, control passes to the connector labelled "CPF MAIN DIRECTORY" at reference 2911, allowing the subscriber to make additional selections from the main directory of the command mode. If at step 2910 it is determined that the digit '8' is not entered, then control passes to step 2912 where a determination is made as to whether the digit '#' is entered, and if not control returns to step 2902. If the digit '#' is entered, then the step number that was saved at step 2901 is retrieved and the control returns to that step.

A flowchart of the CPF - Command Meet Me function is illustrated in FIG. 30. The purpose of this function is to process the call for a subscriber who has called in, entered his PIN code 702, and wishes to be connected to a meet-me caller who is holding for him. The CPF - Command Meet Me function is entered at step 3000 and control passes to step 3001 where a flash is generated, causing switch 4 to place

the subscriber on hold and apply a dial tone to the trunk 3. Then, after pausing for dial tone at step 3002, the call processor 435 dials the phone number of the lines 120 which are connected to the Meet Me Facility (MMF) 115 at step 3003. Control then passes to step 3004 where a 15 second timer is started, and then to step 3005 where the 15 second timer is checked. If the 15 second timer has not expired, then control passes to step 3006 where a determination is made as to whether a '*' digit is detected, indicating that the MMF 115 has answered the call. If the '*' digit is not detected then control returns to step 3005. If at step 3006, the '*' digit is detected, then control passes to step 3007 where the call processor 435 dials '01' indicating this call is from a subscriber, and then dials the subscriber's DID number 701, thereby fully identifying the call to the MMF 115. Control then passes to step 3008 where a flash is generated causing switch 4 to take the subscriber off of hold and create a conference between the subscriber, trunk 3, and the line 120 of the MMF 115. Control then passes to step 3009 where a 4 second pause is initiated to allow the MMF 115 time to connect the caller into the call. Control then passes to step 3010 where the subscriber and caller are prompted by call processor 435: "Go ahead please." Control then passes to step 3011 where the trunk 3 is placed on hook, causing the switch 4 to transfer the subscriber to the line 120 of the MMF 115. Control is then returned to the CPF - Call Handler Task via the connector labelled "CPF IDLE" at reference 3012. If at step 3005 it is determined that the 15 second timer had expired, indicating that the MMF 115 had not answered the call, then control passes to step 3013 where a flash is generated causing switch 4 to create a temporary conference between the subscriber and the dialed number, and then after a 2 second pause at step 3014 another flash is generated at step3015 causing switch 4 to drop the dialed number from the conference and leave just the subscriber connected to the trunk 3. Control then passes to step 3016 where the subscriber is prompted: "I'm sorry, we are unable to connect your call at this time." Control then passes to the connector labelled "CPF MAIN DIRECTORY" at reference 3017, allowing the subscriber to make additional selections from the main directory of the command mode.

A flowchart of the CPF - Command Branch Route function is illustrated in FIG. 31. The CPF - Command Branch Route function is entered at step 3100 and control passes to step 3101 where a determination is made as to whether the current call handling mode 703 is 'branch-routing', and if it is not control is passes to step 3102 where the subscriber is prompted: "Invalid command.", and control passes to the connector labelled "CPF MAIN DIRECTORY" at reference 3103, allowing the subscriber to make additional selections from the main directory of the command mode. If at step 3101 it is determined that the call handling mode 703 is 'branch routing' then control passes to step 3104 where the subscriber is prompted: "Enter 1 to record a new branch routing greeting, 2 to change branch routing numbers, 3 to change the branch routing default number, or '#' to return to the main directory." Control then passes to step 3105 where a determination is made as to whether the digit '1' is entered, and if so, control passes to step 3106 where the subscriber is prompted: "Your branch routing greeting is...". Then at step 3107, the branch routing greeting for this subscriber is retrieved from disk 505 and played back to the subscriber. Control then passes to step 3108 where the subscriber is prompted: "Please record your new branch routing greeting at the tone, or enter * to skip this and use the existing branch routing greeting...BEEP." Then at step 3109, the new greeting is recorded and control passes to step 3110 where a determination is made as to whether the greeting is done, and if it is control passes to step 3111 where the new branch routing greeting is saved to disk 505 and then control returns to step 3104. If at step 3110 it is determined that the greeting is not done, then control passes to step 3112 where a determination is made as to whether the digit '*' is entered, and if not control returns to step 3109. If at step 3112 it is determined that the digit '*' is entered, then control passes to step 3113 where the old branch routing greeting on disk 505 is left unchanged, and control then passes to step 3104. If at step 3105 it is determined that the digit '1' is not pressed, then control passes to step 3114 where a determination is made as to whether the digit '2' is entered, and if it is entered then control passes to step 3115 where the subscriber is prompted: "Please enter the branch routing directory digit 1 to 9 for the phone number your wish to

change, or touch * to skip this." Control then passes to step 3116 where a determination is made as to whether the digit '*' is entered, and if it is entered control returns to step 3104. If at step 3116 it is determined that the digit '*' is not entered, then control passes to step 3117 where a determination is made as to whether one of the digits '1' to '9' are entered, and if one of those digits is entered control then passes to step 3118. Otherwise control returns to step 3116. At step 3118 the subscriber is prompted: "The branch routing transfer number for digit X is....". Control then passes to step 3119 where the branch routing number 722 that corresponds to the digit entered in step 3117 is retrieved from the subscriber master record 700 and voiced to the subscriber. Then at step 3120 the subscriber is prompted: "Please enter the new branch routing transfer number or touch * to skip this without making a change." Control then passes to step 3121 where a determination is made as to whether the digit '*' is entered, and if it is entered control returns to step 3104. If at step 3121 it is determined that the digit '*' is not entered, then control passes to step 3122 where a determination is made as to whether a phone number has been entered, and if a phone number has not been entered, control returns to step 3121. If at step 3122 a phone number is entered, then control passes to step 3123 where the subscriber is prompted: "Accepted." Then at step 3124 the new phone number is voiced to the subscriber. Control then passes to step 3125 where the new phone number is saved as the branch routing number 722 which corresponds to the digit entered in step 3117. Control then returns to step 3104. If at step 3114 it is determined that the digit '2' is not entered, then control passes to step 3126 where a determination is made as to whether the digit '3' is entered, and if it is entered, then control passes to step 3127 where the subscriber is prompted: "The branch routing default transfer number is ..." Control then passes to step 3128 where the branch routing default number 723 is retrieved from the subscriber master record 700 and voiced to the subscriber. Then at step 3129 the subscriber is prompted: "Please enter the new branch routing default transfer number, or touch * to skip this without making a change." Control then passes to step 3130 where a determination is made as to whether the digit '*' is entered, and if the digit '*' is

entered control returns to step 3104. If at step 3130 it is determined that the digit '*' is not entered, then control passes to step 3131 where a determination is made as to whether a phone number has been entered, and if a phone number has not been entered control returns to step 3130. If it is determined at step 3131 that a phone number has been entered, then control passes to step 3132 where the subscriber is prompted: "Accepted." Control then passes to step 3133 where the new phone number is voiced to the subscriber. Control then passes to step 3134 where the new phone number is saved as the branch routing default number 723 in the subscriber master record. Control then returns to step 3104. If at step 3126 it is determined that the digit '3' is not entered, then control passes to step 3135 where a determination is made as to whether the digit '#' is entered, and if it is not entered control then returns to step 3104. If at step 3135 it is determined that the digit '#' is entered then control passes to the connector labelled "CPF MAIN DIRECTORY" at reference 3136, allowing the subscriber to make additional selections from the main directory of the command mode.

A flowchart of the CPF - Command Advanced Features function is illustrated in FIG. 32. The purpose of this function is provide the subscriber with the opportunity to modify those features of the Telephone Control System 1 which do not need to be modified on a regular basis. These features include allowing the subscriber to program mode memories, allowing the subscriber to record his 'drop-in' name, or his personalized greeting, allowing the subscriber to program his reserved numbers, and allowing the subscriber to activate or deactivate the weekly schedule. The CPF - Command Advanced Features function is entered at step 3200 and control passes to step 3201 where the subscriber is prompted: "Advanced Features Directory. Enter 1 to program mode memories, 2 to record greetings, 3 to program reserved numbers, 4 to activate the weekly schedule, 5 to deactivate the weekly schedule, or # to return to the Main Directory." Control then passes to step 3202 where a determination is made as to whether the digit '1' is entered. If the digit '1' is entered, then control passes to step 3203 where the subscriber is allowed to specify a mode memory number 802 of value '10 to '99'. If the mode memory number 802

specified already exists the call processor voices the status of that memory. The subscriber is then given an opportunity to modify the parameters 803 contained in the mode memory. When the subscriber is finished modifying the contents, the changes are saved in mode memory 800. Control then returns to step 3201. If at step 3202 it is determined that the digit '1' is not entered, then control passes to step 3204 where a determination is made as to whether the digit 2 is entered. If the digit '2' is entered, then control passes to step 3205 where the subscriber is allowed to listen to and re-record the 'drop-in' name and the 'personalized greeting'. If the subscriber does re-record either of these, then the changed name or greeting is saved on disk 505. Control then returns to step 3201. If at step 3204 it is determined that the digit '2' is not entered, then control passes to step 3206 where a determination is made as to whether the digit '3' is entered. If the digit '3' is entered, then control passes to step 3207 where the subscriber is allowed to modify the 'message center number' 709, the 'pager number' 710, the 'office number' 711, the 'home number' 712, or the 'mobile phone number' 713. If the subscriber changes any of these numbers then the new number is saved in the corresponding field of the subscriber master record 700. Control then returns to step 3201. If at step 3206 it is determined that the digit '3' is not entered, then control passes to step 3208 where a determination is made as to whether the digit '4' is entered. If the digit '4' is entered, then control passes to step 3209 where the subscriber is allowed to activate the weekly schedule. If the subscriber chooses to activate the weekly schedule, then the 'weekly schedule active' flag 728 of the subscriber master record 700 is set. Control then returns to step 3201. If at step 3208 it is determined that the digit '4' is not entered, then control passes to step 3210 where a determination is made as to whether the digit '5' is entered. If the digit '5' is entered, then control passes to step 3211 where the subscriber is allowed to deactivate the weekly schedule. If the subscriber chooses to deactivate the weekly schedule, then the 'weekly schedule active' flag 728 of the subscriber master record 700 is cleared. Control then returns to step 3201. If at step 3210 it is determined that the digit '5' is not entered, then control passes to step 3212 where a determination is made as to whether the digit '#' is entered. If the digit '#'

is not entered, then control returns to step 3201. If at step 3212 it is determined that the digit '#' is entered then control passes to the connector labelled "CPF MAIN DIRECTORY" at reference 3213, allowing the subscriber to make additional selections from the main directory of the command mode.

A block diagram of the Meet-Me Facility (MMF) 115 is illustrated in FIG. 33. As was discussed earlier, the MMF 115 interfaces to tip-ring lines 120. These lines are provisioned by switch 4 with the CENTREX feature of 'call transfer', which allows a caller to be transferred to another number by flashing, dialing the number, and then going on hook. These lines are also provisioned by switch 4 with the CENTREX feature of 'barge-in', which allows a party on one of the lines 120 to barge into a conversation in progress on another of the lines 120. This is accomplished by flashing, dialing a barge-in code (*77), and then dialing the intercom code associated with the line 120 of the conversation to be barged-in on. As was mentioned earlier, to fully understand the operation of the meet-me feature it is necessary to also review the explanations which are associated with FIG. 21 (CPF - Meet Me Caller), FIG. 30 (CPF - Command Meet Me), and FIG. 34 (Meet Me Facility Main Task). Referring now to FIG. 33, the lines 120 are shown connected to call processors 3300, which contain a tip-ring interface and DTMF generators and detectors. The functions of call processor 330 are well known in the art, and many products, such as the Model D41B manufactured by Dialogic Corporation, exist commercially which can accomplish these functions. The MMF 115 also contains a CPU 3301 which contains among other things a microprocessor, a boot ROM, a RAM, and a disk. The MMF 115 also contains a data network interface module 3302 which connects to the high speed data network 150. The functions of data network interface 150 are well known in the art, and many products, such as the Model COM4i from Digiboard Corporation, exist commercially which can accomplish these functions. The call processors 3300, the CPU 3301, and the data network interface 3302 are all shown connected to an internal data bus 3303. The CPU 3301 initializes itself at power-up using the boot ROM and then loads a control program into memory which it then executes. The control program allows for the control of simultaneous

activities on the lines 120.

A flowchart of the Meet Me Facility Main Task is illustrated in FIG. 34. The Meet Me Facility Main Task is the part of the MMF 115 control program which controls the activities on one of the lines 120. The Meet Me Facility Main Task is entered at step 3400 and control passes to step 3401 where a determination is made as to whether the call processor 3300 has detected a ring signal on the line 120, and if a ring signal is not detected, then control remains at step 3401. If a ring signal is detected, then control passes to step 3402, where the line 120 is taken off hook by call processor 3300, thereby answering the incoming call. At step 3403, a 1 second pause is initiated to allow for the line 120 to settle, and then at step 3404 the call processor 3300 dials the DTMF digit '*' as an answer indication to the CPF 100 which is calling. Then at step 3405 a 5 second timer is started, and control then passes to step 3406 where the 5 second timer is checked. If the 5 second timer has expired, then control passes to step 3407 where the line 120 is placed on-hook by call processor 3300, and then control returns to step 3401. If at step 3406 it is determined that the 5 second timer has not expired, then control passes to step 3408 where a determination is made as to whether the DTMF digit sequence '00' is detected by call processor 3300, indicating the call is a meet-me caller from CPF 100. If the digit sequence '00' is not detected, then control passes to step 3409 where a determination is made as to whether the DTMF digit sequence '01' is detected, indicating the call is a meet-me subscriber from CPF 100. If the digit sequence '01' is not detected, then control returns to step 3406 where the 5 second timer is again checked. If at step 3408 it is determined that the digit sequence '00' is detected, then control passes via a connector labelled "MMF CALLER" at reference 3410 to step 3411, where a determination is made as to whether a DTMF digit sequence representing the Access Number 701 of the subscriber being called is detected by call processor 3300. If a valid phone number is not detected, then control remains at step 3411. If a valid phone number is detected, then control passes to step 3412 where a 2 second pause is initiated. Then at step 3413, the call processor 3300 dials the DTMF digit '*' to inform the CPF 100 that the connection has been successful so far.

Control then passes to step 3414 where a determination is made as to whether the DTMF digit 'd' is detected, indicating that the subscriber has called into the CPF 100, and the CPF 100 is about to conference him to the MMF 115. If the digit 'd' is not detected then control remains at step 3414. If the digit 'd' is detected, then control passes to step 3415 where a flash is generated on lines 120 causing the CENTREX system serving lines 120 to place the calling party (in this case the CPF 100) on hold, and a dial tone to be applied to line 120. Control then passes to step 3416 where a determination is made as to whether the subscriber has yet been connected to one of the other of lines 120 on the MMF 115. If the subscriber has not yet been connected, then control remains at step 3416. If it is determined that the subscriber has connected to one of the other of lines 120, then control passes to step 3417, where the CENTREX 'barge-in code' (*77) is dialed by the DTMF generator of call processor 3300. Then at step 3418, the call processor 3300 dials the intercom code for the line 120 which is currently connected to the subscriber. Control then passes to step 3419 where a 2 second pause is generated, and then to step 3420 where a flash is generated. This causes the line 120 which is connected to the subscriber to be connected via the CENTREX system to the line 120 which is connected to the caller. Control then passes to step 3421 where control remains while the subscriber and caller converse, until a loop interruption signal is detected on line 120 indicating at least one of the two parties has disconnected. Control then passes to step 3422 where the line 120 is placed on hook, and control the returns to step 3401. If at step 3409 it is determined that the digit sequence '01' is detected, then control passes via a connector labelled "MMF SUBSCRIBER" at reference 3423 to step 3424, where a determination is made as to whether a DTMF digit sequence representing the Access Number 701 of the subscriber is detected by call processor 3300. If a valid phone number is not detected, then control remains at step 3424. If a valid phone number is detected, then control passes to step 3425 where an indication is made available that a subscriber is connected to the MMF 115 on this line 120. Control then passes to step 3426 where a 3 second pause is initiated, allowing time for the line 120 connected to the subscriber to perform the barge-in sequence. Control then

passes to step 3427 where the line 120 is placed on hook causing the CENTREX system to call transfer the subscriber to the line 120 which has just barged-in. Control then returns to step 3401.

A block diagram of the Subscriber Access Facility (SAF) 110 is illustrated in FIG. 35. The SAF 110 provides a means by which subscribers can access the Telephone Control System 1 via trunks which provide automatic number identification (ANI). SAF trunk interface 3500 interfaces the SAF 110 with trunks 8. The trunk interface 3500 is the same trunk interface as was described earlier at reference 400 used in the CPF 100, however the E & M Lead Control Circuit operates under a slightly different set of instructions, as will be described below in the explanation which accompanies FIG. 36. Still referring to FIG. 35, as was discussed earlier, the preferred embodiment of the TELEPHONE CONTROL SYSTEM 1 employs a Feature Group D (FGD) facility for trunks 8. This is provided via a 4-wire E&M trunk provisioned with TYPE I signaling, which is well known in the art. These type of trunks provide a 2-wire balanced transmit audio connection, a 2-wire balanced receive audio connection, an E-Lead, and an M-Lead. Although only one trunk interface 3500, one trunk 8, and one call processor 3504 are shown in FIG. 35, it should be readily evident to one skilled in the art that additional trunk interfaces and call processors may be added to support additional trunks. The trunk interface 3500 provides a two-way audio path shown at reference 3501, a loop status output shown at reference 3502, and a on/off hook control input shown at reference 3503. These lines are shown connected to call processor 3504 which performs the functions of voice storage and playback, DTMF generation and detection, and call control. Devices which perform the functions of call processor 3504 are well known in the art and many products, such as the Model D41B manufactured by Dialogic Corporation, exist commercially which can accomplish these functions. Also shown is a multi frequency detector module 3505 which is shown connected to the call processor 3504. A commercially available multi-frequency module capable of performing this function is the Model MF/40 manufactured by Dialogic Corporation. A data network interface 3507 is used to connect the SAF 110 to the other subsystems of the Telephone

Control System 1. Data network interface 3507 passes data messages between the SAF 110 and these other subsystems. The functions of data network interface 3507 are well known in the art, and many products, such as the Model COM4i from Digiboard Corporation, exist commercially which can accomplish these functions. CPU 3506, which contains a microprocessor, a boot ROM, a RAM, and a disk, controls all functions of the SAF 110. The trunk interface 3500, the CPU 3506, the call processor 3504, and the data network interface 3507 are all shown connected to an internal data bus 3508. The CPU 3506 initializes itself at power-up using the boot ROM and then loads a control program into memory which it then executes. The control program allows for the control of simultaneous activities on the trunks 8. An explanation of the control program for the SAF 110 accompanies FIG. 37.

A flowchart of the operation of E&M control circuit for the trunk interface 3500 of the SAF 115 is shown in FIG. 36. As the construction of the trunk interface 3500 of FIG. 35 is identical to that of the trunk interface 400 of FIG. 5, the explanation which follows will refer to the reference numbers of FIG 5 when discussing the internal components of the trunk interface 3500. Referring now to FIG. 36, the E&M Lead Control Circuit Operation for the SAF Trunk Interface function is entered at step 3600 and control passes to step 3601 where the control circuit 450 idles waiting for an indication from current detector 440 that the E-Lead has gone off-hook. When the E-Lead does go off-hook, control passes to step 3602 where an "Incoming Call" signal is sent to CPU 3506 via buffer 460. Control then passes to step 3603 where a determination is made as to whether an off-hook signal is received from call processor 3504 signifying that the CPU 3506 is ready to accept the call. If the off hook signal is detected, then control passes to step 3604 where the 'loop status' 3502 is set active. Control then passes to step 3605 where the M-Lead is winked by taking the M-Lead relay 455 momentarily off-hook. Control then passes to step 3606 where a determination is made as to whether a 'DID received' signal 480 is detected. If the signal is not detected then control remains at step 3606. If the signal is received, indicating that the multifrequency detector 3505 has detected the 'ANI' and 'called number' digits from the FGD trunk 8, then control passes to step

3607 where the M-lead relay is once more winked momentarily off hook to acknowledge receipt of the multifrequency data. A 300 millisecond pause is then initiated at step 3608, prior to taking the M-Lead off hook at 3609 to 'answer' the trunk. At this point audio is established by the switch which is providing the FGD service, and the calling party is connected to the SAF 110. Control then passes to a loop consisting of steps 3610 and 3611. This loop persists until either at step 3610 the on/off hook signal 3503 is taken on hook by the call processor 3504, or at 3611 the E-Lead is determined to be on-hook. In either case the call is ended, and control passes to step 3612 where the 'loop status' signal 3502 is set inactive. Then at step 3613 a determination is made as to whether the 'DID received' signal 480 still remains active indicating the CPU 3506 is not yet ready to receive a new call. If this signal is still active, then control remains at step 3613. If it is determined at step 3613 that the 'DID received' signal 480 is now inactive, then control passes to step 3614 where the M-Lead is placed on hook, terminating the call, and control passes to step 3601.

A flowchart of the Subscriber Access Facility Main Task is illustrated in FIG. 37. This program is loaded into memory and executed by SAF CPU 3506. The Subscriber Access Facility Main Task is entered at step 3700 and control passes to step 3701 where a 'clear DID received' signal is sent to the trunk interface 3500. Control then passes to step 3702 where the 'incoming call' signal of the trunk interface 3500 is checked. If this signal is not active then control remains at step 3702. If this signal is active, then control passes to step 3703, where the output of the multifrequency detector 3505 is checked via call processor 3504. The incoming multifrequency digit sequence 'KP' + '00' + ANI + 'ST' is decoded where 'KP' is the start digit, 'ST' is the stop digit, and the ANI is the phone number of the phone from which the subscriber is calling. Control then passes to step 3704 where, in a similar manner, the incoming multifrequency digit sequence 'KP' + 800 + NXX + XXXX + 'ST' is decoded. Again the 'KP' is the start digit, the 'ST' is the stop digit, and the sequence 800 NXX XXXX is the phone number dialed by the subscriber to reach the trunk 8, the NXX being the prefix which identifies trunk

group 8 to the PSTN 2. This phone number represents the programming function which the subscriber wishes to accomplish. Control then passes to step 3705 where a 'set DID received' signal is sent to the trunk interface 3500, indicating that the multifrequency data has been received. Control then passes to step 3706 where a determination is made as to whether the dialed number was of the form 800 - NXX - 00ab, and if the dialed number was not of this form then control passes to a connector labelled "SAF EXT" at reference 3707. If at step 3706 it is determined that the dialed number is of the form 800 - NXX - 00ab, then control passes to step 3710 where a 'request master record' message is constructed using the ANI received in step 3703, and the message is sent via data network interface 3507 to the CPF 100. Control then passes to step 3711 where a determination is made as to whether a response has been received to the 'request master record' message, and if such a response is not received control remains at step 3711. If the response message is received by network interface 3507, then control passes to step 3712 where a determination is made as to whether a valid subscriber master record 700 is included in the returned message. If a valid subscriber master record is not included, then control passes to the connector labelled "SAF REORDER" shown at reference 3713. If at step 3712 a valid subscriber master record 700 is found, then control passes to step 3714 where the DID number 701 is removed from the subscriber master record 700. Control then passes to step 3715 where a 'mode memory inquiry' message is constructed using the DID number 701 and the digits 'ab' as detected in step 3706, and the message is sent via data network interface 3507 to the CPF 100. Control then passes to step 3716 where a determination is made as to whether a response has been received to the 'mode memory inquiry' message, and if such a response is not received control remains at step 3716. If the response message is received by network interface 3507, then control passes to step 3717 where a determination is made as to whether a valid mode memory 800 is included in the returned message. If a valid mode memory 800 is not included, then control passes to the connector labelled "SAF REORDER" shown at reference 3718. If at step 3717 a valid mode memory 800 is found, then control passes to step 3720, which is identified by a

connector labelled "SAF UPDATE" at reference 3719. At step 3720 a 'change to new mode memory' message is constructed, again using DID number 701 and the digits 'ab' as detected in step 3706, and the message is sent via data network interface 3507 to the CPF 100. Control then passes to step 3721 where the subscriber is prompted by call processor 3504: "Accepted, you have selected mode memory...'ab'", where 'ab' are the digits detected in step 3706. Control then passes to step 3722 where the call processor 3504 causes trunk 8 to be placed on hook, and then control returns to step 3701. If at step 3706 it is determined that the dialed number was not of the form '800 - NXX - 00ab', then control passes to a connector labelled "SAF EXT" as shown at reference 3707. A connector labelled "SAF EXT" is shown at reference 3724, which causes control to be passed to step 3725 where a determination is made as to whether the dialed number was of the form 800 - NXX - cdef, where the digits 'cd' do not equal '00'. If the dialed number is not of this form, then control passes to a connector labelled "SAF REORDER" shown at reference 3745. If at step 3725 it is determined that the dialed number is of this form, then control passes to step 3726 where call processor 3504 prompts the subscriber by playing a 'bong tone'. Control then passes to step 3727 where a determination is made as to whether the subscriber has entered a PIN code, and if the PIN code is not entered control remains at step 3727. If a PIN code is entered, then control passes to step 3728 where a 'request master record' message is constructed using then PIN code entered in step 3727 and the digits 'cdef' detected in step 3706. This message is then sent via data network interface 3507 to the CPF 100. Control then passes to step 3729 where a determination is made as to whether a response has been received to the 'request master record' message, and if such a response is not received control remains at step 3729. If the response message is received by network interface 3507, then control passes to step 3750 where a determination is made as to whether a valid subscriber master record 700 is included in the returned message. If a valid subscriber master record is not included, then control passes to the connector labelled "SAF REORDER" shown at reference 3751. If at step 3750 a valid subscriber master record 700 is found, then this indicates that CPF 100 found

a subscriber master record 700 which had a DID number 701 which had the same last four digits as the digits 'cdef' detected in step 3706, and also had the same PIN code 702 as that detected in step 3727. Control passes to step 3730 where the subscriber is prompted: "Please enter your new mode memory number." Control then passes to step 3731 where a determination is made as to whether the subscriber has entered a memory number '10 to '99', and if such a number has not been entered, then control remains at step 3731. If a mode memory number is entered, then control passes to step 3732 where a 'mode memory inquiry' message is constructed using the DID number 701 and the and the memory number as detected in step 3731, and the message is sent via data network interface 3507 to the CPF 100. Control then passes to step 3733 where a determination is made as to whether a response has been received to the 'mode memory inquiry' message, and if such a response is not received control remains at step 3733. If the response message is received by network interface 3507, then control passes to step 3734 where a determination is made as to whether a valid mode memory 800 is included in the returned message. If a valid mode memory 800 is not included, then control passes to the connector labelled "SAF REORDER" shown at reference 3745. If at step 3734 a valid mode memory 800 is found, then control passes to step 3735, where a determination is made as to whether the mode memory which was received in the message requires an 'externally entered' memory. This is determined by inspecting the transfer number field of the mode memory 800. If it has an 'externally entered number' tag, then the mode memory does require an 'externally entered number'. If at step 3735 it is determined that an 'externally entered number' is not required, then control passes to a connector labelled "SAF UPDATE" at reference 3736, which as described earlier causes the mode memory requested to be invoked. If at step 3735 it is determined that an 'externally entered number' is required, then control passes to step 3737 where the subscriber master record 700 as acquired at step 3750 is retrieved from memory. Control then passes to step 3738 where the mode memory 800 that was acquired in step 3734 is copied field-by-field to the subscriber master record. Control then passes to step 3740, where the ANI number acquired in step 3703 is

copied to the transfer number field 707 of the subscriber master record 700. Control then passes to step 3741 where an 'update master record' message is constructed using this master record, and the message is sent via data network interface 3507 to CPF 100. Control then passes to step 3742 where the subscriber is prompted: "Accepted, you have selected mode memory..xx", where the digits 'xx' are the digits entered by the subscriber at step 3731. Control then passes to step 3743 where the trunk 8 is placed on hook, and then control returns to the Subscriber Access Facility Main Task entry point as shown at reference 3748. If at step 3734, it is determined that the mode memory received in the message was not valid, then control passes to a connector labelled "SAF REORDER" at reference 3745, which causes control to pass to step 3746 where the call processor 3504 plays a 'reorder signal' to the subscriber, indicating that the call is being terminated. Control then passes to step 3747 where the trunk 8 is placed on hook. Control then returns to the Subscriber Access Facility Main Task entry point as shown at reference 3748.

A block diagram of the Communicator Access Facility (CAF) 125 is illustrated in FIG. 38. As shown, the CAF 125 contains a serial port interface module 3800 which connects to the serial datalink 10, and a data network interface 3801 which connects to the high speed data network 150. The functions of data network interface 3801 are well known in the art, and many products, such as the Model COM4i from Digiboard Corporation, exist commercially which can accomplish these functions. The operation of the CAF 125 is controlled by CPU module 3802, which consists of a microprocessor, a boot ROM, RAM, and disk. The boot ROM is used to initialize the CPU and load the control program into memory from disk. Operation of the CAF 125 is then controlled by the control program. The control program is described in the explanation which accompanies FIG. 39. Still referring to FIG. 38, the serial port 3800, data network interface 3801, and the CPU module 3802 are all shown connected to internal bus 3803.

A flowchart of the Communicator Access Facility Main Task is illustrated in FIG. 39. This program is loaded into memory and executed by CPU 3802 of the CAF 125. The Communicator Access Facility Main Task is entered at step 3900 and

control passes to step 3901 where a determination is made as to whether a 'page message' is received via data network interface 3801, and if a 'page message' is received then control passes to step 3902 where the page message is sent via serial port 3800 and datalink 10 to packet radio transceiver 9. Control then passes to step 3903 where an 'acknowledge timer' is started, and the 'page message' just sent is saved and associated with this 'acknowledge timer'. Control then passes to step 3904. Control also passes to step 3904 if a 'page message' is not received as determined at step 3901. At step 3904, a determination is made as to whether a 'phone number' message has been received from a communicator 11 via the serial port interface 3800. If such a message has been received, then control passes to step 3905 where the subscriber's DID number 701 is retrieved form the message, and a 'request master record' message is created and sent to the CPF 100 via data network interface 3801. When the response is received from the CPF 100 via the data network interface 3801, the subscriber master record is retrieved from the response message. Control then passes to step 3906 where the transfer number field 707 of the subscriber master record 700 is updated per the phone number received from the communicator 11 at step 3904. Control then passes to step 3907 where an 'update master record' message is then constructed and sent back to the CPF 100 via data network interface 3801. Control then passes to step 3908, where an 'acknowledge message' is sent back to the communicator 11 via serial port 3800. Control then passes to step 3909. Control also passes to step 3909 if a 'phone number' message is not detected at step 3904. At step 3909 a determination is made as to whether a 'new mode memory' message is received from a communicator 11 via serial port 3800. If this message type has been received then control passes to step 3910 where a 'change to new mode memory' message is constructed and sent to CPF 100 via data network interface 3801, and then control passes to step 3908 where an 'acknowledge' message is sent back to the communicator 11 as described earlier. If at step 3909 a 'new mode memory request' message is not detected, then control passes to step 3911 where a determination is made as to whether a 'set dynamic mode assignment mode' message is received from a communicator 11 via serial port 3800. If this message

type is received, then control passes to step 3912, where a 'set dynamic mode assignment flag' message is constructed and sent to CPF 100 via data network interface 3801. Control then passes to step 3908 where an 'acknowledge' message is sent back to the communicator 11 as described earlier. If at step 3911 a 'set dynamic mode assignment mode' message is not detected, then control passes to step 3913 where a determination is made as to whether a 'disable dynamic mode assignment mode' message is received from a communicator 11 via serial port 3800. If this message type is received, then control passes to step 3914, where a 'clear dynamic mode assignment flag' message is constructed and sent to CPF 100 via data network interface 3801. Control then passes to step 3908 where an 'acknowledge' message is sent back to the communicator 11 as described earlier. If at step 3913 a 'disable dynamic mode assignment mode' message is not detected, then control passes to step 3915 where a determination is made as to whether the 'acknowledge timer' has just expired. If the 'acknowledge timer' has just expired, as determined at step 3915, then control passes to step 3916 where the message which was associated with this 'acknowledge timer' is again sent to the communicator 11 via serial port interface 3800, and control then passes to step 3903. If at step 3915 it is determined that an 'acknowledge timer' has not just expired, then control passes to step 3917 where a determination is made as to whether an 'acknowledge' message is received from a communicator via serial port interface 3800, and if an 'acknowledge' message is not received, then control returns to step 3901. If an 'acknowledge' message is received, as determined at step 3917, then the 'acknowledge' timer which is associated with the last message sent to the communicator 11 identified in the 'acknowledge' message is cleared. Control then returns to step 3901.

A flowchart of the Communicator Main Task is illustrated in FIG. 40. This task is executed by microprocessor 200, and controls all operations of the communicator 11. The Communicator Main Task is entered at step 4000 and control passes to step 4001 where a determination is made as to whether a 'page' message is detected at the receive data input 245. If a 'page' message is detected, and the message contains the pager number which corresponds to this communicator, then

control passes to step 4002, where a signal is sent via output port 250 causing the beeper 260 to generate an alerting sound. Control then passes to step 4003 where a display number is retrieved from the decoded 'page' message, and is output to the display 210. Control then passes to step 4004 where a brief 'acknowledge' message is sent via transmit data port 215 to packet data encoder 220 and then to rf transmitter 225. All RF transmissions from communicator 11 are sent as brief packet 'bursts', thus maintaining a longer life for battery 290. Control then returns to step 4001. If at step 4001 it is determined that a 'page' message is not received, then control passes to step 4005 where a determination is made as to whether a 'manual phone number flag' is set, and if the flag is not set control passes to step 4006 where a determination is made as to whether a data message is received from the ultrasonic transmitter 12 via the serial data input 280, and if such a message is received then control passes to step 4007. At step 4007 a determination is made as to whether a 'auto phone number flag' is set and if the flag is not set control passes to step 4009 where the 'auto phone number flag' is set. Control then passes to step 4010 where the phone number which was embedded in the message received at step 4006 is stored in the memory of microprocessor 200. Control then passes to step 4011 where a 'phone number' message is constructed using the phone number of step 4006, and the subscriber DID number 701, as prestored in the RAM of microprocessor 200. This message is then sent to transmit data port 215. Control then passes to step 4012 where an 'acknowledge timer' is started. Control then passes to step 4013 where a '20 second ultrasonic data timer' is started. Control then returns to step 4001. If at step 4007 it is determined that the 'auto phone number flag' is set, then control passes to step 4008, where a determination is made as to whether the phone number received embedded in the message at step 4006 is the same as the phone number currently in memory as stored at step 4010. If the phone numbers match then control passes to step 4013. If at step 4008 it is determined that the phone numbers are different, indicating that the subscriber has moved to a different room, then control passes to step 4009. If at step 4005 it is determined that the 'manual phone number flag' is set, or if at step 4006 it is determined that a data message is not being received via

input port 280, then control passes to step 4014 where a determination is made as to whether the '20 second ultrasonic data timer' has just expired, and if it has, indicating that the subscriber is no longer near an ultrasonic transmitter 12, then control passes to step 4015. At step 4015 the 'auto phone number flag' is cleared and control passes to step 4016 where the a 'new mode memory request' message is constructed using the stored subscriber DID number 701, and the stored 'default mode memory'. Control then passes to step 4017 where an 'acknowledge timer' is started, and then control returns to step 4001. If at step 4014 it is determined that the '20 second ultrasonic data timer' has not just expired, then control passes to step 4018 where a determination is made as to whether the 'acknowledge timer' has just expired, and if it has just expired control passes to step 4019 where the message is re-sent via transmit data port 215. Then at step 4020, an 'acknowledge timer' is started, and then control returns to step 4001. If at step 4018 it is determined that the 'acknowledge timer' has not expired, then control passes to step 4021 where a determination is made as to whether an 'acknowledge' message with a pager number that corresponds to this communicator 11 is received via the receive data input 245, and if such a message is received then control passes to step 4022 where the 'acknowledge timer' is cleared. Control the returns to step 4001. If at step 4021 it is determined that an 'acknowledge' message is not received, then control passes to step 4023 where a determination is made as to whether the subscriber is entering data via the keypad 205, and if the subscriber is not entering data, then control returns to step 4001. If the subscriber is entering data via the keypad, as determined at step 4023, then control passes to step 4024 where a determination is made as to whether the subscriber wishes to program the Telephone Control System 1 to operate under control of a new mode memory. If this is the case, then control passes to step 4025 where a 'new mode memory request message' is constructed and sent to transmit data port 215, and then control passes to step 4033 where an 'acknowledge timer' is started, and then control returns to step 4001. If at step 4024 it is determined that the subscriber is not selecting a new mode memory, then control passes to step 4026 where a determination is made as to whether the subscriber is selecting the dynamic

mode assignment feature, and if this is the case, then control passes to step 4027 where a 'set dynamic mode assignment mode' message is constructed and sent to transmit data port 215, and then control passes to step 4033. If at step 4026 it is determined that the subscriber is not selecting the dynamic mode assignment feature, then control passes to step 4028 where a determination is made as to whether the subscriber is disabling the dynamic mode assignment feature, and if this is the case, then control passes to step 4029 where a 'disable dynamic mode assignment mode' message is constructed and sent to transmit data port 215, and then control passes to step 4033. If at step 4028 it is determined that the subscriber is not disabling the dynamic mode assignment mode, then control passes to step 4030 where a determination is made as to whether the subscriber is entering a phone number, and if a phone number is being entered then control passes to step 4031 where the 'manual phone number flag' is set. Control then passes to step 4032 where a 'phone number' message is constructed using the phone number entered by the subscriber at step 4030, and this message is transmitted via transmit data port 215. Control then passes to step 4033. If at step 4030 it is determined that the subscriber is not entering a phone number, then control passes to step 4034 where a determination is made as to whether the subscriber is selecting the auto-phone number mode, and if this is the case, then control passes to step 4035 where the 'manual phone number flag' is cleared, and control then passes to step 4015. If at step 4034 it is determined that the subscriber is not selecting the auto-phone number mode, then control passes to step 4036, where a determination is made as to whether the subscriber is entering new program data such a the stored DID number, the stored pager number, and the stored default mode memory. If the subscriber is attempting to modify any of these parameters, then control passes to step 4037 where the new data is stored in the RAM of microprocessor 200. Otherwise, control returns to step 4001. As can be understood from the explanation above, one of the primary functions of the Communicator 11 and the Communicator Access Facility 125 is to take the phone number identifying the location of the subscriber, as transmitted by ultrasonic transmitter 12, and cause that number to be used by the Telephone Control System

1 as the forwarding number for the subscriber. It should also be understood that in a similar fashion the ultrasonic transmitter 12 may transmit a 'mode memory number' which, if sent to the Telephone Control System 1 via the Communicator 11 and the Communicator Access Facility 125, would allow that mode memory to be used by the Telephone Control System 1 to specify the call handling mode for the subscriber. In this case, the Communicator 11 receives a data message from an ultrasonic transmitter 12 and determines that the message contains a mode memory. The Communicator 11 then transmits a 'new mode memory request' message, which includes the subscriber's DID number 701, via its RF transmitter 225. This message is received by packet radio transceiver 9 and sent to the CAF 125 via data line 10. The CAF 125 then sends a "change to new mode memory" message to CPF 100 via data network interface 3801. CPF 100 then copies the mode memory referred to in the message to this subscriber's "subscriber master record" 700. To further illustrate this process, consider the example of a hospital operating room where an ultrasonic transmitter 12 is transmitting a message containing a mode memory number which corresponds to the "message center" call handling mode. If a doctor, carrying a Communicator 11 enters the operating room, then the Telephone Control System is automatically programmed to send his calls to the "message center."

A block diagram of the Pager Dialing Facility (PDF) 105 is illustrated in FIG. 41. Standard tip-ring line 5 is shown connected to call processor 4100, which contains a tip-ring interface, DTMF generators, call progress detectors. The functions of call processor 4100 are well known in the art, and many products, such as the Model D41B manufactured by Dialogic Corporation, exist commercially which can accomplish these functions. The PDF 105 also contains a CPU 4101 which contains a microprocessor, a boot ROM, a RAM, and a disk. The PDF 105 also contains a data network interface module 4103 which connects to the high speed data network 150. The functions of data network interface 4103 are well known in the art, and many products, such as the Model COM4i from Digiboard Corporation, exist commercially which can accomplish these functions. The call processor 4100, the CPU 4101, and the data network interface 4103 are all shown connected to an

internal data bus 4102. The CPU 4101 initializes itself at power-up using the boot ROM and then loads a control program into memory which it then executes.

A flowchart of the Pager Dialing Facility Main Task is illustrated in FIG. 42. This program is loaded into memory and executed by CPU 4101 of the PDF 105. The Pager Dialing Facility Main Task is entered at step 4200 and control passes to step 4201 where a determination is made as to whether a 'page' message is received from CPF 100 via data network interface 4201, and if the message is not received then control remains at step 4201. If a 'page' message is received, then the 'pager number' and the 'display digits' are retrieved from the message, and control passes to step 4202 where an 'attempt count' is set to a value of 1. Control then passes to step 4203, where line 5 is taken off hook, and then control passes to step 4204 where call processor 4100 dials the 'pager number'. Control then passes to step 4205 where a determination is made as to whether the call has not been answered due to a time-out or a non-answer signal such as operator intercept, busy, or reorder. If such a signal or time-out condition is not detected then control passes to step 4206 where a determination is made as to whether the call has been answered by the paging terminal, and if the call has not been answered, control returns to step 4205. If at step 4206 it is determined that the call is answered, then control passes to step 4207 where a 1 second pause is initiated, and then control passes to step 4208 where the 'display digits' are dialed by call processor 4100. Control then passes to step 4209 where the pager termination digit '#' is dialed, and then control passes to step 4210 where the line 5 is placed on hook. Control then passes to step 4211 where a 2 second delay is initiated before returning control to step 4201. If at step 4205 it is determined that a time-out or non-answer signal is detected, then control passes to step 4212 where the 'attempt count' is incremented. Control then passes to step 4213 where the 'attempt count' is checked and if it is found to be not equal to ten then control passes to step 4214 where the line 5 is placed on hook and then after a 2 second pause a step 4215, control returns to step 4203 to make another attempt at dialing this number. If at step 4213 it is found that the 'attempt count' is now equal to 10, then this page is abandoned by returning control to step 4201.

A block diagram of the Client Services Facility (CSF) 130 is illustrated in FIG. 43. The Client Services Facility (CSF) 130 is used by the service bureau which provides the Telephone Control System service to it's subscribers. The CSF 130 allows a client services representative to gain access to the database contained in the CPF 100, and thus be able to review and modify the subscriber master records 700 and mode memories 800 of the subscribers. The CSF 130 contains a CPU 4300 which contains a microprocessor, a boot ROM, a RAM, and a disk. The CSF 130 also contains a data network interface module 4301 which connects to the high speed data network 150. The functions of data network interface 4301 are well known in the art, and many products, such as the Model COM4i from Digiboard Corporation, exist commercially which can accomplish these functions. Also shown is a display monitor 4302, and a keyboard 4303. The CPU 4300 initializes itself at power-up using the boot ROM and then loads a control program into memory which it then executes.

A flowchart of the Client Services Facility Main Program is illustrated in FIG. 44. This program is loaded into memory and executed by CPU 4300 of the CSF 130. The Client Services Facility Main Program is entered at step 4400 and control passes to step 4401 where a determination is made as to whether the client services representative has entered the DID number for a particular subscriber and has requested a subscriber master record 700, and if this is the case then control passes to step 4402 where a 'request master record' message is sent via data network interface 4301 to CPF 100. Control then passes to step 4403 where the subscriber master record 700 is removed from the response message from the CPF 100, and is displayed on monitor 4302. Then at step 4404, the client services representative is allowed to review and modify the contents of the subscriber master record 700 using monitor 4302 and keyboard 4303. Then at step 4405 a determination is made as to whether the client services representative is completed with this operation, and if not, then control returns to step 4404. When the operation is complete, then control passes to step 4406 where an 'update master record' message is constructed and sent to CPF 100 via data network interface 4301. Control then returns to step 4401. If

at step 4401 it is determined that the client services representative is not requesting a subscriber master record 700, then control passes to step 4407 where a determination is made as to whether the client services representative has entered the DID number for a particular subscriber and has requested a subscriber mode memory 800, and if this is the case then control passes to step 4408 where a 'mode memory inquiry' message is sent via data network interface 4301 to CPF 100. Control then passes to step 4409 where the mode memory 800 is removed from the response message from the CPF 100, and is displayed on monitor 4302. Then at step 4410, the client services representative is allowed to review and modify the contents of the mode memory 800 using monitor 4302 and keyboard 4303. Then at step 4411 a determination is made as to whether the client services representative is completed with this operation, and if not, then control returns to step 4410. When the operation is complete, then control passes to step 4412 where an 'update mode memory' message is constructed and sent to CPF 100 via data network interface 4301. Control then returns to step 4401. If at step 4407 it is determined that the client services representative is not requesting a new mode memory, the control passes to step 4413 where a determination is made as to whether the client services representative has entered a DID number and wishes to activate a new subscriber for this number. If this is the case then control passes to step 4414 where a 'create a new subscriber message' is generated with this DID number and the message is sent to CPF 100 via data network interface 4301. Control then returns to step 4401. If at step 4413 it is determined that the client services representative does not wish to create a new subscriber, then control returns to step 4401.

While a preferred embodiment of the invention has been described in detail, it should be apparent that many modifications and variations thereto are possible, all of which fall within the true spirit and scope of the invention. For example, while the preferred embodiment of the control system provides voice synthesized type courtesy messages, any appropriate tones, beeps, etc. would serve as a courtesy message and such is the use of that term throughout the claims appended hereto. In addition, the term "line" as used herein and in the claims appended hereto includes both lines and

trunks. In addition, whereas the preferred embodiment of the invention uses the term "line" to describe the interconnecting medium between the control system and the central exchange, it should be understood throughout the specification and claims that "line" refers to tip and ring pairs, trunks or any other form of connecting circuits.

Claims:

1. A control system adapted for connection to a telephone exchange for receiving and processing calls from a caller to a user, the control system comprising: input/output means adapted for connection to telephone exchange lines to input and output telephone calls; switching control means for controllably connecting a call on one line to a different line; memory means for controllably storing and recalling electronic signals; and electronic processing means for accessing said memory means, switching control means and input/output means to direct the flow of input and output calls, said electronic processing means including means for:

a) processing calls to the system directed to a specific user in a selected one of at least two distinct modes, one such mode being call forwarding in which case the processing means proceeds with items b) through d),

b) recalling from said memory means a forwarding number for said user,

c) implementing a call to said forwarding number,

d) switching the caller's call to said forwarding number,

e) identifying a call to said system from a specific user,

f) changing said specific user's memory means stored forwarding number responsive to a command from said specific user, and

g) changing a users call processing mode responsive a command from said user.

2. The control system of claim 1 wherein the electronic processing means further comprises means for recalling from said memory means a courtesy message indicating that a call transfer is being effectuated and transmitting said message to said caller.

3. The control system of claim 1 including a message center mode wherein the electronic processing means further comprises means for: storing as a user mode control signal a message center mode signal that represents the user not being available and, upon recalling said message center mode signal in processing an

incoming call, recalling from said memory means a courtesy message indicating that the user is not available and that the caller can leave a message, transmitting said courtesy message to said caller, recording a message sent by the caller and allowing the specific user to call the system and access such message.

4. The control system of claim 1 including a priority call screening mode wherein the electronic processing means further comprises means for: storing as a user mode control signal a priority screening mode signal that represents the user not being available except for a priority call and, upon recalling said priority screening mode signal in processing an incoming call, recalling from said memory means a message indicating that the user is not available unless the call is a priority call in which event the caller should transmit a specific command from his calling station, transmitting said message to said caller and, responsive to said caller transmitting said specific command, proceeding with steps b) - d) to forward said call.

5. The control system of claim 4 wherein the electronic processing means further comprises means for: responding to said caller not transmitting said specific command to process said caller's call in accordance with a predetermined default processing mode.

6. The control system of claim 4 wherein the electronic processing means further comprises means for: responding to said caller not transmitting said specific command by recalling from said memory means a courtesy message indicating that the caller can leave a message, transmitting said message to said caller, recording a message sent by the caller, and allowing the specific user to call the system and access such message.

7. The control system of claim 1 including a VIP screening mode wherein the electronic processing means further comprises means for: storing as a user mode control signal a VIP screening mode signal that represents the user not being available except for callers having a VIP code and, upon recalling said VIP screening mode signal in processing an incoming call, recalling from said memory means a message indicating that the user is not available unless the caller has said VIP code in which event the caller should transmit said VIP code from his calling station,

transmitting said message to said caller and, responsive to said caller transmitting said VIP code, proceeding with steps b) - d) to forward said call.

8. The control system of claim 7 wherein the electronic processing means further comprises means for: responding to said caller not entering said VIP code to process said caller's call in accordance with a predetermined default processing mode.

9. The control system of claim 7 wherein the electronic processing means further comprises means for: responding to said caller not entering said VIP code by recalling from said memory means a courtesy message indicating that the caller can leave a message, transmitting said message to said caller, recording a message sent by the caller, and allowing the specific user to call the system and access such message.

10. The control system of claim 1 including a branch routing mode wherein the electronic control means further comprises means for: responding to an incoming call to a specific user to recall from said memory means a courtesy message indicating to the caller that his call could be branched to any of a plurality of options responsive to the caller transmitting an appropriate command corresponding to the desired branch, transmitting said courtesy message to said caller and, responsive to the caller transmitting said command, proceeding with steps b) -d) to forward said call.

11. The control system of claim 1 including a voice-screening mode wherein the electronic control system comprises means for: storing as a user mode control signal a voice-screen mode signal and, upon recalling said voice-screening mode signal in processing an incoming call, recalling from said memory means a message requesting that the caller transmit specific identification information, transmitting said message to said caller, recording the caller's response to said message, implementing a call to the user's forwarding number, transmitting the caller's response, and responding to a command response from the user to appropriately dispose of the caller's call.

12. The control system of claim 11 wherein the electronic control system

further comprises means for: upon completing said call to said user's forwarding number, recalling a courtesy message from said memory means indicating that the user is being called by a caller, interleaving with said courtesy message the caller's recorded identification information, said courtesy message further including the user's option to transmit a first control command signal to connect the user to the caller or an alternate control command signal to recall a second courtesy message from said memory means and send such message to said caller, transmitting said courtesy message to said user, and responding to the user transmitting a control command to appropriately dispose of the caller's call.

13. The control system of claim 11 wherein the electronic processing means further comprises means for: responding to a second control command from said user to recall a terminating message from said memory means, send said terminating message to said caller and terminate the connection to said caller, responding to a third control signal from said user to recall a leave-a-message signal, transmitting said leave-a-message signal to said caller and storing the caller's message in said memory means, and responding to a fourth control signal from said user to recall a predetermined phone number from said memory means, call said number and connect said caller to said predetermined number.

14. The control system of claim 1 including a meet-me mode wherein the electronic processing means further comprises means for: storing as a user mode control signal a meet-me mode signal and, upon recalling said meet-me mode signal in processing an incoming call, recalling from said memory means a pager access control procedure, controlling a paging system to page the user with an indication that he has a call waiting, identifying a call to said system from said user responsive to said page and, in the event the caller has waited on the line, switching the caller to the user.

15. The control system of claim 14 wherein the electronic processing means further comprises means for: in the event the caller has not waited on the line, so notifying the user by recalling a predetermined courtesy message and transmitting said courtesy message to the user.

16. The control system of claim 14 wherein the electronic processing means further comprises means for: recalling from said memory means a courtesy signal notifying the caller that the system must page the user and informing the caller that by transmitting a command the caller would be allowed to record a message, transmitting said courtesy signal to the caller before initiating the page to the user and, responsive to receipt of said command from the caller, recording the caller's message.

17. The control system of claim 15 wherein the electronic processing means further comprises means for: recalling from said memory means a courtesy signal notifying the caller that the system must page the user and informing the caller that by entering a command the caller would be allowed to record a message, transmitting said courtesy message to the caller before initiating the page to the user and, responsive to receipt of said command from the caller, recording the caller's message.

18. The control system of claim 1 in combination with a paging system wherein each user carries a paging device adapted to receive radio frequency signals broadcast from a central paging system with a unique identification code assigned to each paging device, and wherein: each paging device includes: a radio frequency transmitter; and control means for controlling said radio frequency transmitter such that a data signal may be transmitted to the control system to revise said control system memory means.

19. The combination of claim 18 wherein said controller means comprises a keypad and associated electronics allowing the user to manually revise said control system memory means stored signals.

20. The combination of claim 18 in further combination with a locater system wherein said locater system comprises a plurality of predeterminedly located locater transmitters, with each locater transmitter transmitting to a proximate paging device a signal corresponding to the telephone number of a nearby phone, and wherein said control means controls said radio frequency transmitter to transmit a signal related to said telephone number signal to said control system to revise said control system

memory means, whereby the control system will automatically forward incoming calls to a telephone near said user.

21. The combination of claim 20 wherein: each locater transmitter transmits an ultrasonic signal; and wherein: each paging device includes an ultrasonic receiver for receiving said ultrasonic signal.

22. The combination of claim 21 wherein each locater transmitter transmits an ultrasonic signal of approximately 40 kiloHertz modulated by said locater signal at a rate of approximately 75 baud.

23. The control system of claim 18 wherein each paging device includes a keypad for entry of commands by the user.

24. The control system of any one of claims 1 through 23 wherein a command from said user is entered via the user's telephone keypad.

25. The control system of any one of claims 1 through 23 wherein a command from said user is entered via a user voice command.

26. The control system of claim 1 wherein the electronic processing means further comprises means for: identifying a call to said system from a specific user requesting the present mode by which the system processes incoming calls directed to said specific user, recalling from said memory means the current mode by which the system processes incoming calls directed to said specific user, recalling from said memory means a courtesy message which indicates said current mode and informs the user as to how to enter a mode command to change said mode, transmitting said courtesy message to said user, and responding to said user transmitting a specific mode command to appropriately change the mode by which the system processes subsequent incoming calls directed to said user.

27. The control system of claim 26 wherein said user mode commands are entered via the user's telephone keypad.

28. The control system of claim 26 wherein said user mode commands are entered via voice commands from said user.

29. The control system of claim 1 including a schedule mode wherein said electronic processing means further comprises means for: responding to said user

transmitting a sequence of schedule command modes and corresponding times for each such command mode to appropriately automatically change to the commanded modes at the commanded times.

30. The control system of claim 1 including a timer mode wherein said electronic processing means further comprises means for: responding to said user entering a timer command mode and a corresponding time interval command to appropriately change to the commanded mode for said commanded interval, thereafter reverting to a predetermined default mode.

31. The control system of claim 1 wherein said telephone exchange provides an automatic number identification of a caller (ANI) to said control system, and wherein the electronic processing means further comprises means for: identifying a call to said system by a user; and utilizing said ANI as said user's memory means stored forwarding number, whereby the user can update his forwarding number without manually entering the number of the telephone at his present location.

32. The control system of claim 31 wherein calls to said system are made by dialing a sequence which includes digits to identify one of a plurality of call processing modes and wherein the electronic processing means further comprises means for: identifying a call to said system by a specific user by matching the ANI with a memory means stored number for said user and processing said digits as a specific mode command control signal from said user.

33. The control system of claim 32 wherein said user's telephone station includes a telephone exchange provided speed calling service wherein multi-digit numbers can be recalled and dialed by the user entering a limited digit code, and wherein a sequence of said speed calling numbers are programmed as said specific mode command control signals, whereby a user can change the system mode control for processing his calls by entering the appropriate limited digit code.

34. The control system of claim 1 wherein said electronic processing means further includes means for: identifying a message center control signal from said caller and, regardless of the user's present call processing mode, permitting said caller to access the user's provided message center memory and store a message for

later access by the user.

35. The control system of claim 1 wherein said electronic processing means further includes means in implementing step c) for:upon implementing a call to said forwarding number, identifying if the user's number is busy or not answered and, in such event, disposing of said call in a predetermined manner.

36. The control system of claim 1 wherein said electronic processing means further includes means in implementing step c) for: upon implementing a call to said forwarding number, initiating a predetermined time-out interval, identifying the condition of the user's line not being busy or not ringing within said time-out interval to thereby implement step d), or identifying the condition of the user's phone ringing within said time-out interval to allow the user's phone to ring for a predetermined sequence and, if the user does not answer within said sequence, terminating the attempt to forward the call or identifying the condition of the user's phone being busy within said time-out interval to thereby terminate the attempt to forward the call.

37. The control system of claim 36 wherein the duration of said time-out interval is predeterminedly a function of whether the call from the caller is detected as local or long distance.

38. The control system of claim 36 wherein the electronic processing means further comprises means responsive to terminating the attempt to forward the call to recall from said memory means a courtesy message indicating that the caller can leave a message, transmitting said message to the caller, recording a message sent by the caller and allowing the user to call the system and access such message.

39. The control system of claim 1 wherein the electronic processing means further comprises means in implementing step for: identifying a command from said user requesting a desired call processing mode and responding to a predetermined help command from said user to recall from said memory means a courtesy message related to said specific call processing mode and transmitting said courtesy message to said user.

40. The control system of claim 1 wherein the electronic processing means further comprises means for: identifying a predetermined client service command

transmitted by said user and, responsive thereto, connecting said user to a client service operator.

41. The control system of claim 1 wherein the electronic processing means further comprises means following step e) for: identifying a command from said user indicating that the user desires to place a call to a predetermined number, calling said number, connecting said user to said called number while maintaining the user to system connection such that upon completion of said user's call the user is returned to the system to enter further commands.

42. The control system of claim 3 wherein the electronic processing means further comprises means for: upon said user calling the system and accessing a recorded message from a caller, identifying a command from said user indicating that the user desires to place a call to a predetermined number, calling said number, connecting the user to said called number while maintaining the user to system connection such that upon completion of said user's call the user is returned to his recorded messages in the system.

43. The control system of claim 1 wherein the electronic processing means step g) further comprises means for: implementing user call processing mode changes responsive to predetermined command sequences and further including user controls which, when transmitted, automatically implement said predetermined command sequences.

44. The control system of claim 1 wherein the electronic processing means further comprises means for: upon implementing call forwarding in accordance with steps b) through d), generating predetermined signals which to a caller indicate normal call processing operation but to a user indicate that the user can transmit his predetermined identification code to gain access to his system provided functions and, upon receipt of said predetermined identification code, terminating the call forwarding and transferring the user to the system's command mode.

45. The control system of claim 1 wherein the electronic processing means further comprises means for: upon implementing call forwarding in accordance with steps b) through d), recalling from said memory means a predetermined courtesy

message which directs the caller to ask for the called party by name upon completion of the call and transmitting said courtesy message to the caller.

46. The control system of claim 1 wherein the electronic processing means further comprises means for: upon implementing call forwarding in accordance with steps b) through d), recalling from said memory means a predetermined courtesy message which directs the caller to ask for the called party's extension upon completion of the call and transmitting said courtesy message to the caller.

47. The control system of either one of claims 45 or 46 wherein the particular courtesy message recalled from the memory means and transmitted to the caller is controllable by command from the user.

48. The control system of claim 1 wherein the electronic processing means further comprises means for: identifying a predetermined external message center command transmitted by said user and, responsive thereto, completing a call to a message center external of the control system and connecting the user to said external message center.

49. A control system for receiving and processing telephone calls from a caller to a user, the system comprising: detector means for detecting signals over a telephone line; signal generating means, responsive to control signals, for producing predetermined signals and transmitting said signals over a telephone line; memory means for controllably storing and recalling electronic signals; switching means for connecting a call on one line to another line; and central processing means for monitoring signals on a telephone line, accessing said memory means and controlling said signal generator means and switching means, said central processing means including means for:

a) identifying a call to said system directed to a user,

b) recalling from said memory means a user controlled call processing signal corresponding to a user selected one of a plurality of call processing modes and, responsive to said user controlled call processing signal dictating a voice-screen mode, proceeding by

c) recalling from said memory means a predetermined identification message

requesting caller identification information,

d) controlling said signal generating means to send said identification message to said caller,

e) storing in said memory means the caller's response to said identification message,

f) recalling the user's number from said memory means and controlling said signal generating means to call said user,

g) recalling from said memory means the caller's response and sending said response to said user, and

h) responding to a control command from said user to dispose of the call from the caller in a selected one of a plurality of options.

50. The control system of claim 49 wherein the central processing means further includes means for:

h) i) responding to a first control command from said user to connect said caller to said user.

51. The control system of claim 50 wherein the central processing means further includes means for:

h) ii) responding to an alternate control command from said user to recall a predetermined message from said memory means and send said message to said caller.

52. The control system of claim 50 wherein the central processing means further includes means for:

h) ii) responding to a second control command from said user to recall a terminating message from said memory means, send said terminating message to said caller and terminate the connection to said caller.

53. The control system of claim 50 wherein the central processing means further includes means for:

h) ii) responding to a second control command from said user to recall a leave-a-message signal, sending said leave-a-message signal to said caller and storing the caller's message in said memory means.

54. The control system of claim 50 wherein the central processing means further includes means for:

h) ii) responding to a second control command from said user to recall a predetermined phone number from said memory means, call said number and connect said user to said predetermined number.

55. The control system of claim 49 wherein the central processing means further includes means for:

a) i) recognizing a predetermined signal transmitted by the caller and, responsive thereto, immediately proceeding with step f) to call said user and then connect said caller to said user.

56. A control system for receiving and processing telephone calls from a caller to a user, the system comprising: detector means for detecting signals over a telephone line; signal generating means, responsive to control signals, for producing predetermined signals and transmitting said signals over a telephone line; memory means for controllably storing and recalling electronic signals; switching means for connecting a call on one line to another line; and electronic processing means for monitoring signals on a telephone line as detected by said detection means, accessing said memory means and producing and applying predetermined control signals to said signal generating means and switching means, said central processing means including means for:

a) identifying a call to said system directed to a user,

b) recalling from said memory means a predetermined paging system control procedure for paging said user,

c) causing said signal generating means to control said paging system to page said user with an indication that the user has a call waiting,

d) identifying a call to said system from said user,

e) in the event said caller has waited on the line, connecting the caller to the user, and

f) in the event the caller has not waited on the line, so notifying the user by recalling a predetermined message from said memory means and causing said signal

generating means to transmit said message to said user.

57. The control system of claim 56 wherein the electronic processing means further includes means for: recalling from said memory means a courtesy message notifying the caller that the system must page the user and allowing the user the option of recording a message in said memory means, transmitting said courtesy message to said caller and, responsive to said caller implementing the message option, recording said message in said memory means and allowing the user to access said message after responding to the page.

58. A paging system wherein each user carries a paging device adapted to receive radio frequency broadcast signals from a central paging system, with a unique identification code assigned to each paging device, characterized by:

a plurality of predeterminedly located ultrasonic transmitters, each transmitter transmitting and information signal; and

each paging device including:

an ultrasonic receiver for receiving the signal from a proximate ultrasonic transmitter, and

a radio frequency transmitter for transmitting to the central paging system a signal corresponding to the paging device received ultrasonic signal and the paging device assigned identification code,

whereby the paging system is provided with related information for each paging device.

59. The paging system of claim 58 wherein: said information signal is the phone number of a proximately located telephone, and said paging device radio frequency transmitter transmits said phone number related signal to said central paging system, whereby the central paging system is provided with the phone number of a phone proximate to said user.

60. The paging system of claim 59 in combination with a control system, wherein the control system comprises: means for detecting a call from a caller to said control system directed to a user, and processing means for accessing said central paging system and causing said central paging system to transmit a control signal to

the paging device of said user, which control signal causes said paging device to transmit back to said central paging system the proximate phone number signal, and implementing a call to said proximate phone number.

61. The system of claim 60 further comprising: means for connecting the caller to said proximate phone number.

62. The system of claim 60 wherein: each paging device includes user controllable means for transmitting telephone call processing control signals to said control system, and wherein each control system includes means responsive to said control signals to process incoming calls to said user in accordance therewith.

63. The system of claim 62 wherein one telephone call processing control signal causes said control system to forward to the user only selected calls.

64. The system of claim 59 wherein each locater transmitter transmits an ultrasonic signal of approximately 40 kiloHertz modulated by said locater signal at a rate of approximately 75 band.

65. A control system connected to the telephone exchange wherein each user of the system is assigned a unique telephone number and said control system routes a call to a user controlled number, the control system comprising:

input/output means adapted for connection to telephone exchange lines to input and output telephone calls;

switching control means for controllably connecting a call on one line to a different line;

memory means for controllably storing and recalling electronic signals; and

electronic processing means for accessing said memory means, switching control means and input/output means to direct the flow of input and output calls, said electronic processing means including means for responding to an incoming call to a specific user to recall from said memory means a courtesy message indicating to the caller that his call could be branched to any of a plurality of options responsive to the caller transmitting an appropriate command corresponding to the desired branch, transmitting said courtesy message to said caller and, responsive to the caller transmitting said implementing the commanded option.

66. A paging system wherein each user carries a paging device adapted to receive radio frequency signals broadcast from a central paging system with a unique identification code assigned to each paging device, and characterized in that:

each paging device includes:

a radio frequency transmitter, and controller means for controlling said radio frequency transmitter, said controller means operable in at least two distinct user selectable modes, the first such mode being responsive to receiving a signal broadcast by the central paging system and responding by transmitting predetermined data back to said central paging system.

67. The system of claim 66 wherein said controller means comprises a keypad and associated electronics allowing a user to manually enter data.

68. The system of claim 66 in combination with a locater system comprising a plurality of predeterminedly located locater transmitters with each locater transmitter transmitting a unique locater signal including locating information, and wherein said controller means includes means for receiving the signal from a proximate locater transmitter and controlling said radio frequency transmitter to re-transmit said locating information to the central paging system.

69. The system of claim 68 wherein each locater transmitter locater signal corresponds to the number of a nearby telephone and wherein said controller controls said radio frequency transmitter to transmit said telephone number related signal to said central paging system.

70. The system of claim 68 in combination with a telephone control system for predeterminedly controlling incoming calls to a user in a selected one of at least two distinct modes responsive to a mode control signal wherein a locater transmitter transmits a predetermined mode signal and wherein said paging device transmits a signal responsive to said mode control signal through said paging system to said telephone control system to control the mode thereof.

71. A control system for receiving and processing telephone calls from a caller to a user, the system comprising: detector means for detecting signals over a telephone line; signal generating means, responsive to control signals, for producing

predetermined signals and transmitting said signals over a telephone line; memory means for controllably storing and recalling electronic signals; switching means for connecting a call on one line to another line; and central processing means for monitoring signals on a telephone line, accessing said memory means and controlling said signal generator means and switching means, said central processing means including means for:

a) identifying a call to said system directed to a user,

b) recognizing a predetermined signal transmitted by the caller and, responsive thereto, immediately proceeding with step g) to call said user, otherwise proceeding to step c);

c) recalling from said memory means a user controlled call processing signal corresponding to a call processing mode and, responsive to said user controlled call processing signal dictating a voice-screen mode, proceeding by

d) recalling from said memory means a predetermined identification message requesting caller identification information,

e) controlling said signal generating means to send said identification message to said caller,

f) storing in said memory means the caller's response to said identification message,

g) recalling the user's number from said memory means and controlling said signal generating means to call said user,

h) recalling from said memory means the caller's response and sending said response to said user, and

i) responding to a control command from said user to dispose of the call from the caller in a selected one of a plurality of options.

72. The control system of claim 71 wherein the central processing means further includes means for:

i) i) responding to a first control command from said user to connect said caller to said user.

73. The control system of claim 72 wherein the central processing means

further includes means for:

i) ii) responding to an alternate control command from said user to recall a predetermined message from said memory means and send said message to said caller.

74. The control system of claim 73 wherein the central processing means further includes means for:

i) ii) a) responding to a second control command from said user to recall a terminating message from said memory means, send said terminating message to said caller and terminate the connection to said caller.

75. The control system of claim 74 wherein the central processing means further includes means for:

i) ii) b) responding to a third control command from said user to recall a leave-a-message signal, sending said leave-a-message signal to said caller and storing the caller's message in said memory means.

76. The control system of claim 75 wherein the central processing means further includes means for:

i) ii) c) responding to a fourth control command from said user to recall a predetermined phone number from said memory means, call said number and connect said user to said predetermined number.

77. The combination of claim 18 in further combination with a locater system wherein said locater system comprises a plurality of predeterminedly located locater transmitters, with each locater transmitter transmitting to a proximate paging device a signal corresponding to a call processing mode, and wherein said control means controls said radio frequency transmitter to transmit a signal related to said call processing mode to said control system to revise said control system memory means, whereby the control system will automatically change a user's call processing mode.

78. The combination of claim 77 wherein: each locater transmitter transmits an ultrasonic signal; and wherein: each locater transmitter transmits an ultrasonic receiver for receiving said ultrasonic signal.

79. The combination of claim 78 wherein each locater transmitter transmits

an ultrasonic signal of approximately 40 kilohertz modulated by said locater signal at a rate of approximately 75 baud.

Fig. 1.

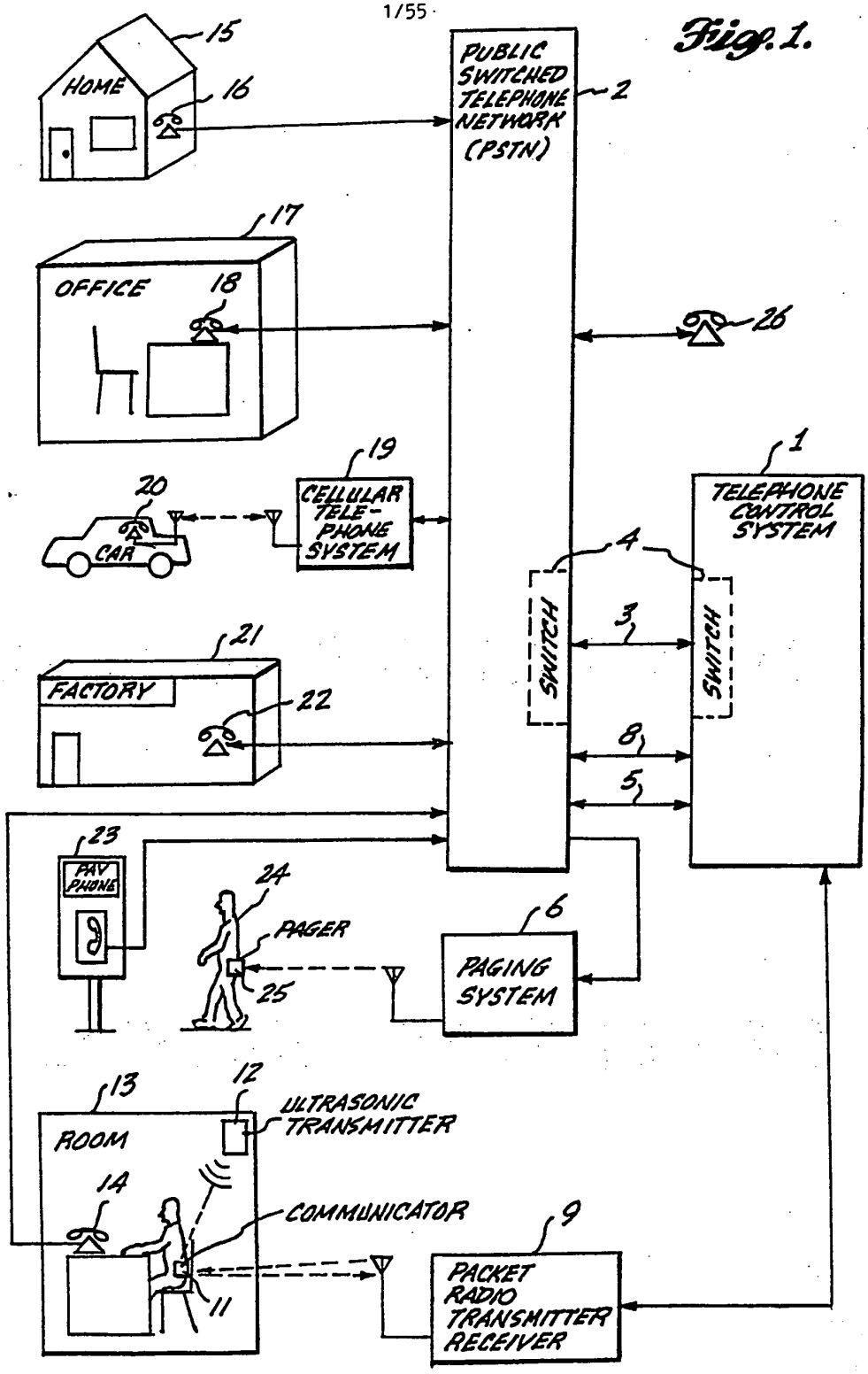


Fig. 2.

TELEPHONE CONTROL SYSTEM

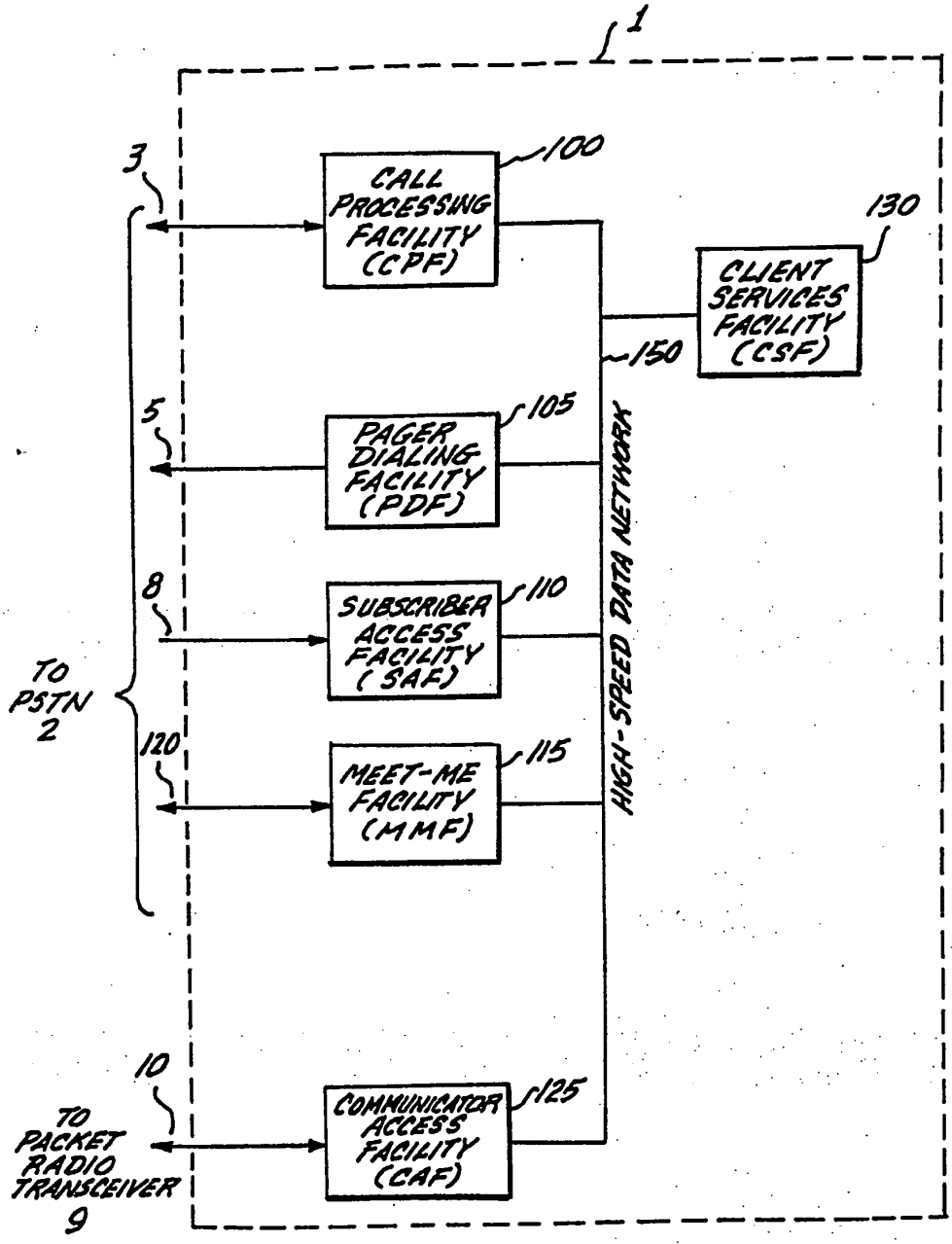


Fig. 3.

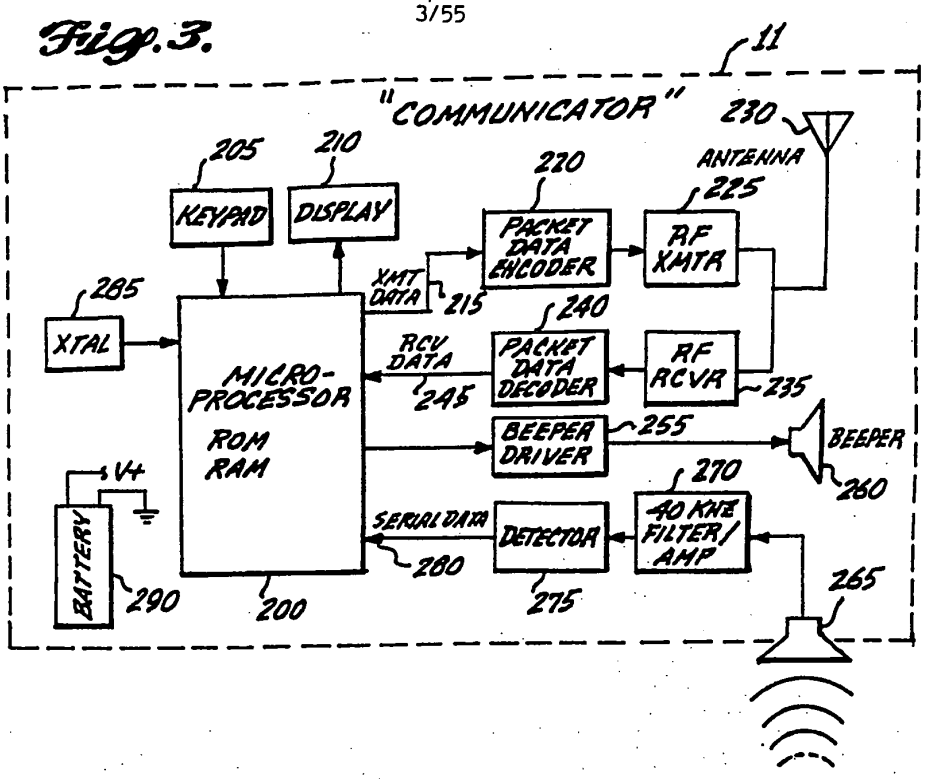
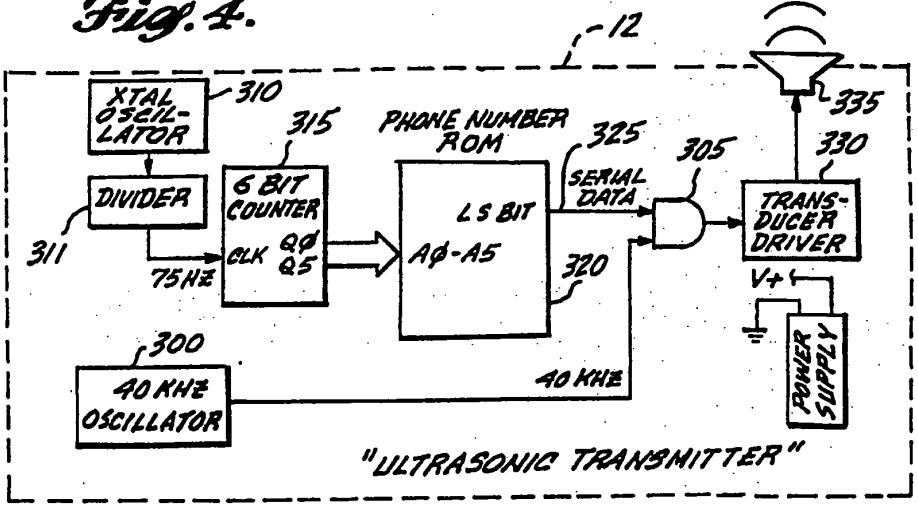


Fig. 4.



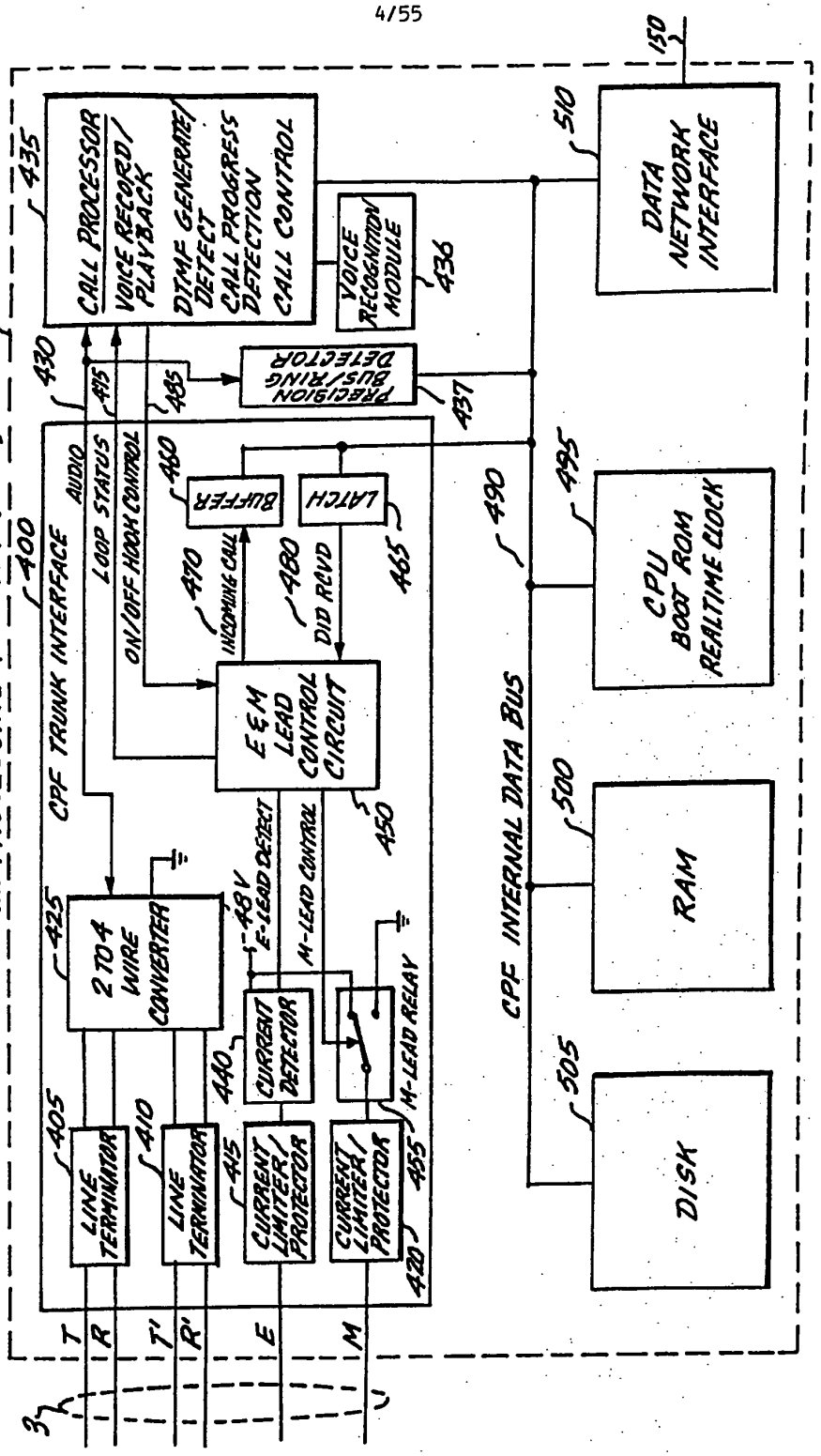


Fig. 5.

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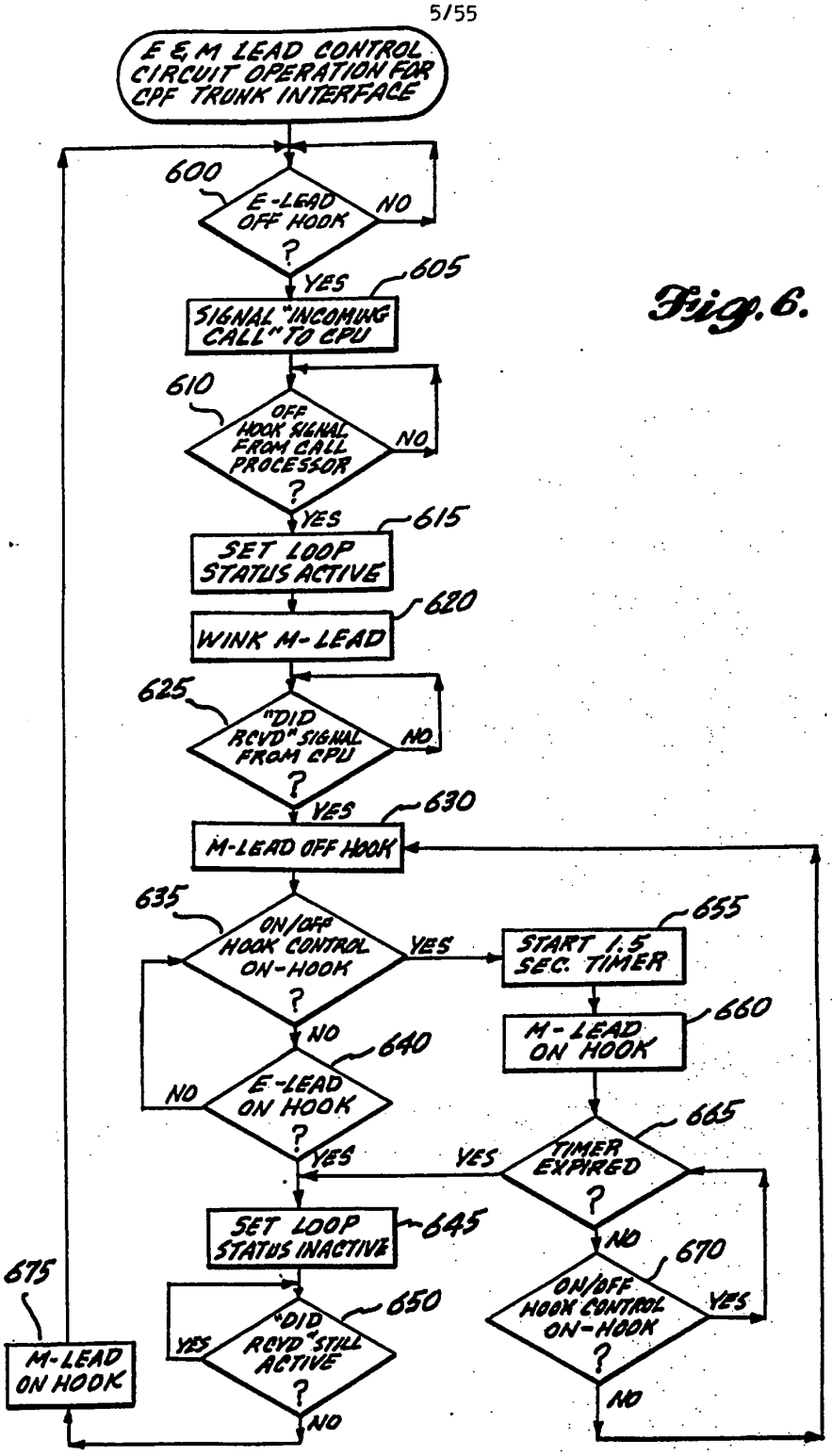


Fig. 6.

Fig. 7.

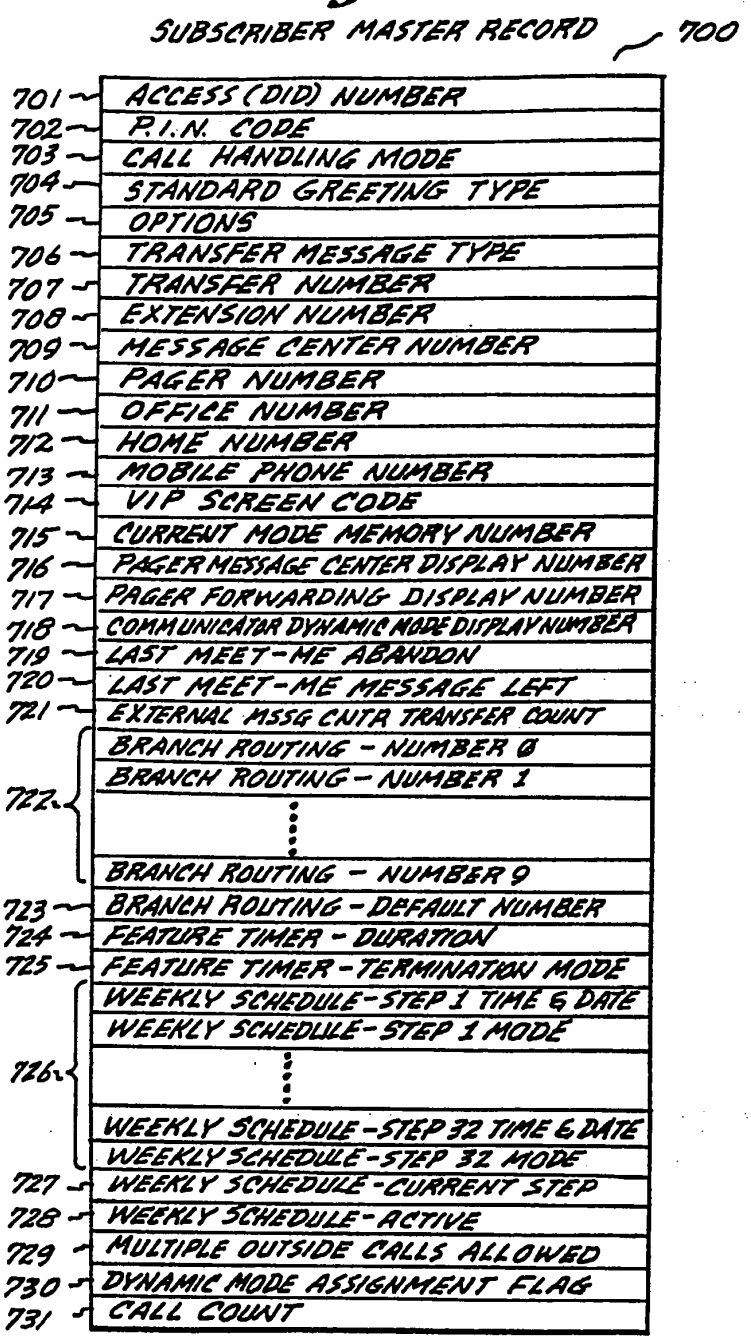
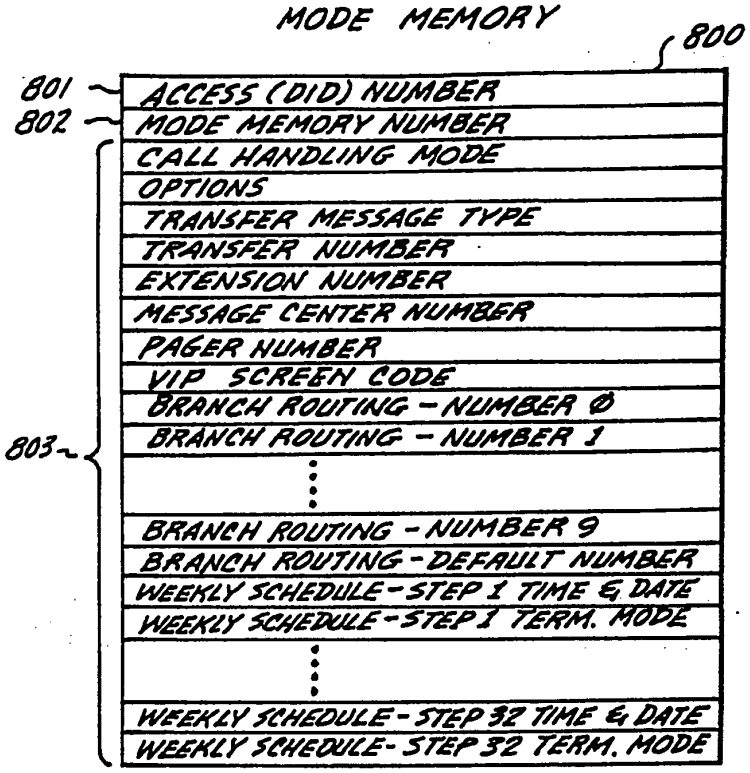


Fig. 8.



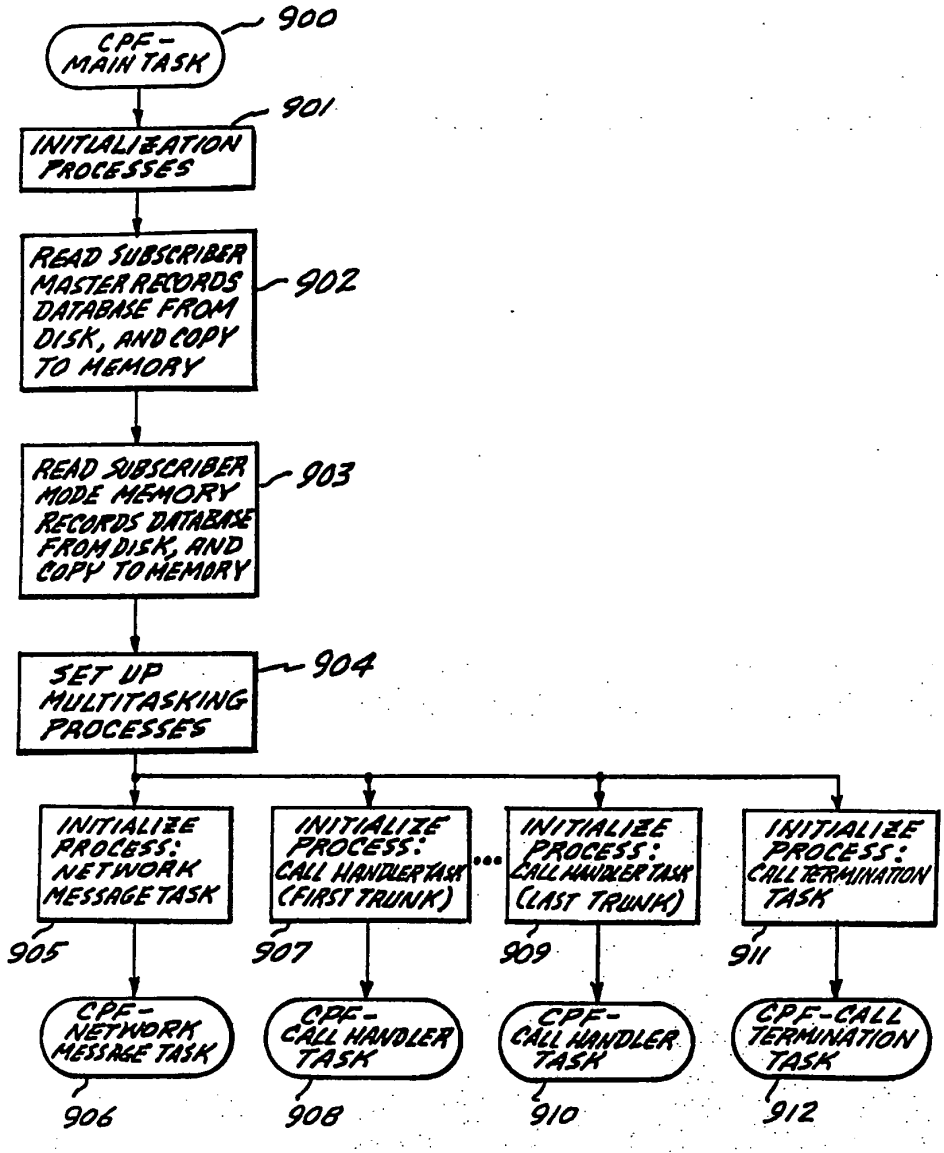
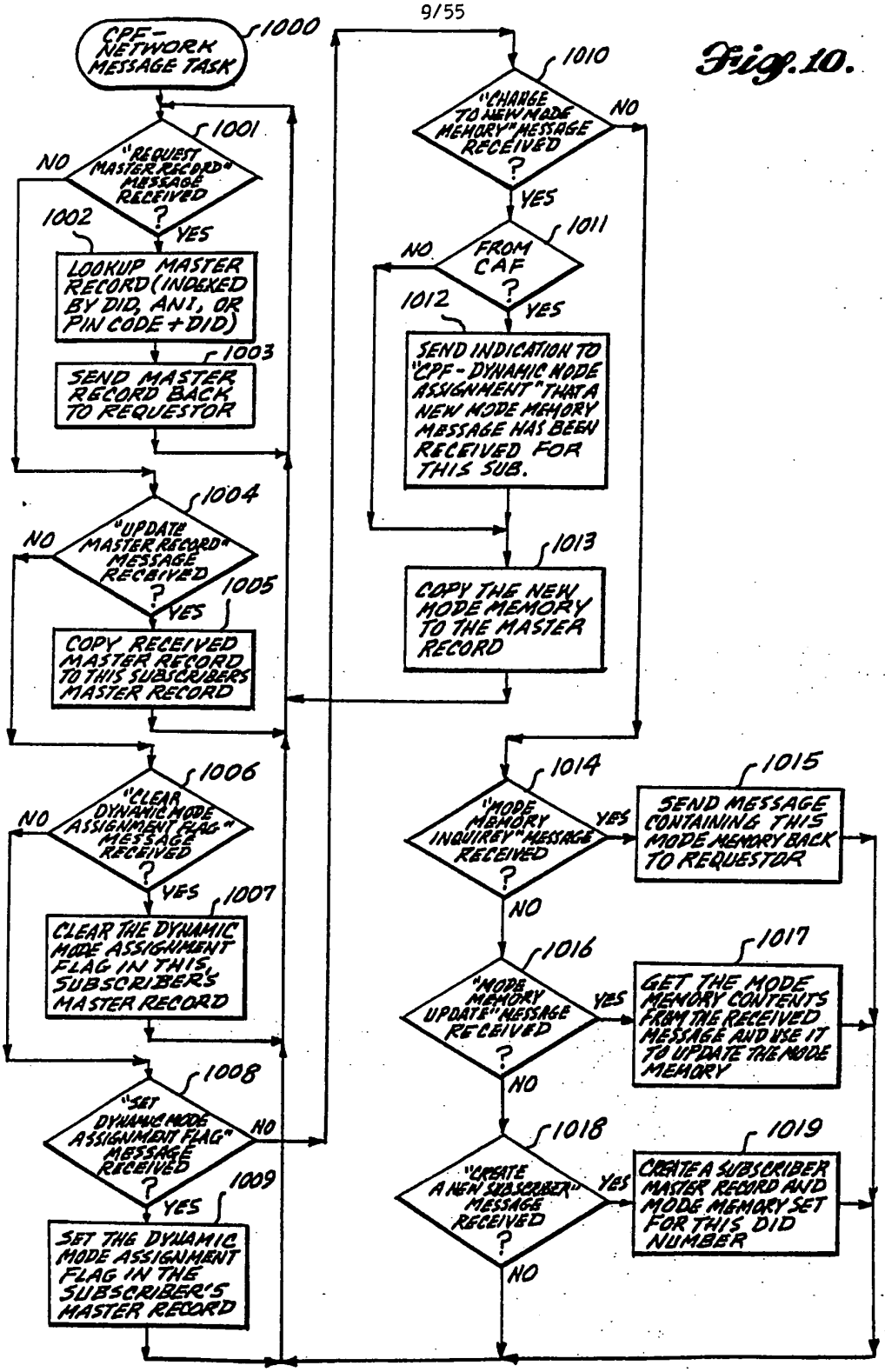


Fig. 9.

Fig. 10.



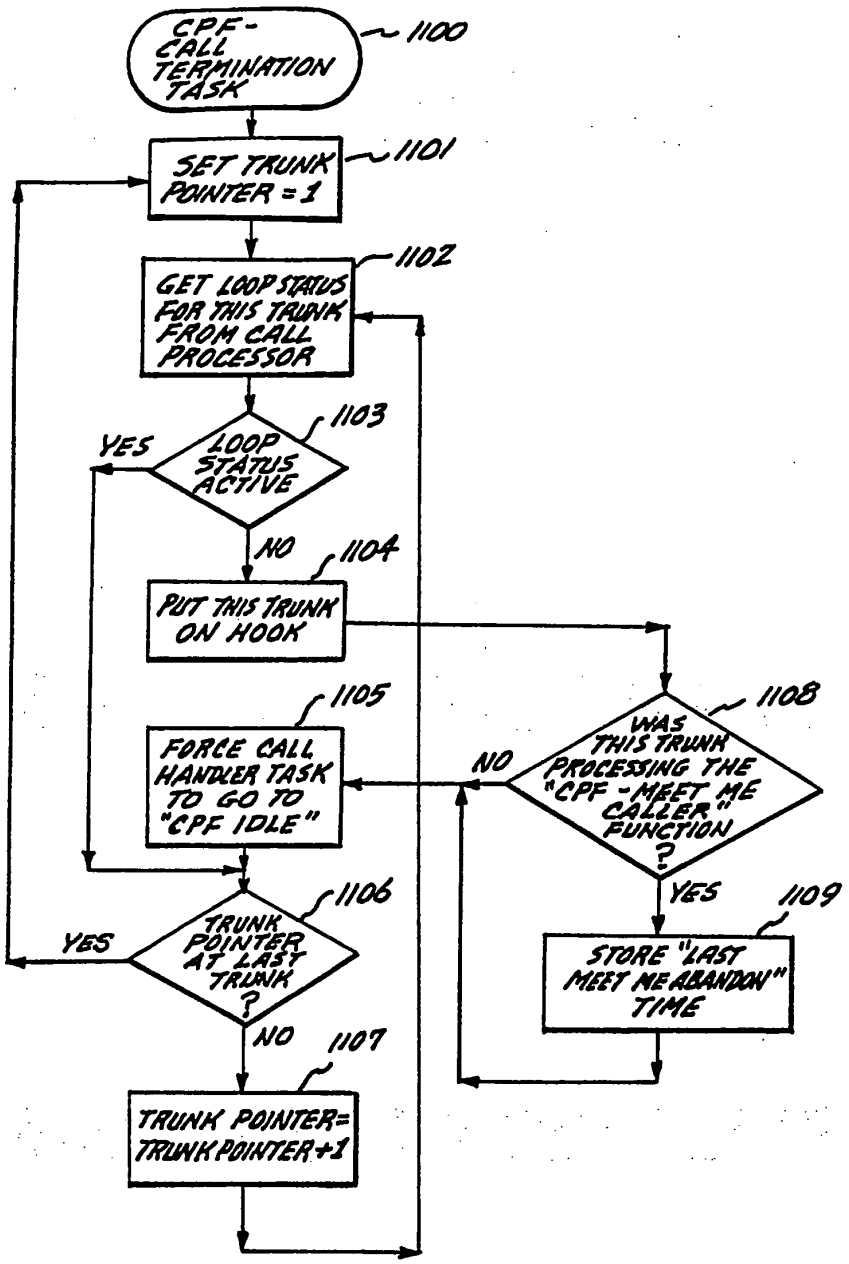


Fig. 11.

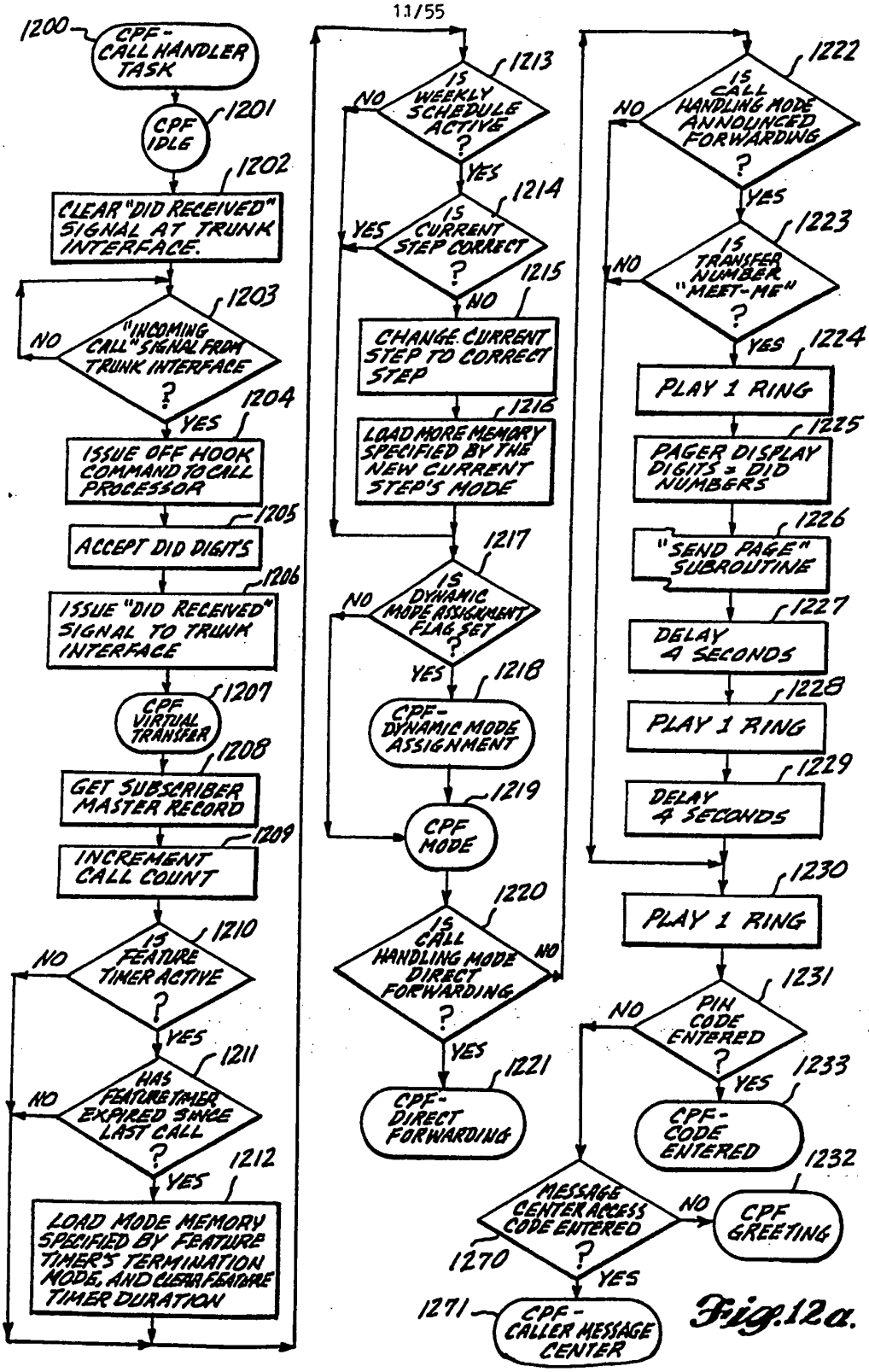


Fig. 12a.

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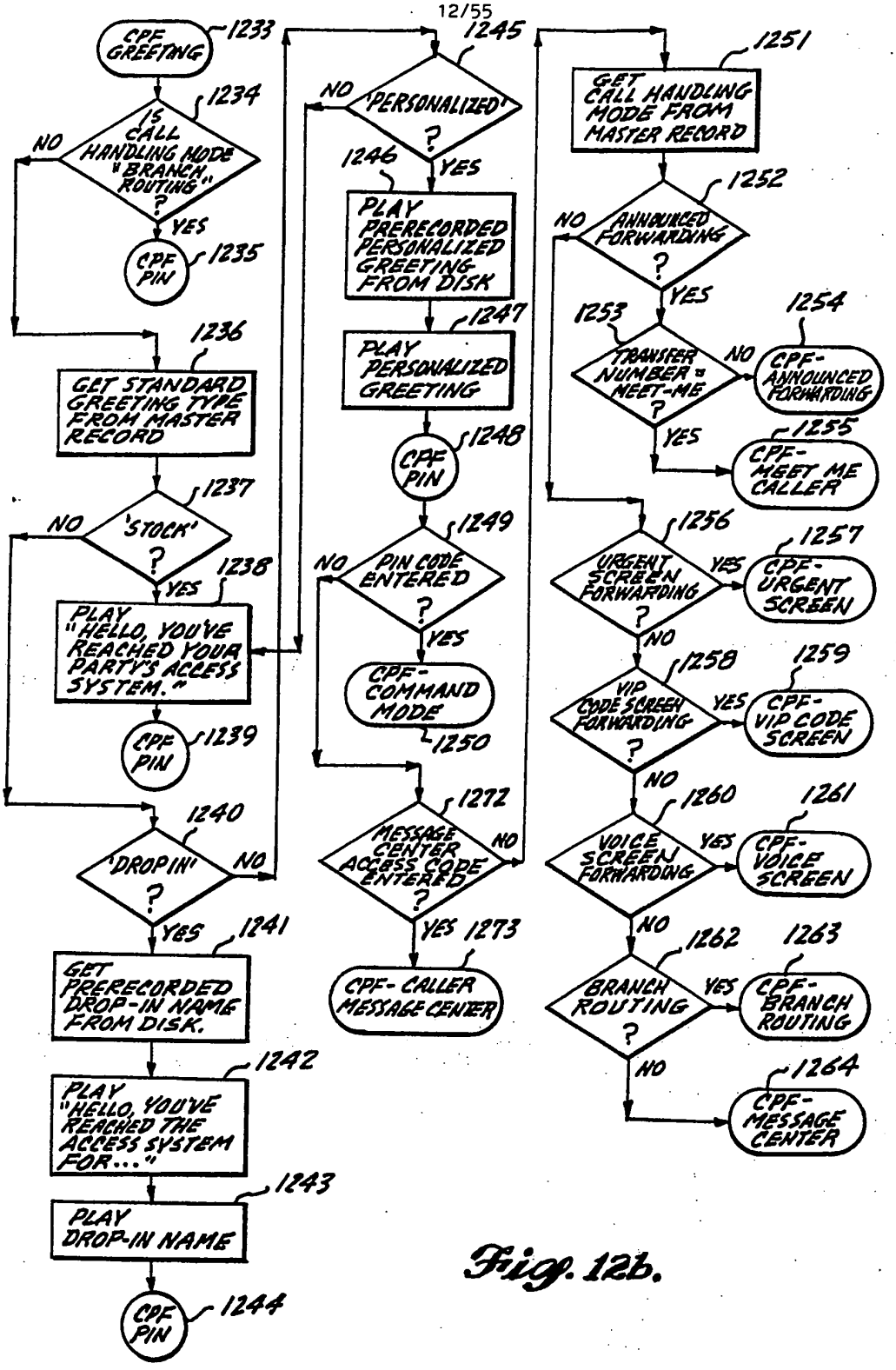

Fig. 12b.

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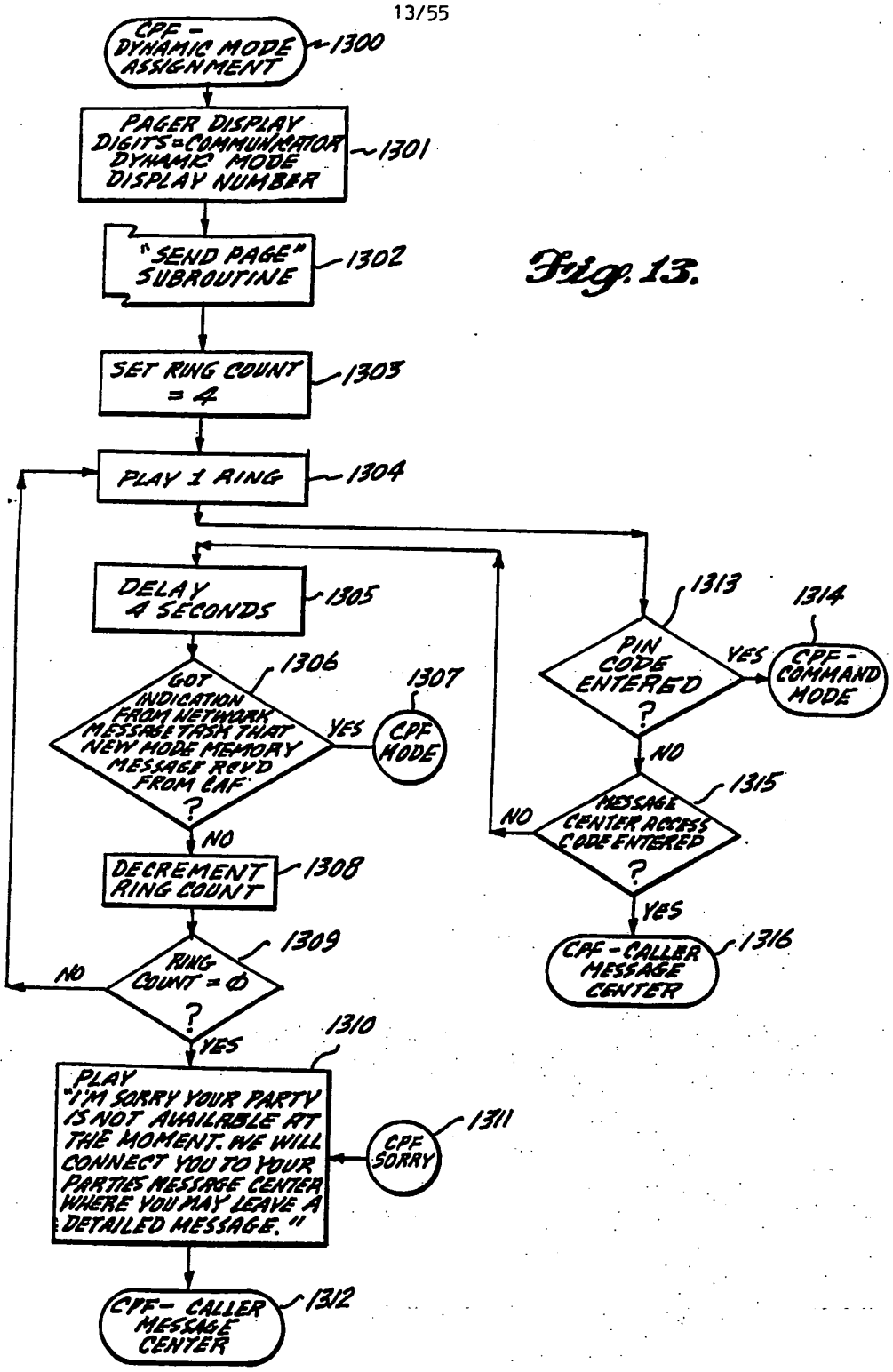


Fig. 13.

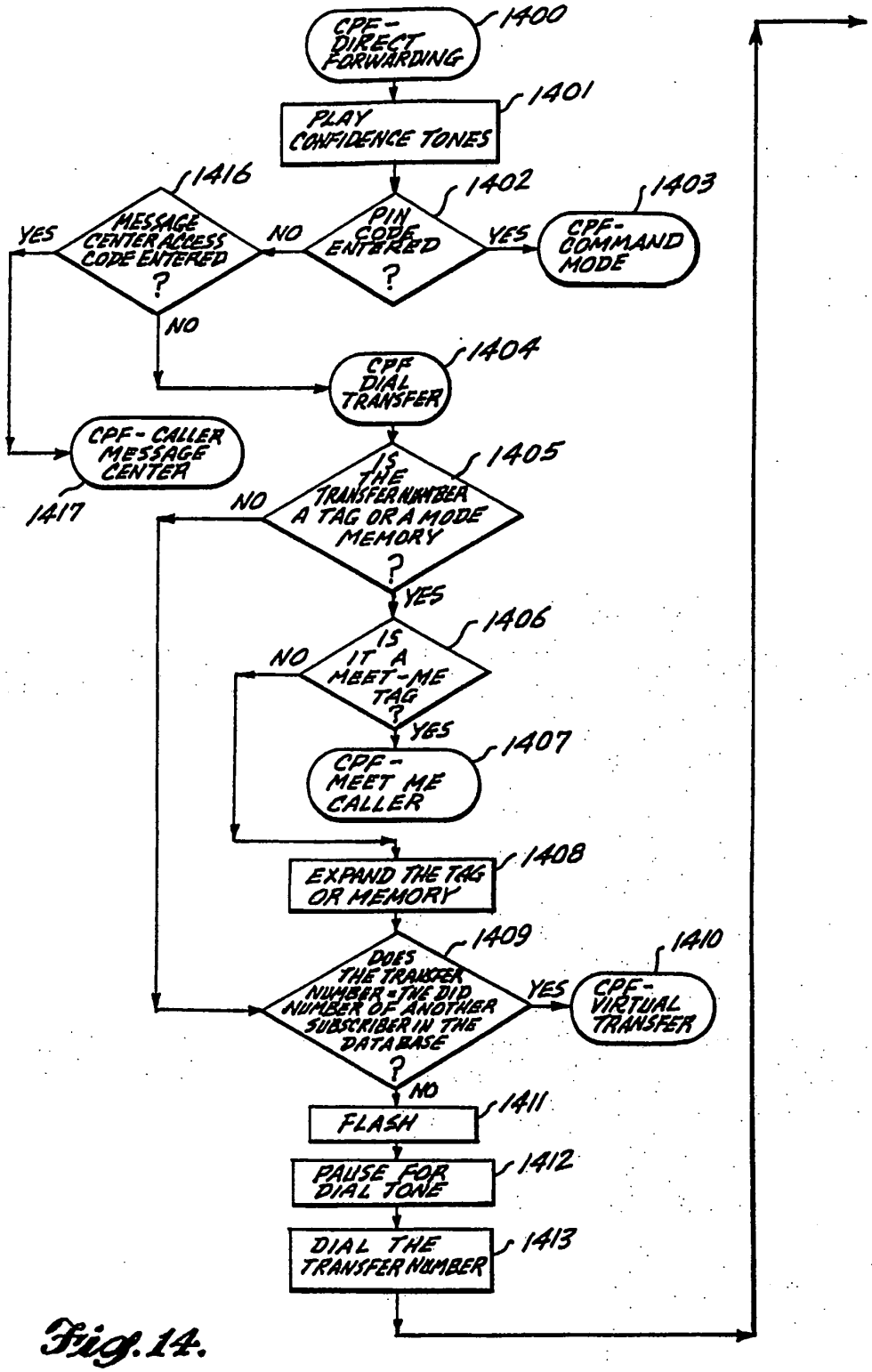
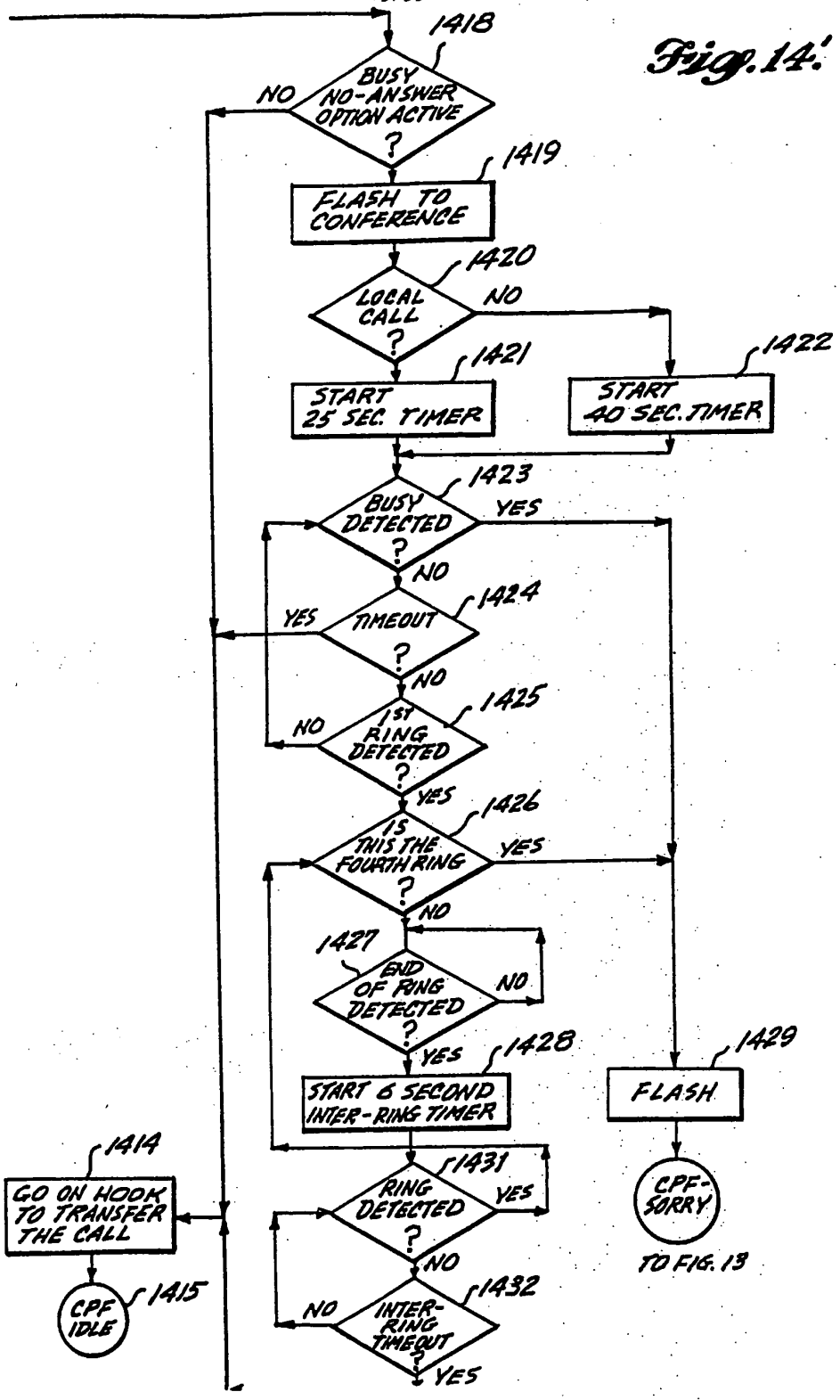


Fig. 14.

Fig. 14'



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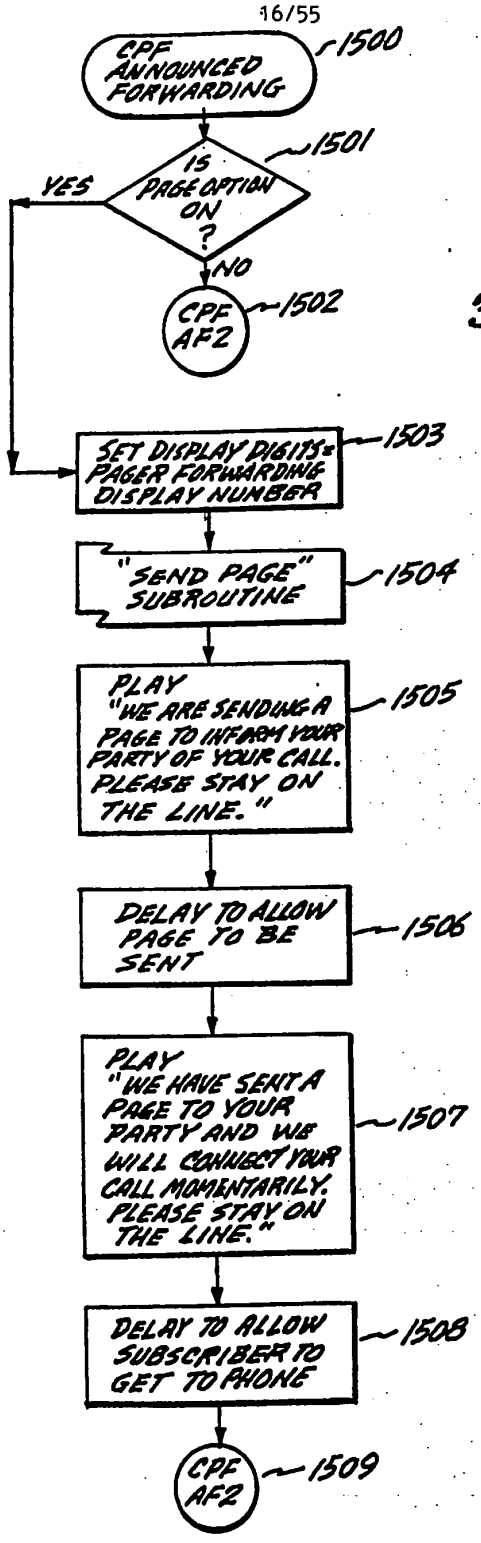

Fig. 15a.

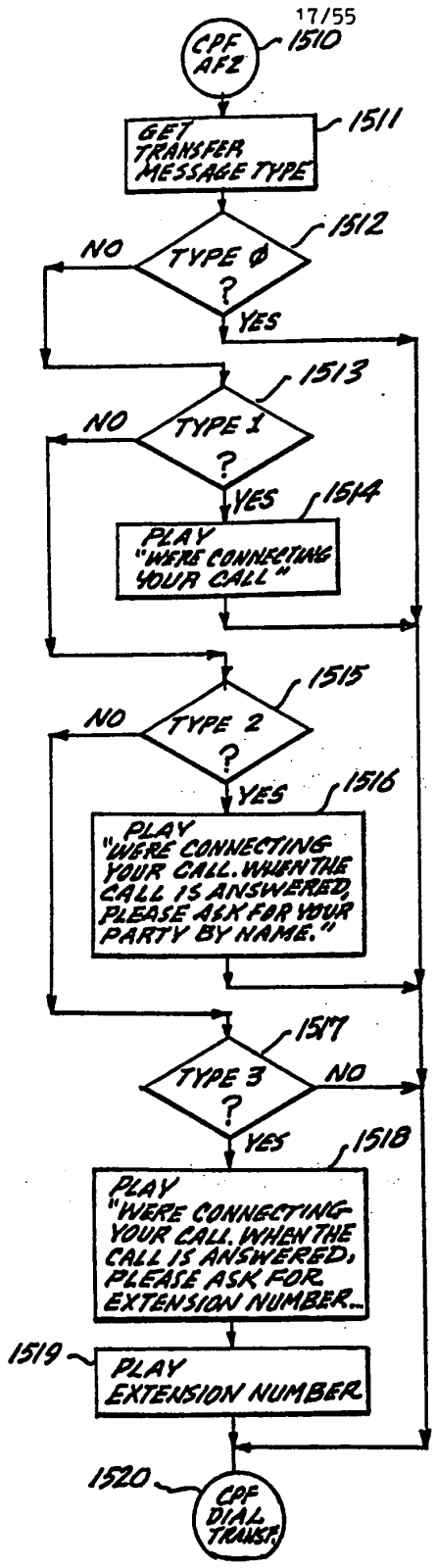

Fig. 15b.

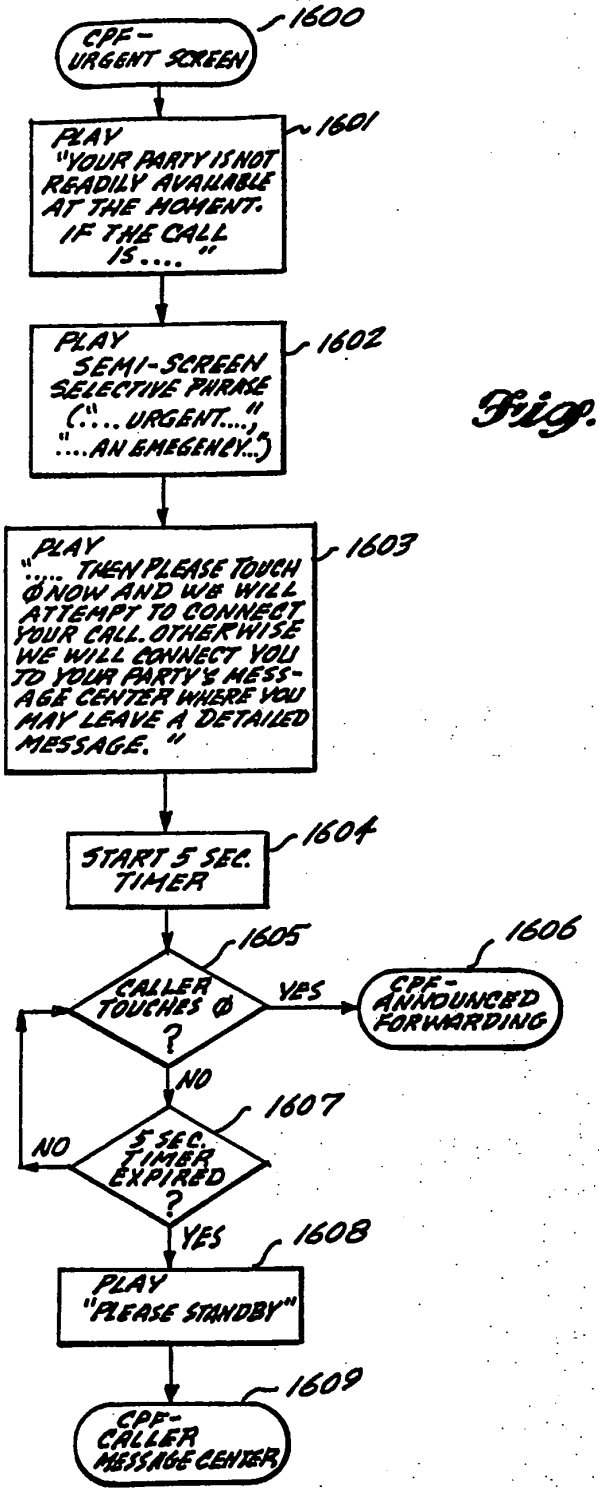

Fig. 16.

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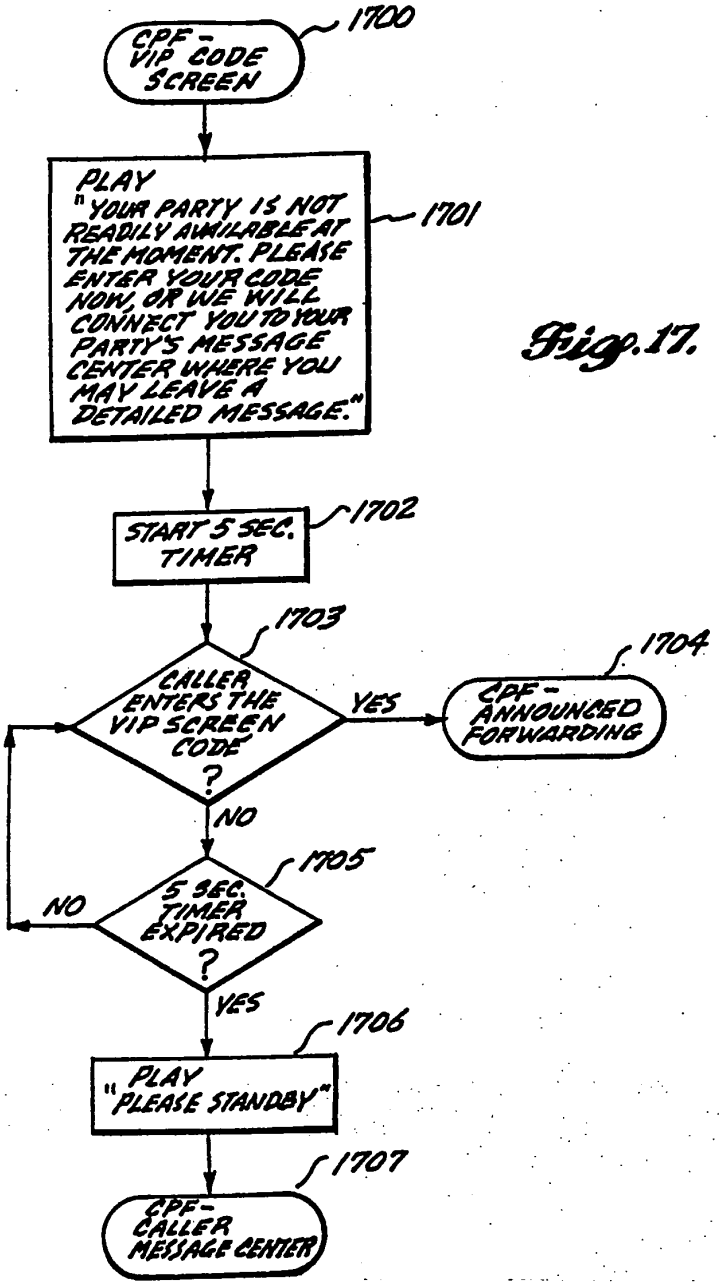

Fig. 17.

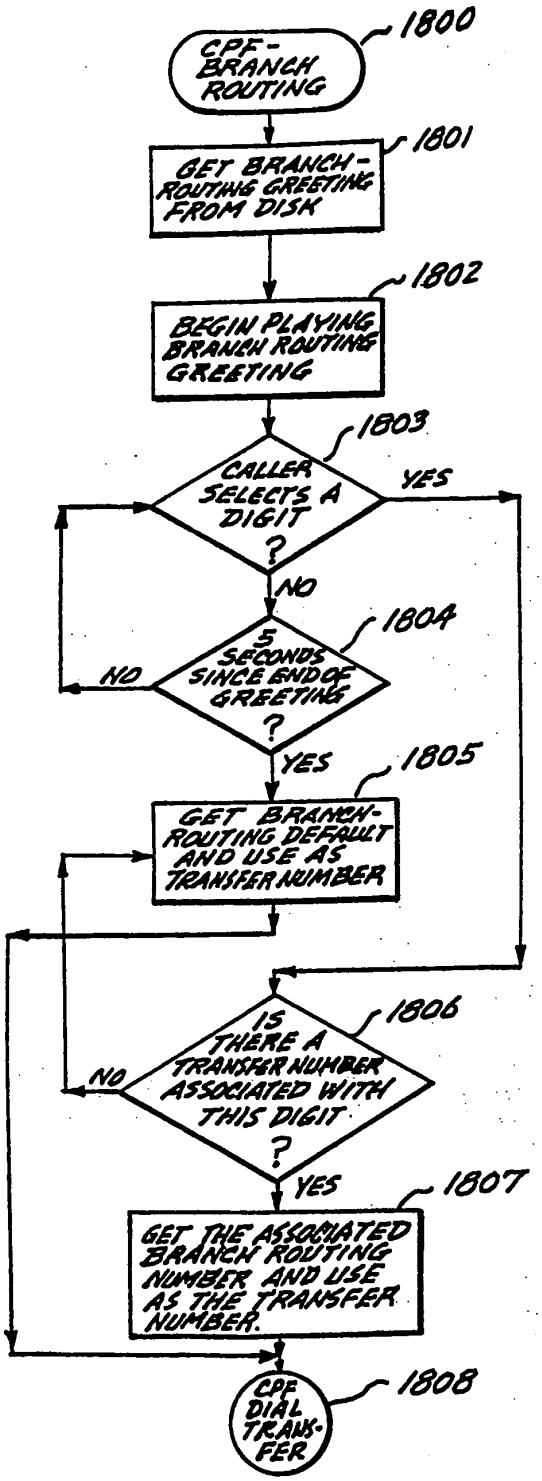

Fig. 18.

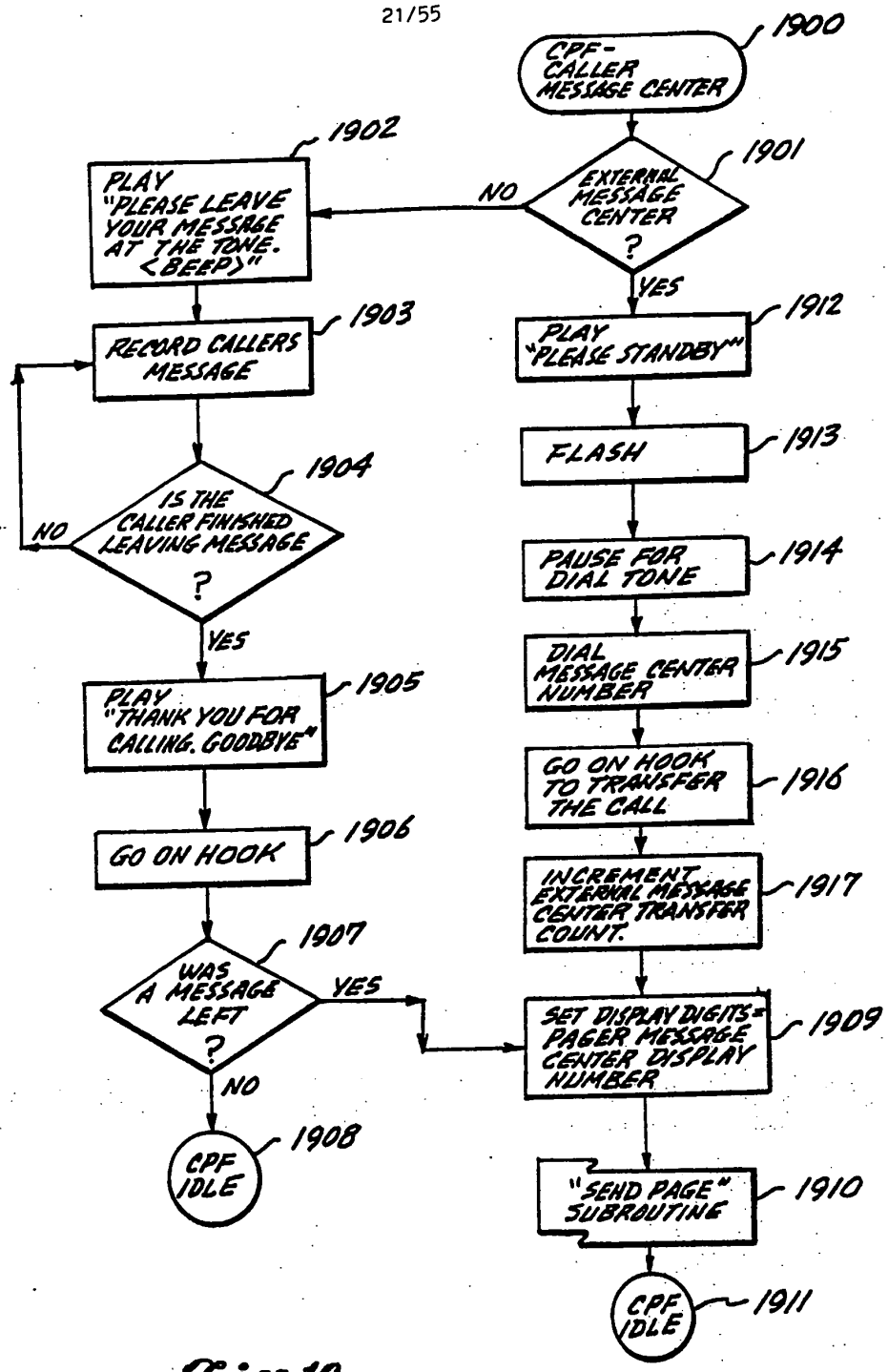

Fig. 19.

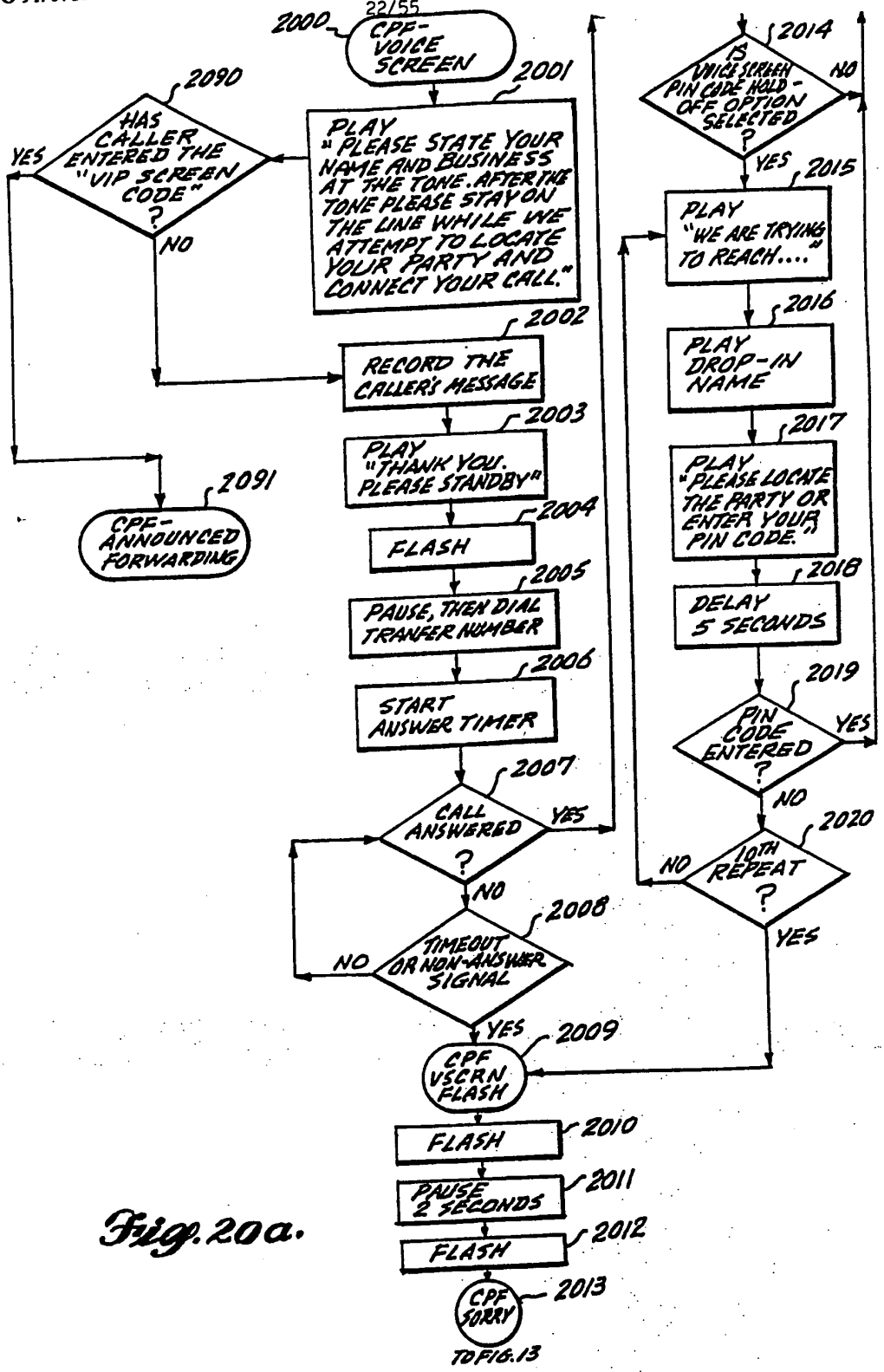

Fig. 20a.

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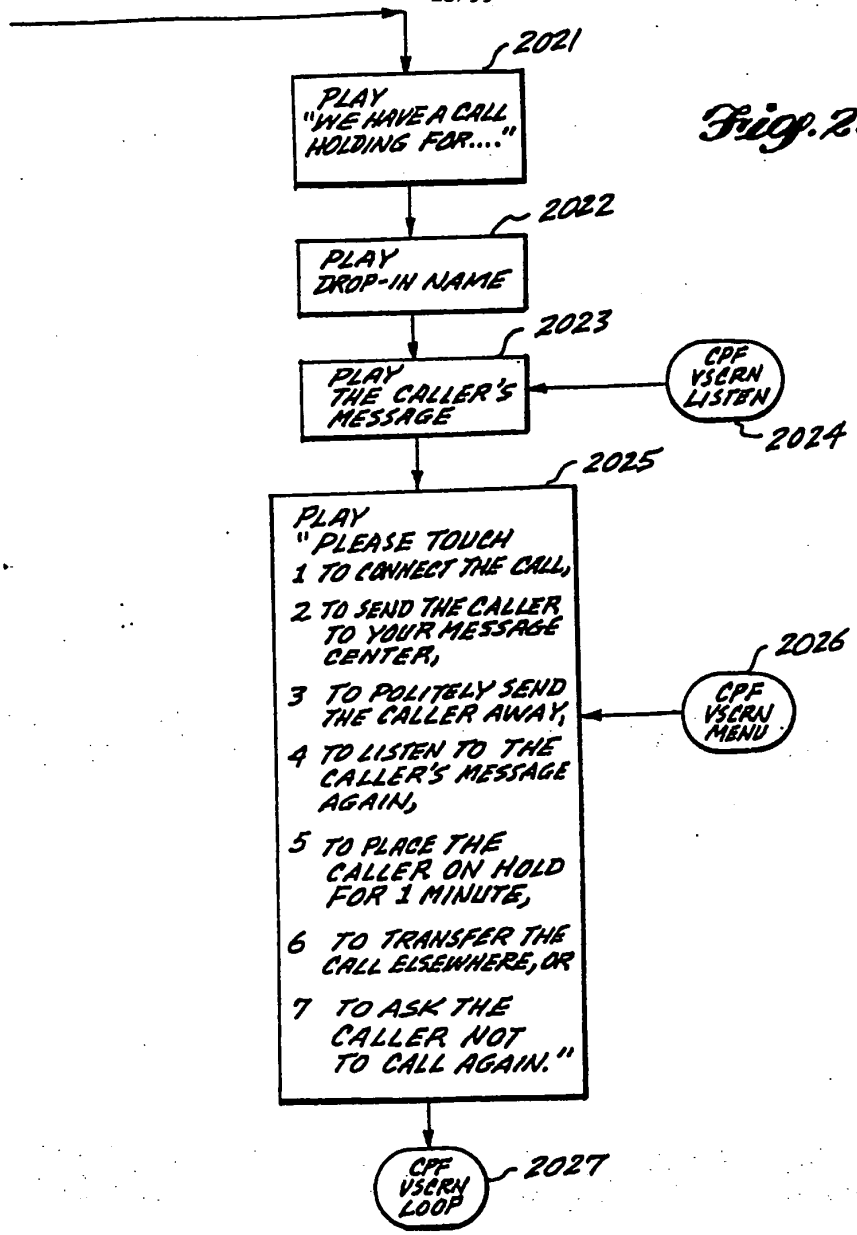

Fig. 20a'

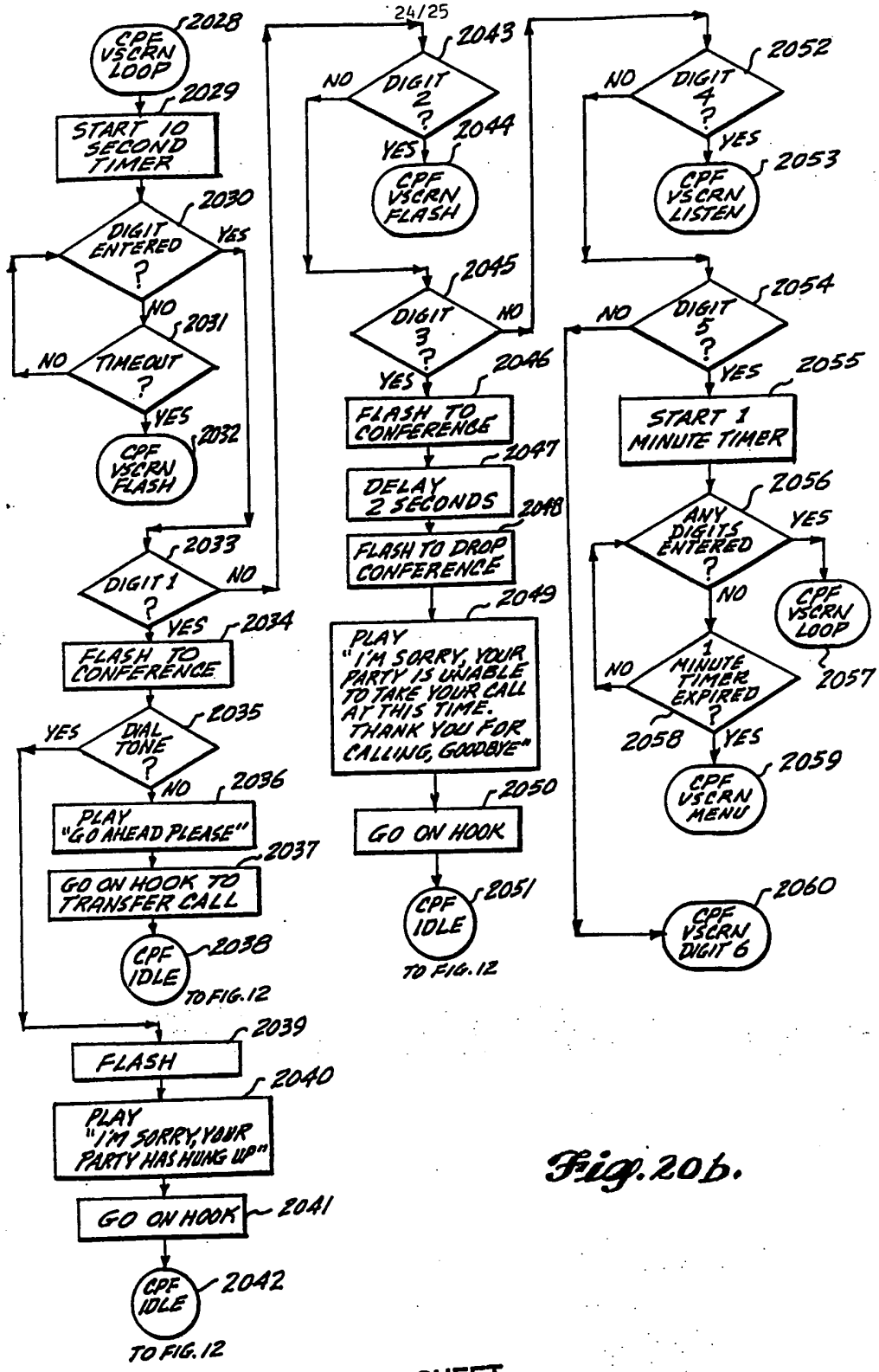

Fig. 20b.

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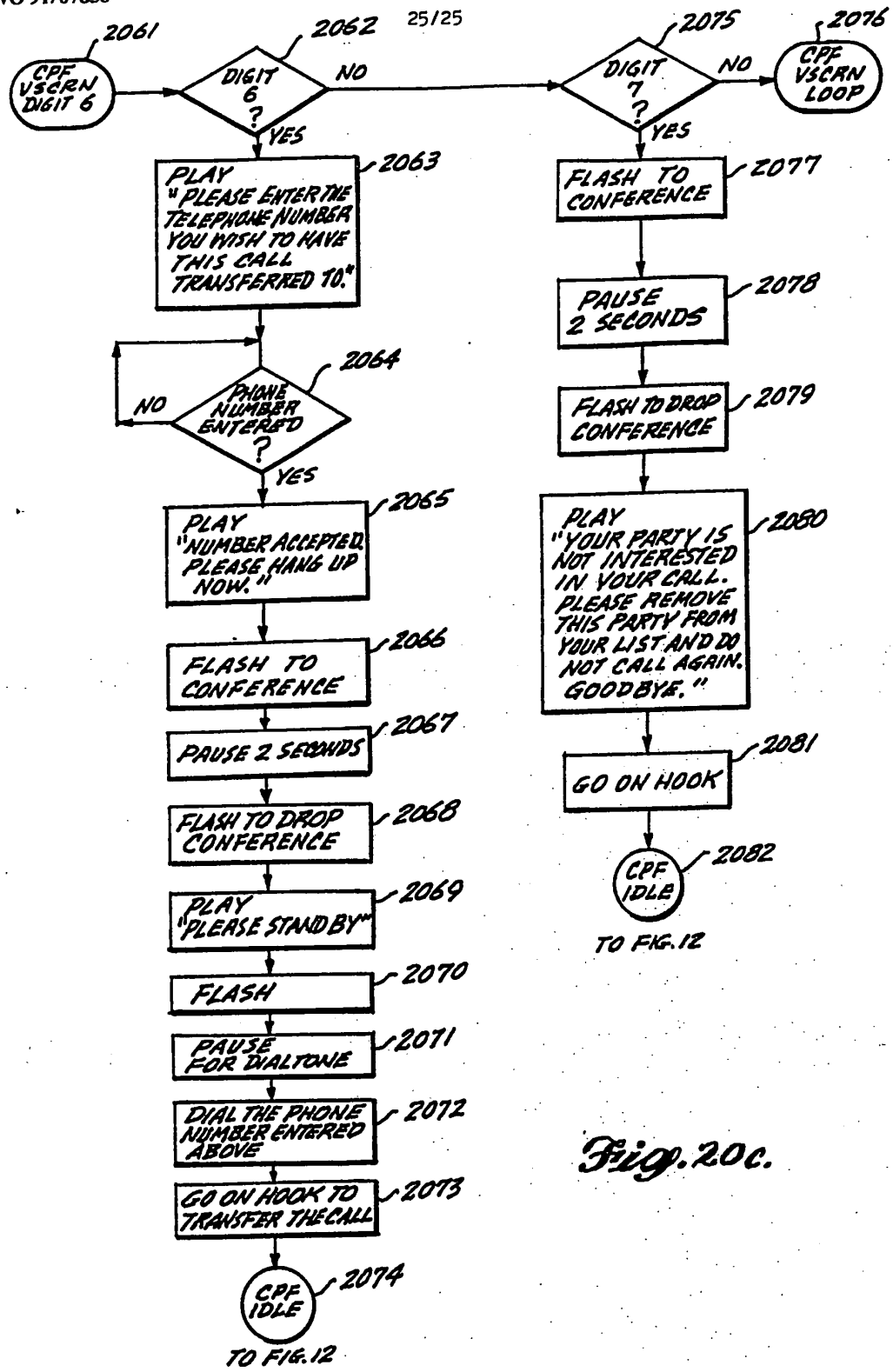

Fig. 20c.

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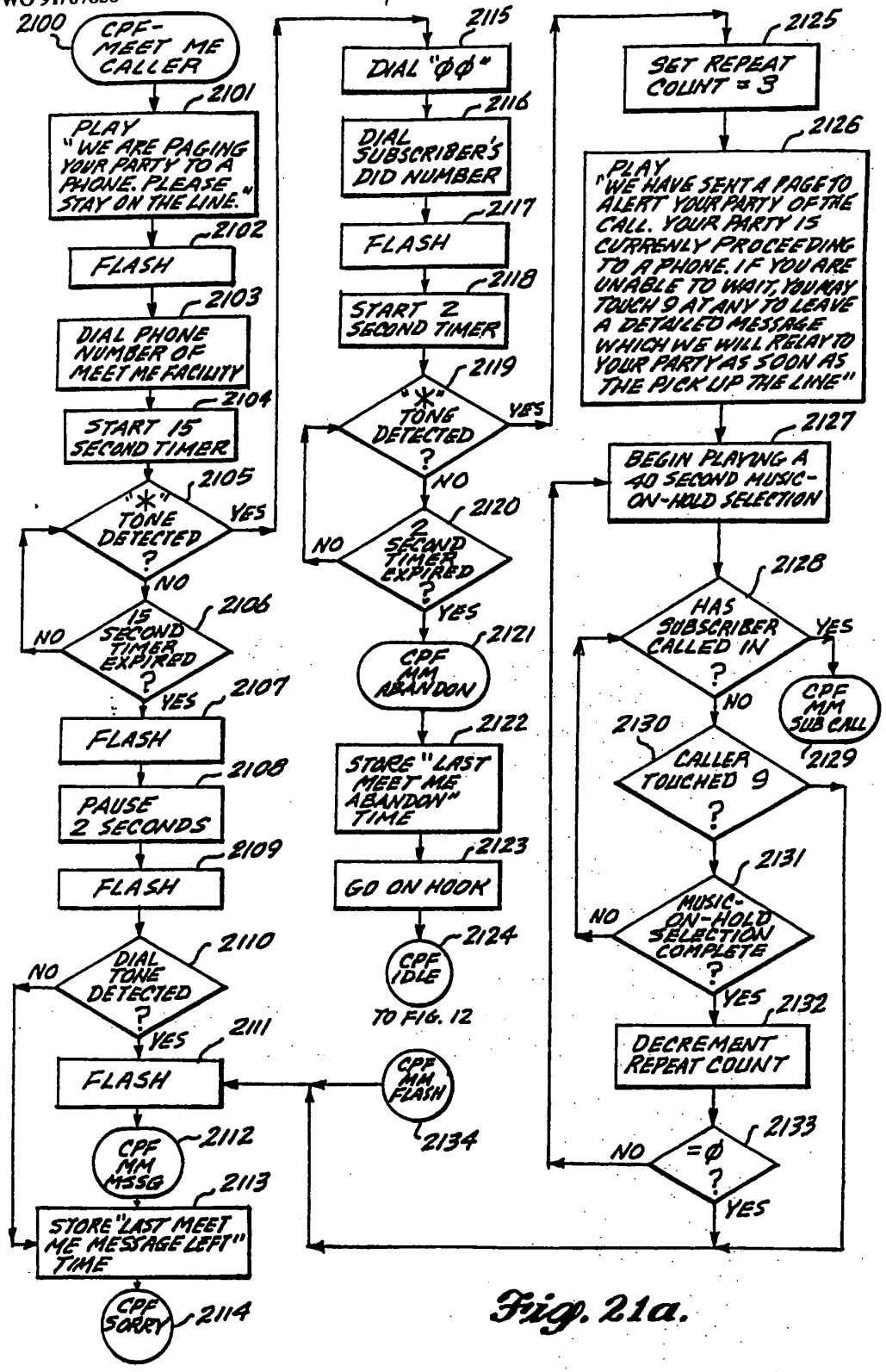

Fig. 21a.

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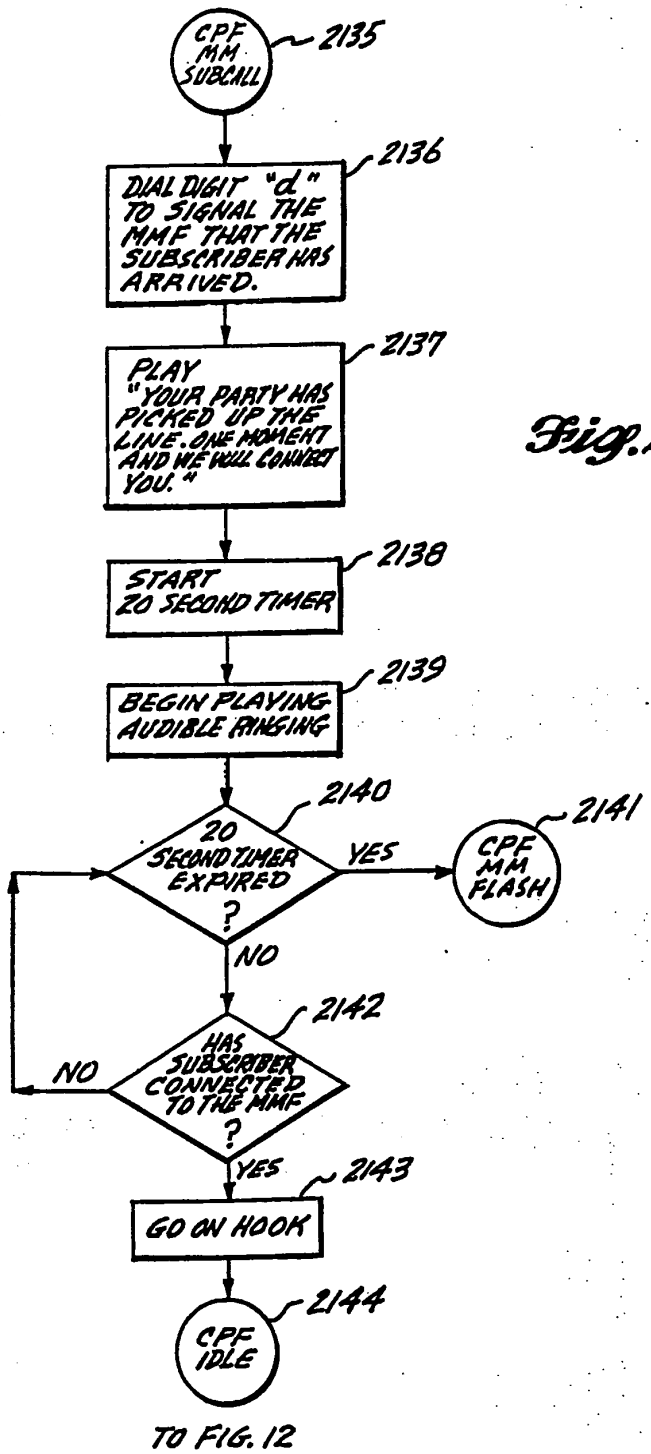


Fig. 21b.

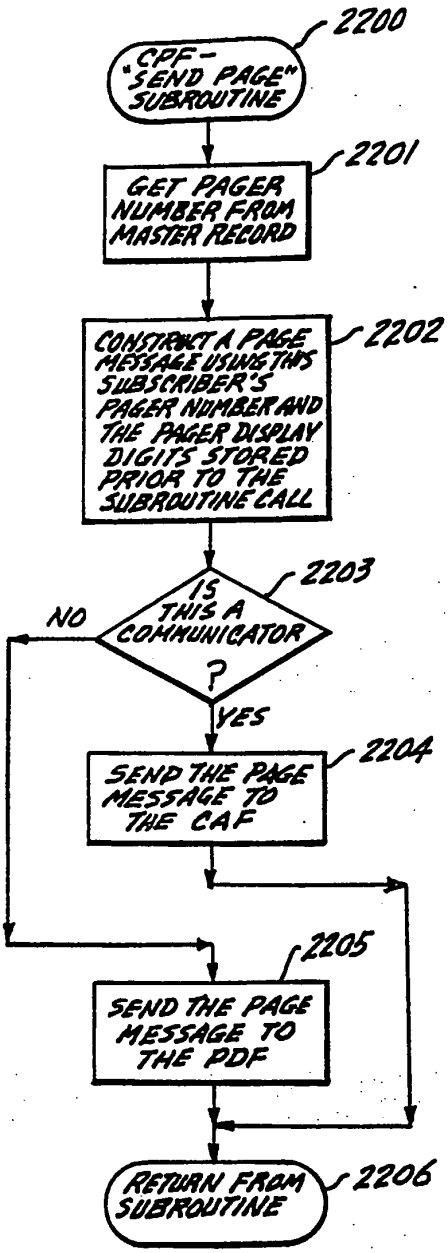


Fig. 22.

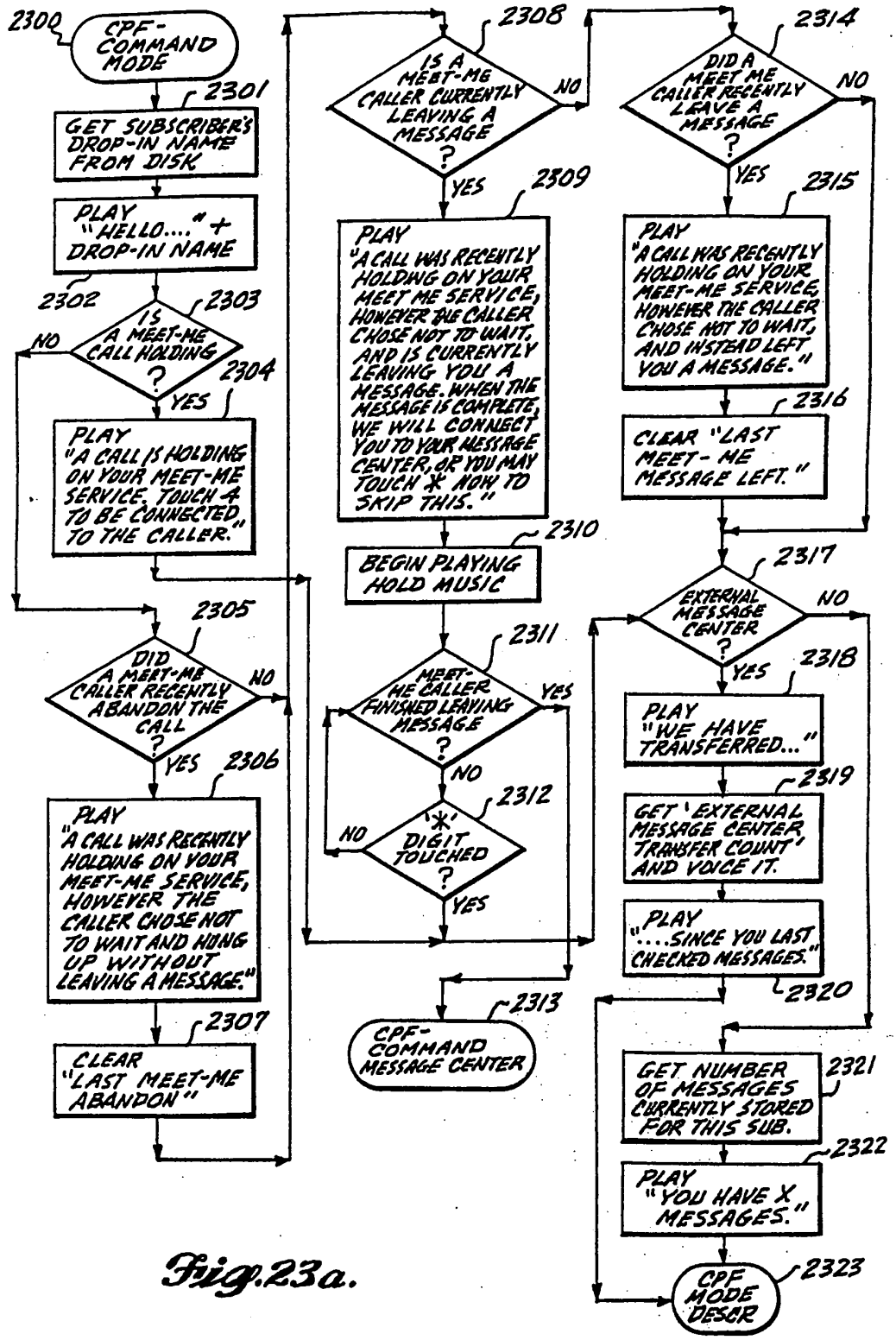


Fig. 23a.

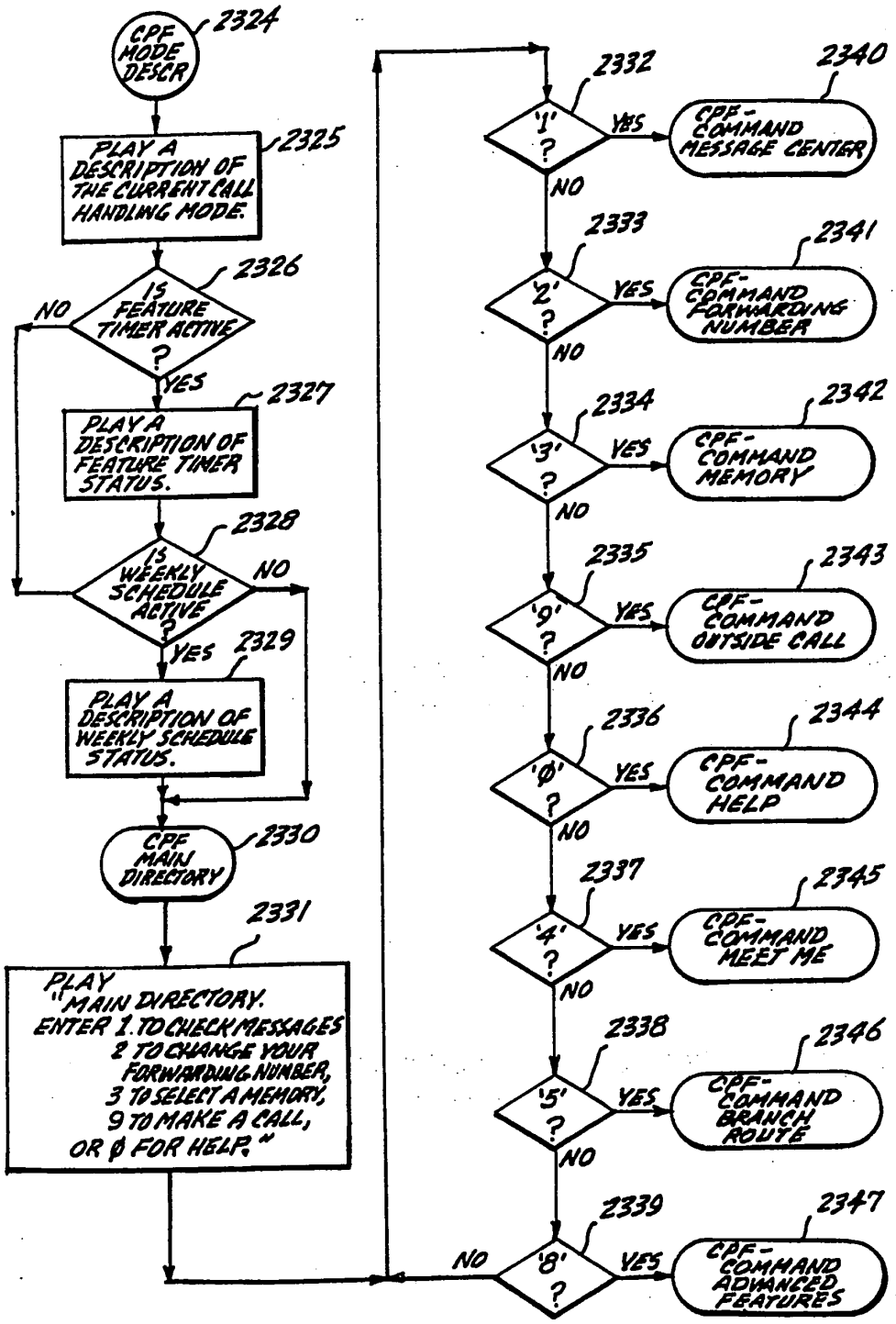


Fig. 23b.

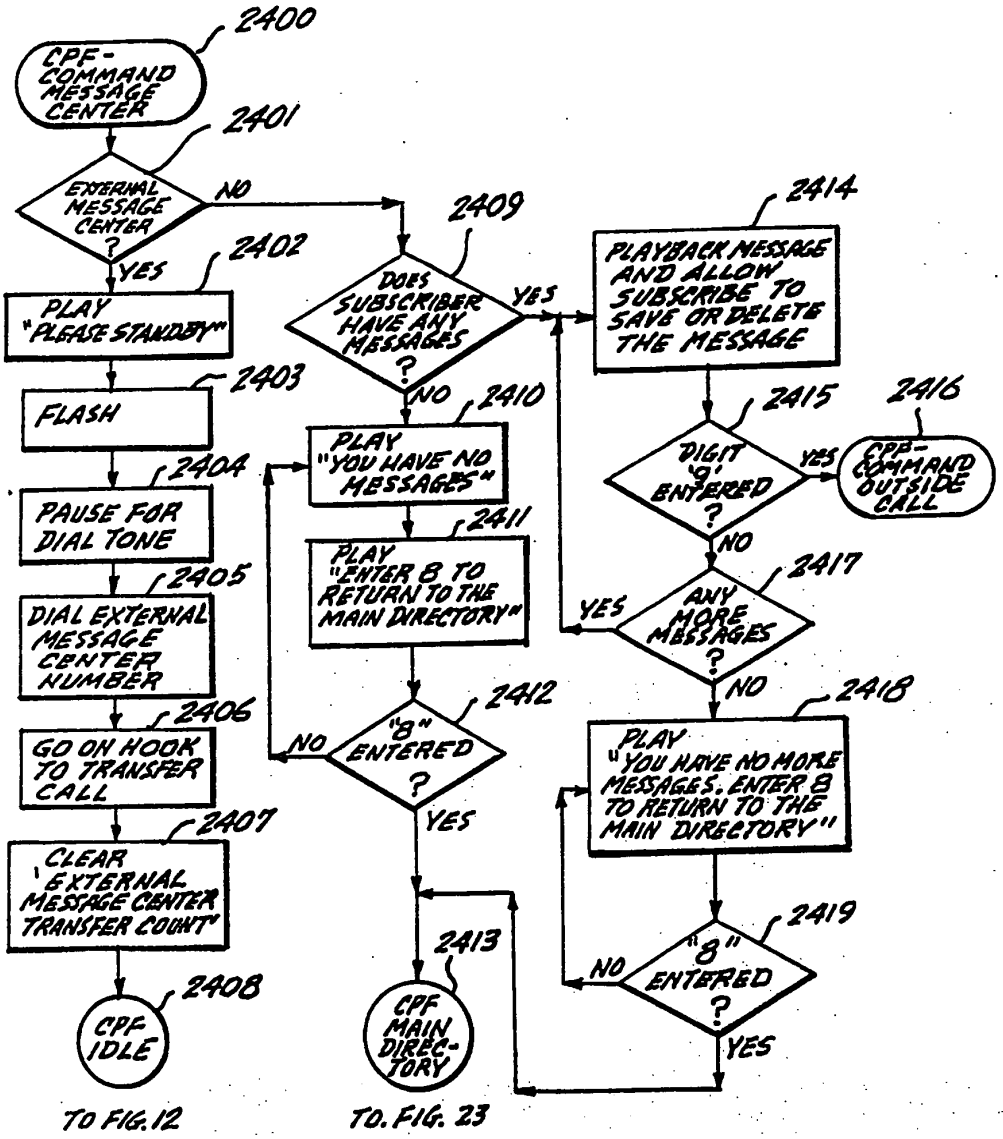


Fig. 24.

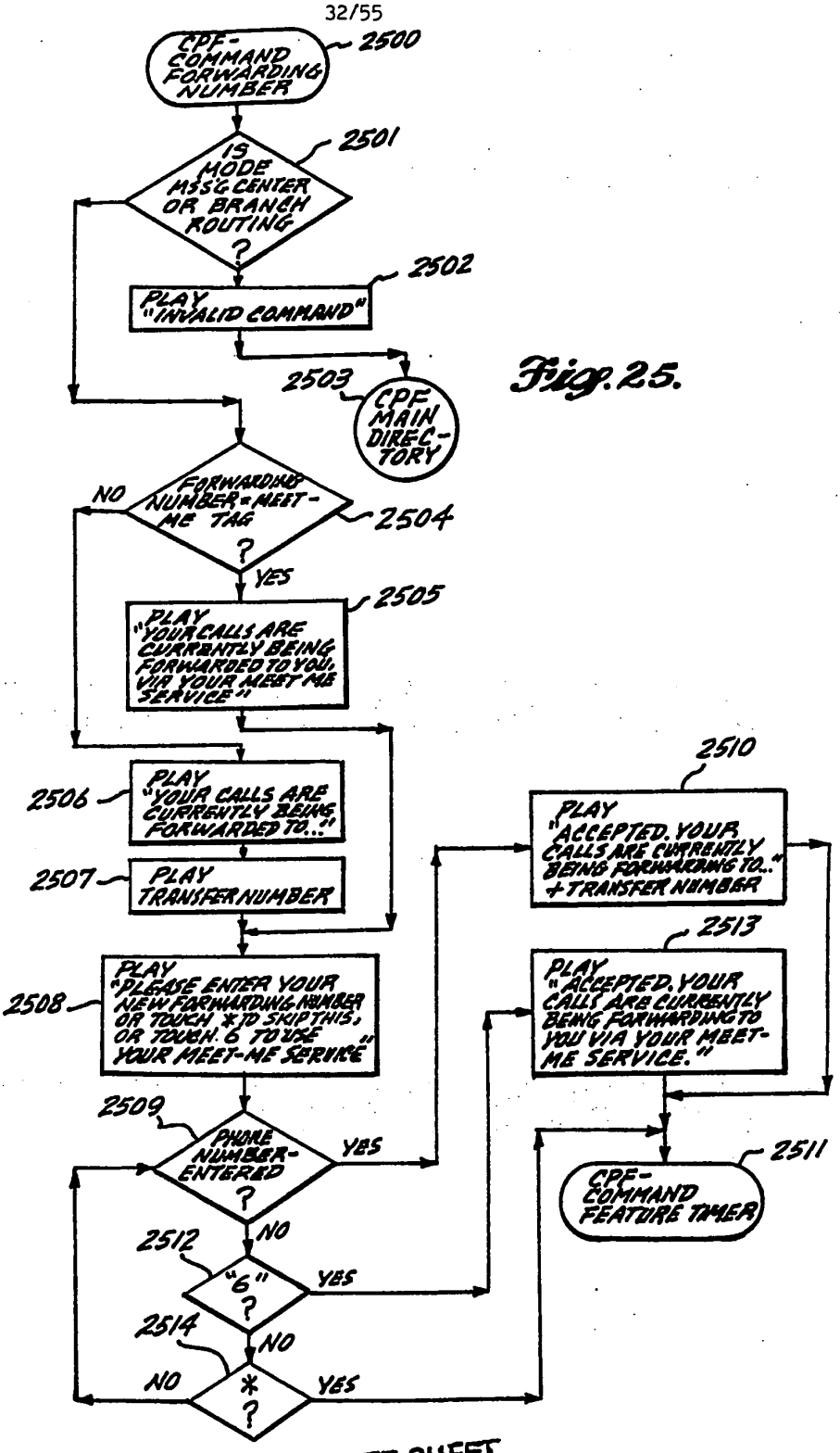


Fig. 25.

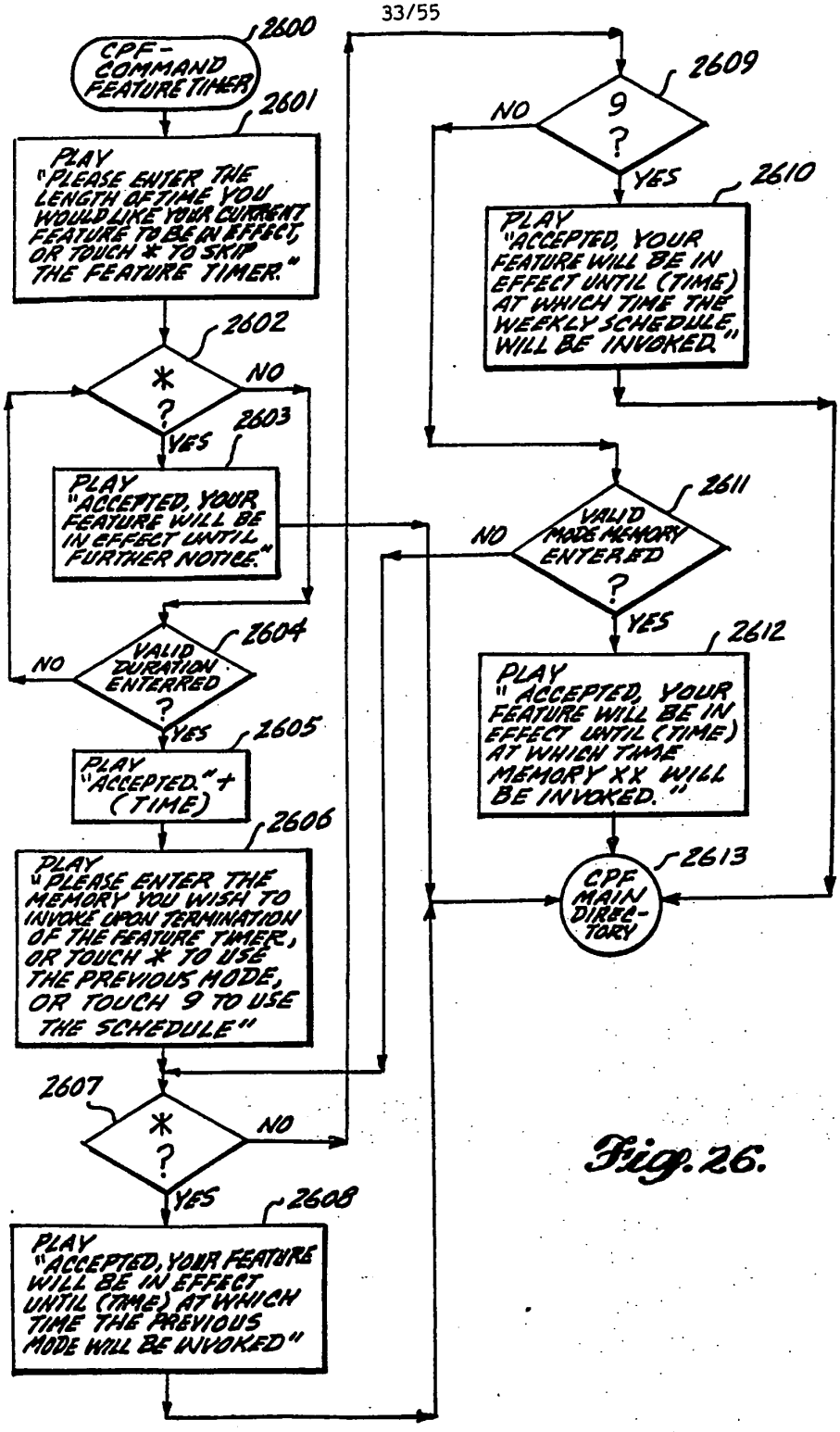


Fig. 26.

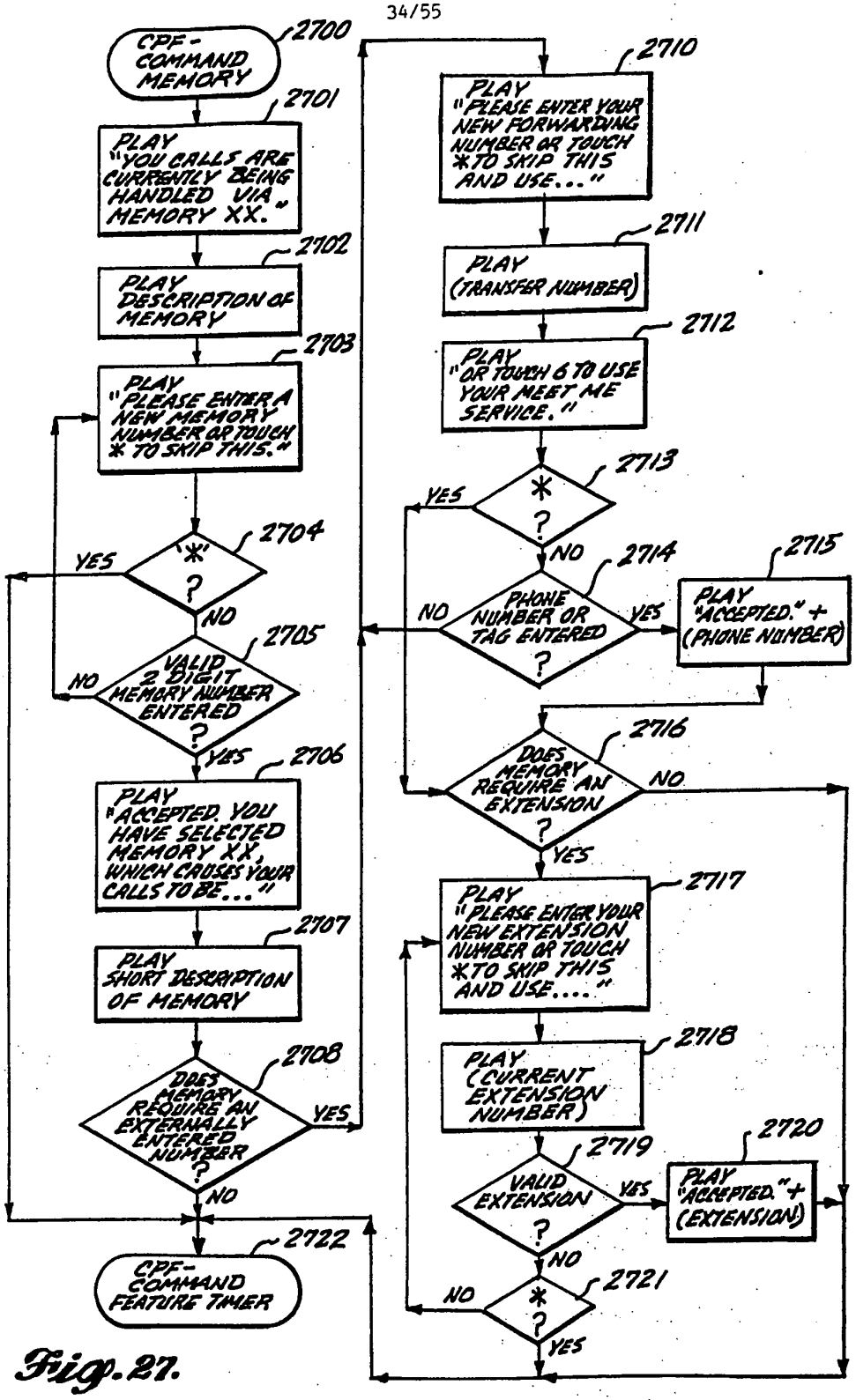
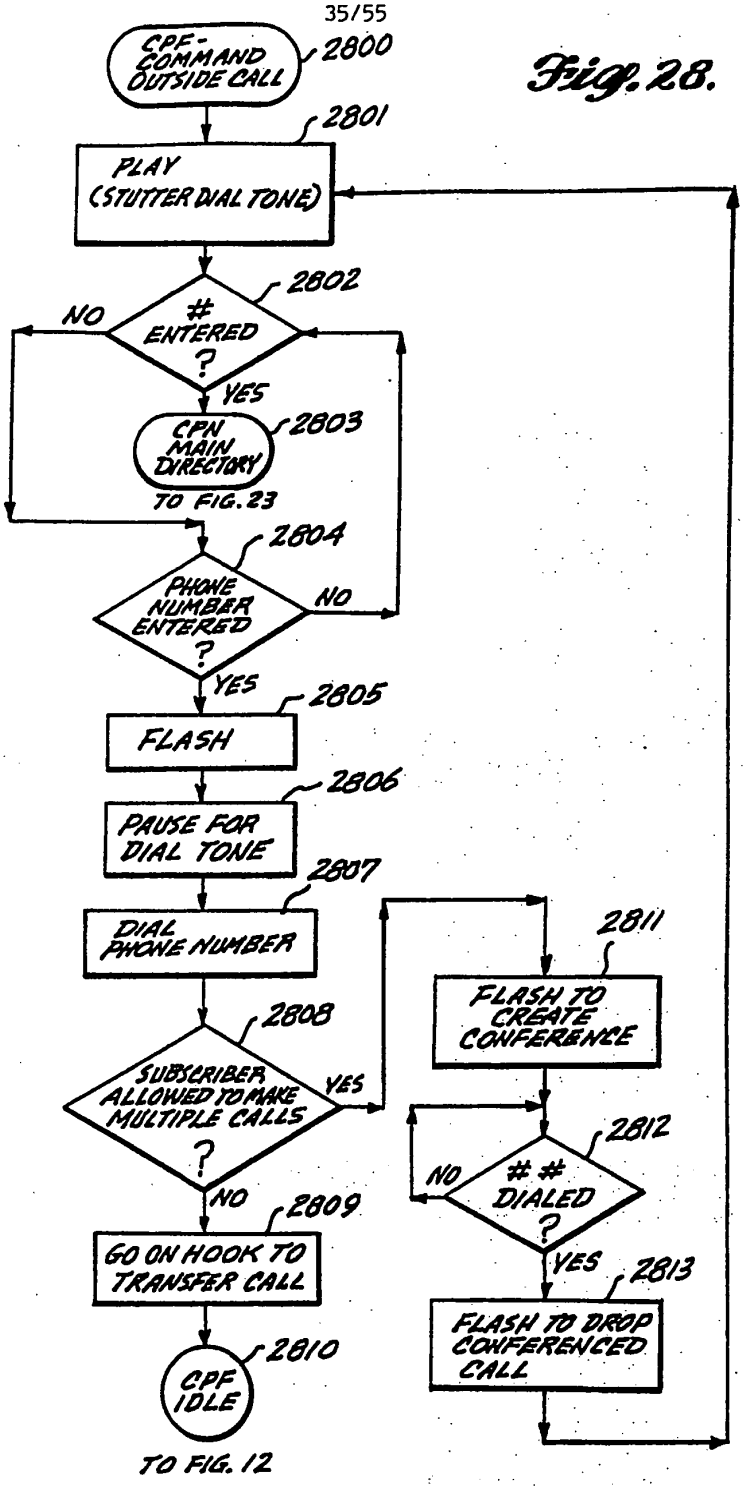


Fig. 27.

SUBSTITUTE SHEET

Fig. 28.



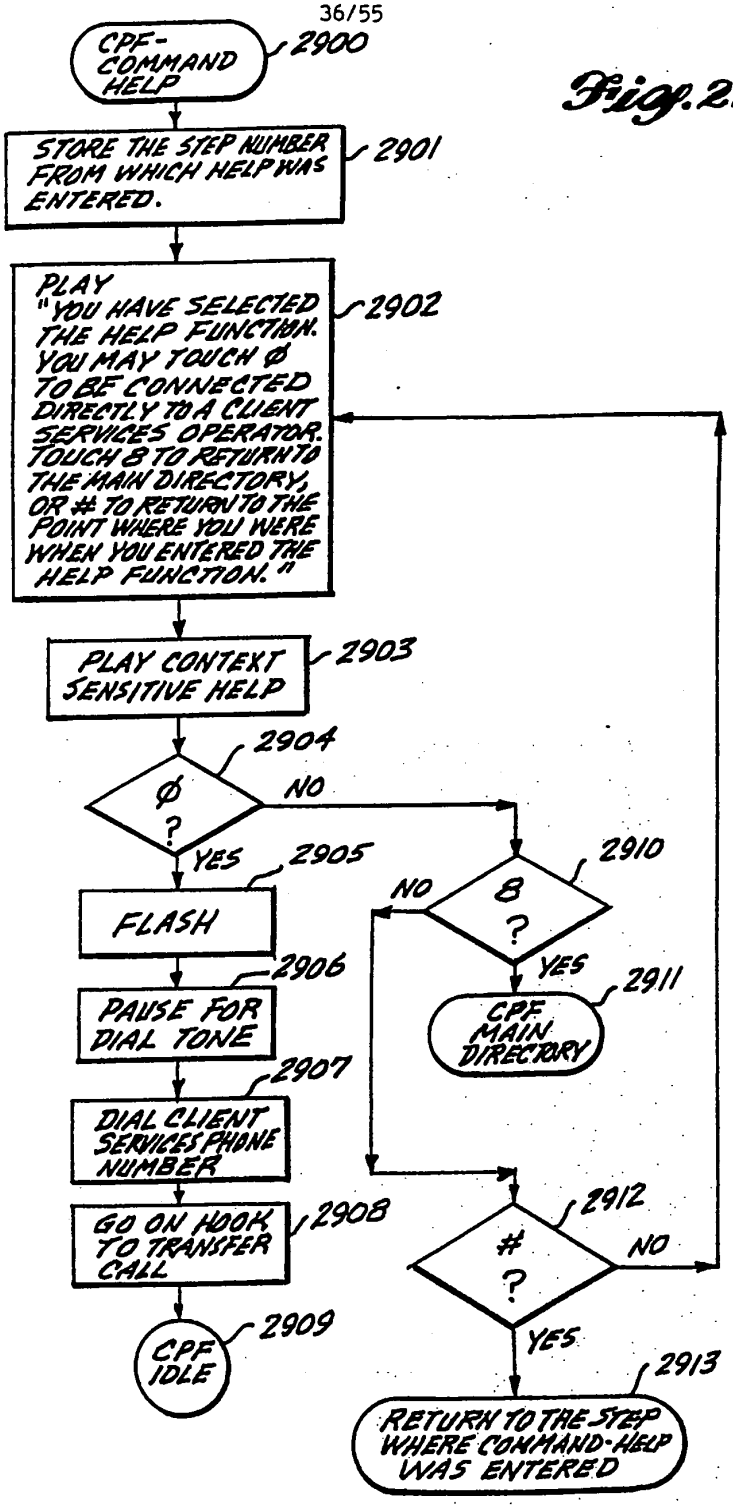


Fig. 29.

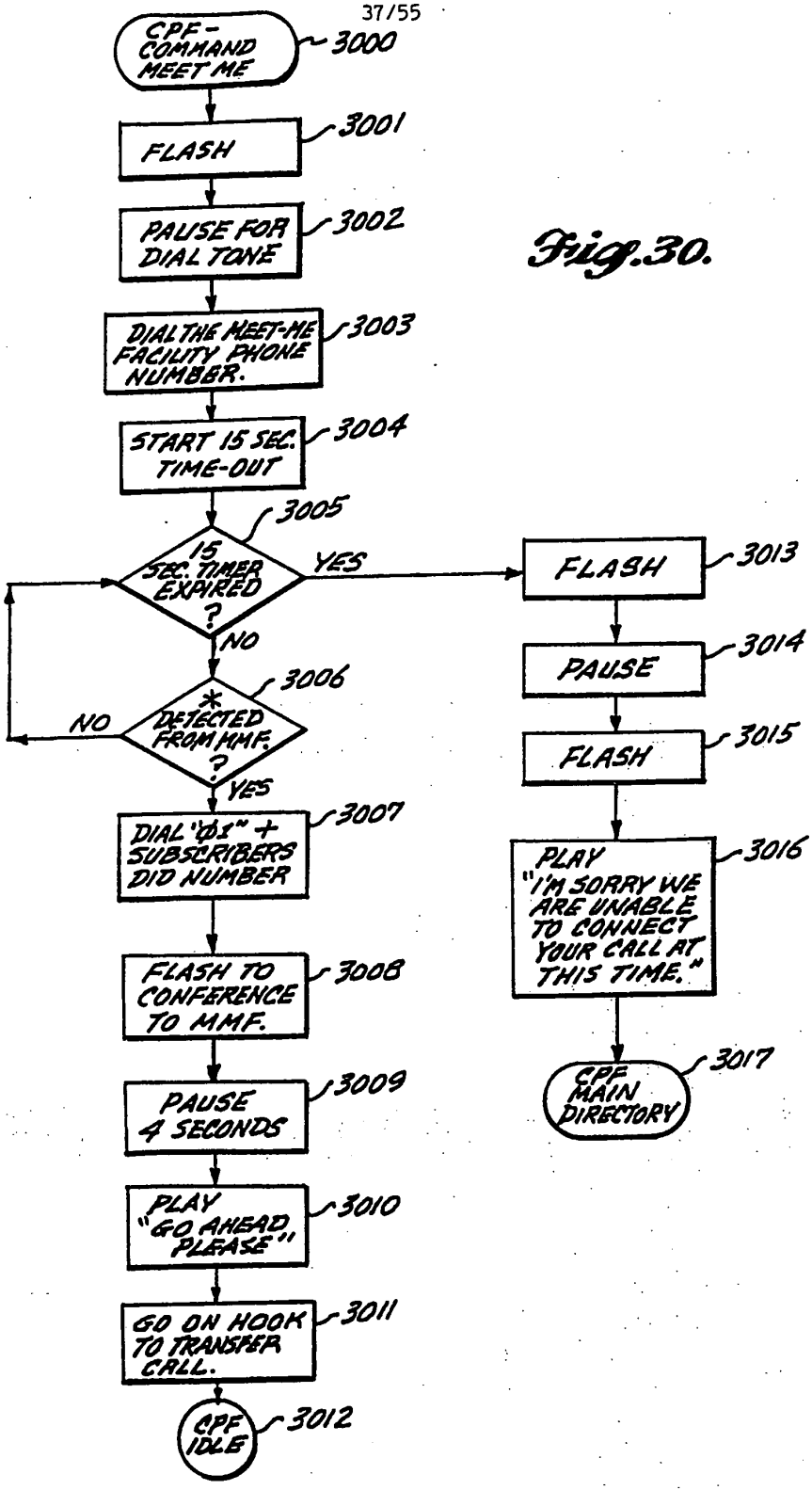


Fig.30.

SUBSTITUTE SHEET

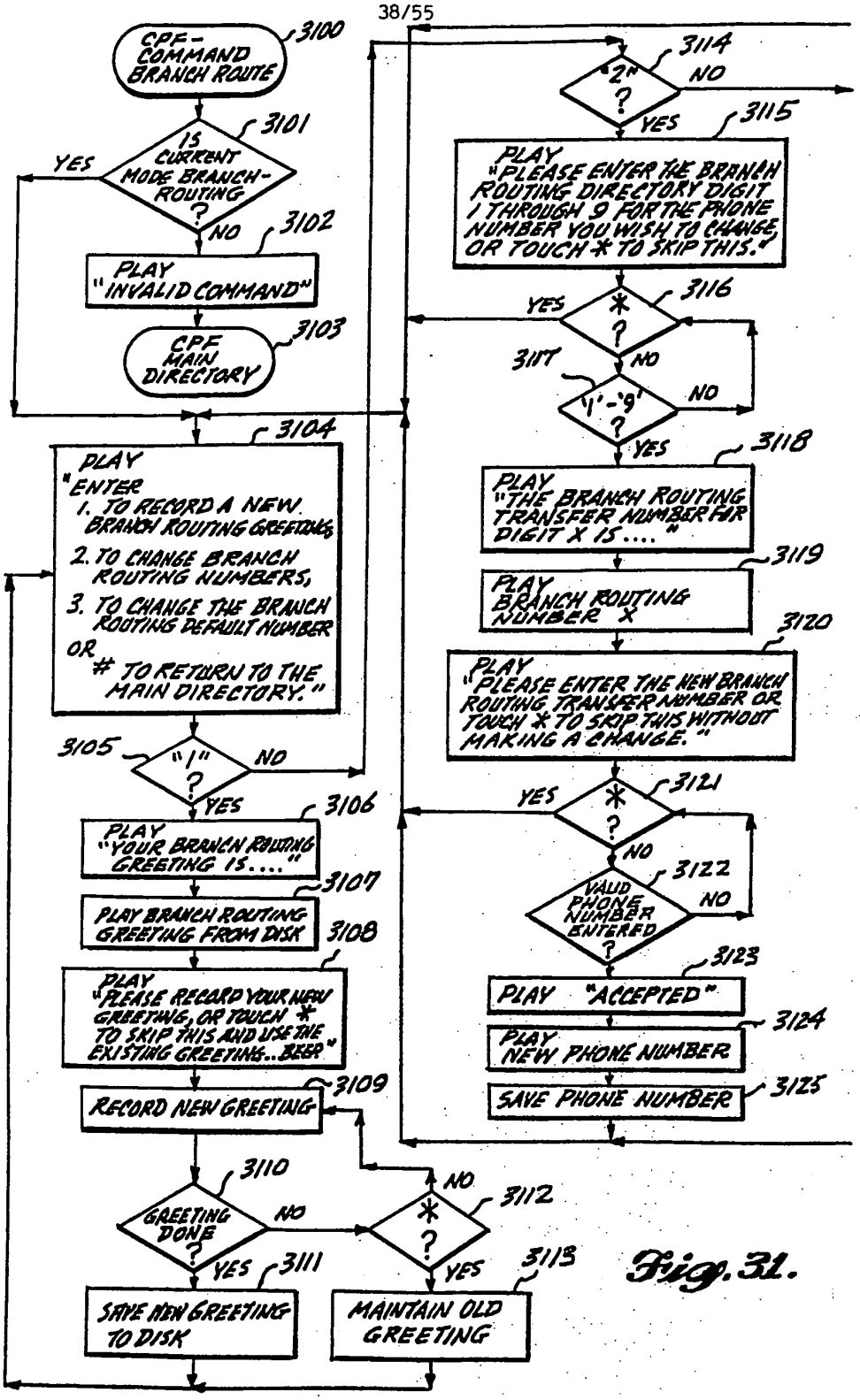


Fig. 31.

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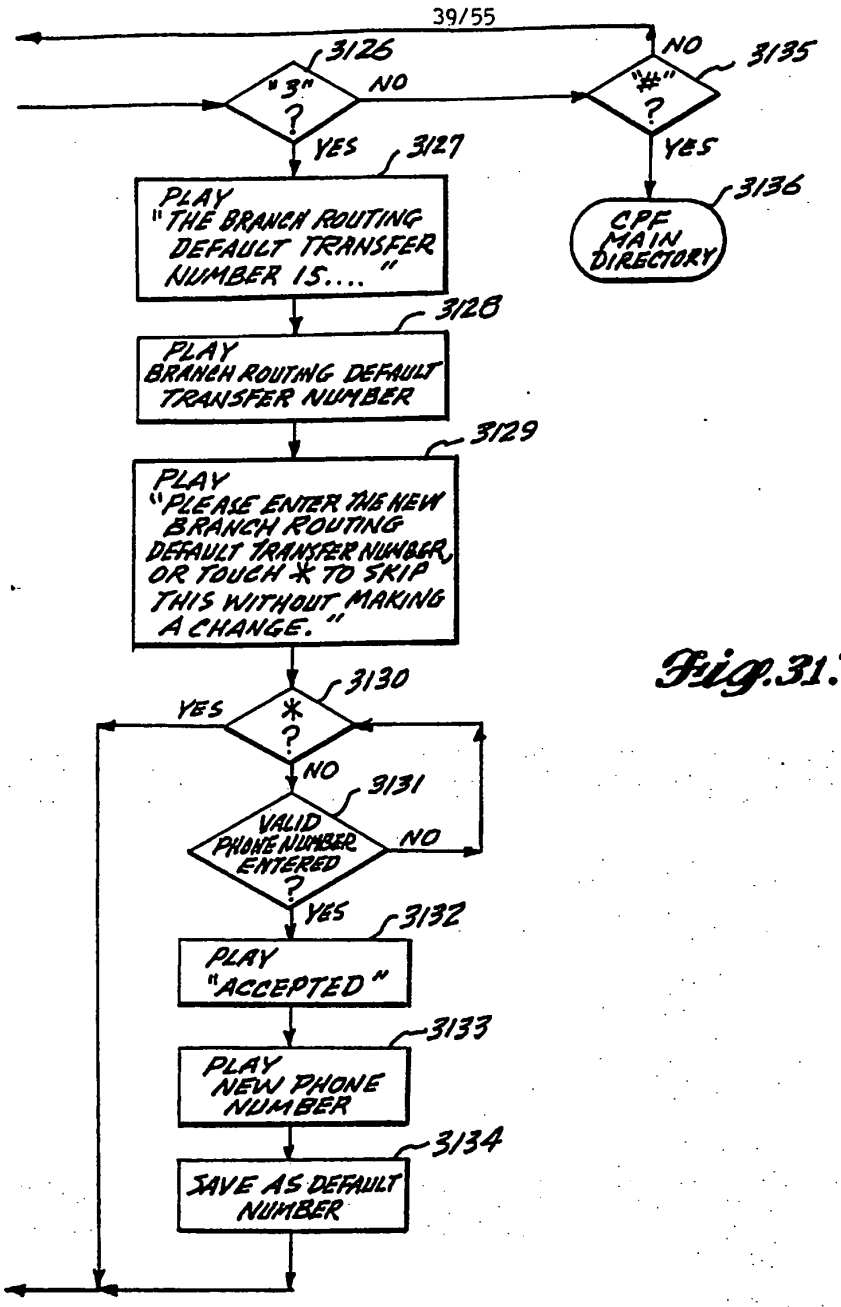

Fig.31.

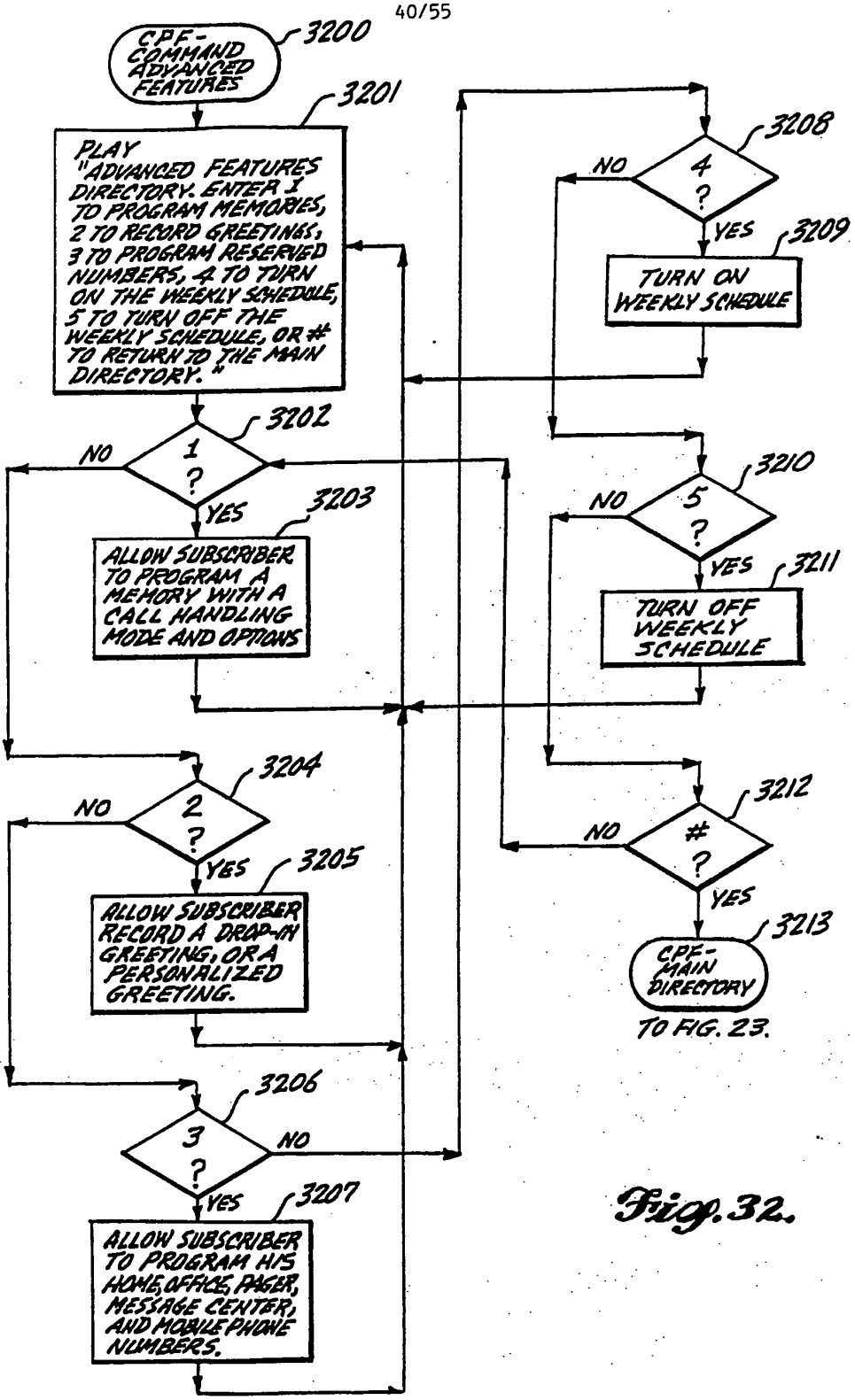

Fig. 32.

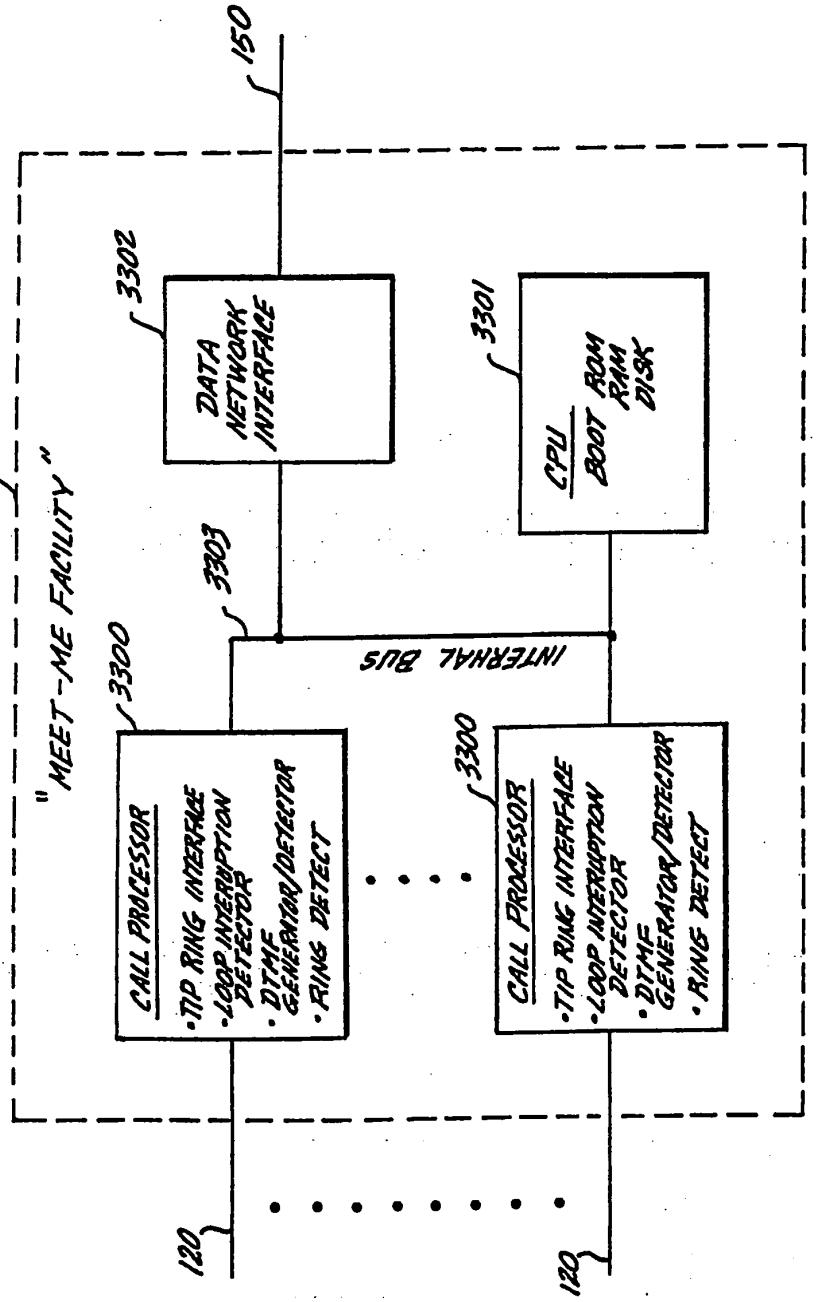

Fig. 33.

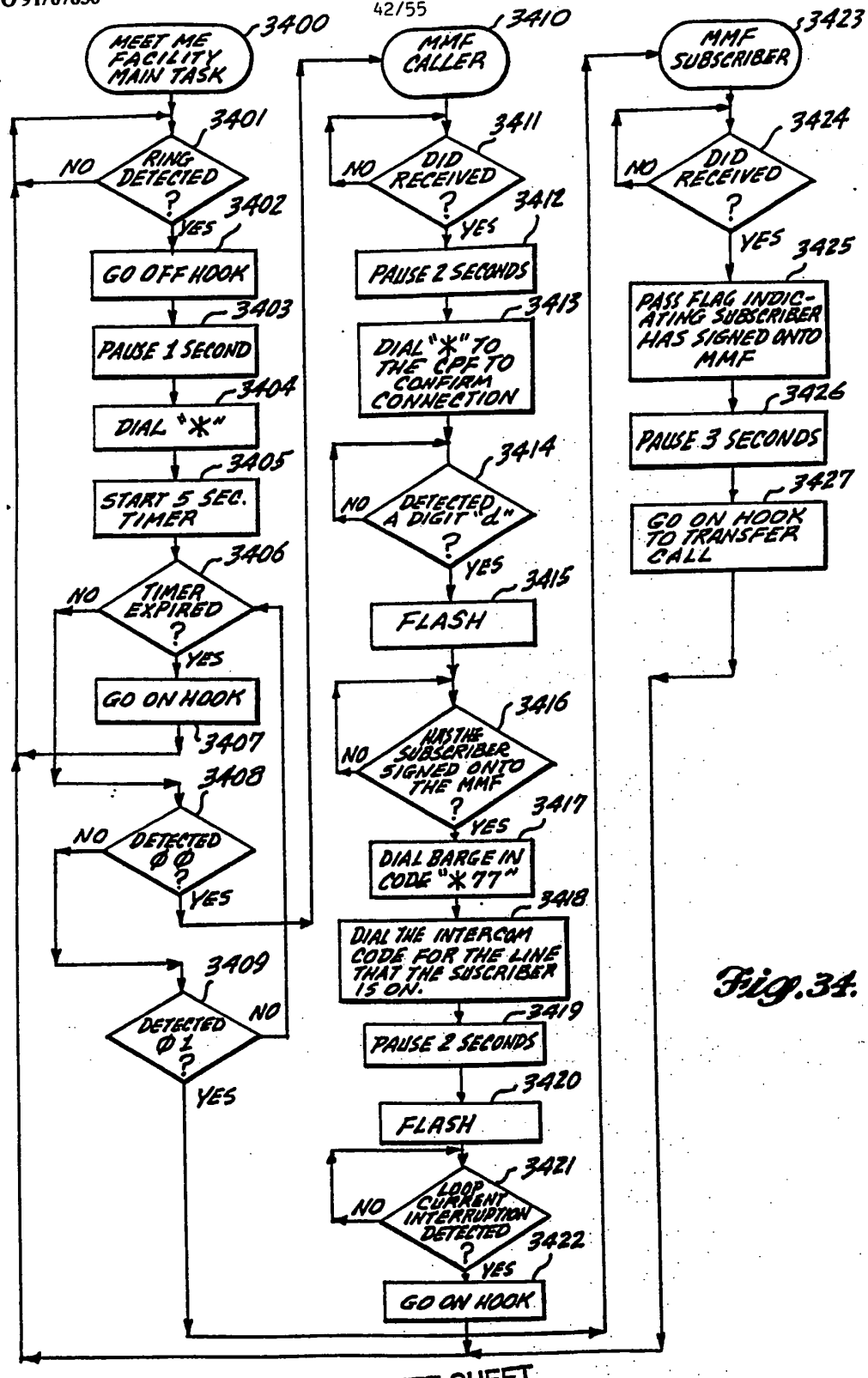

Fig. 34.

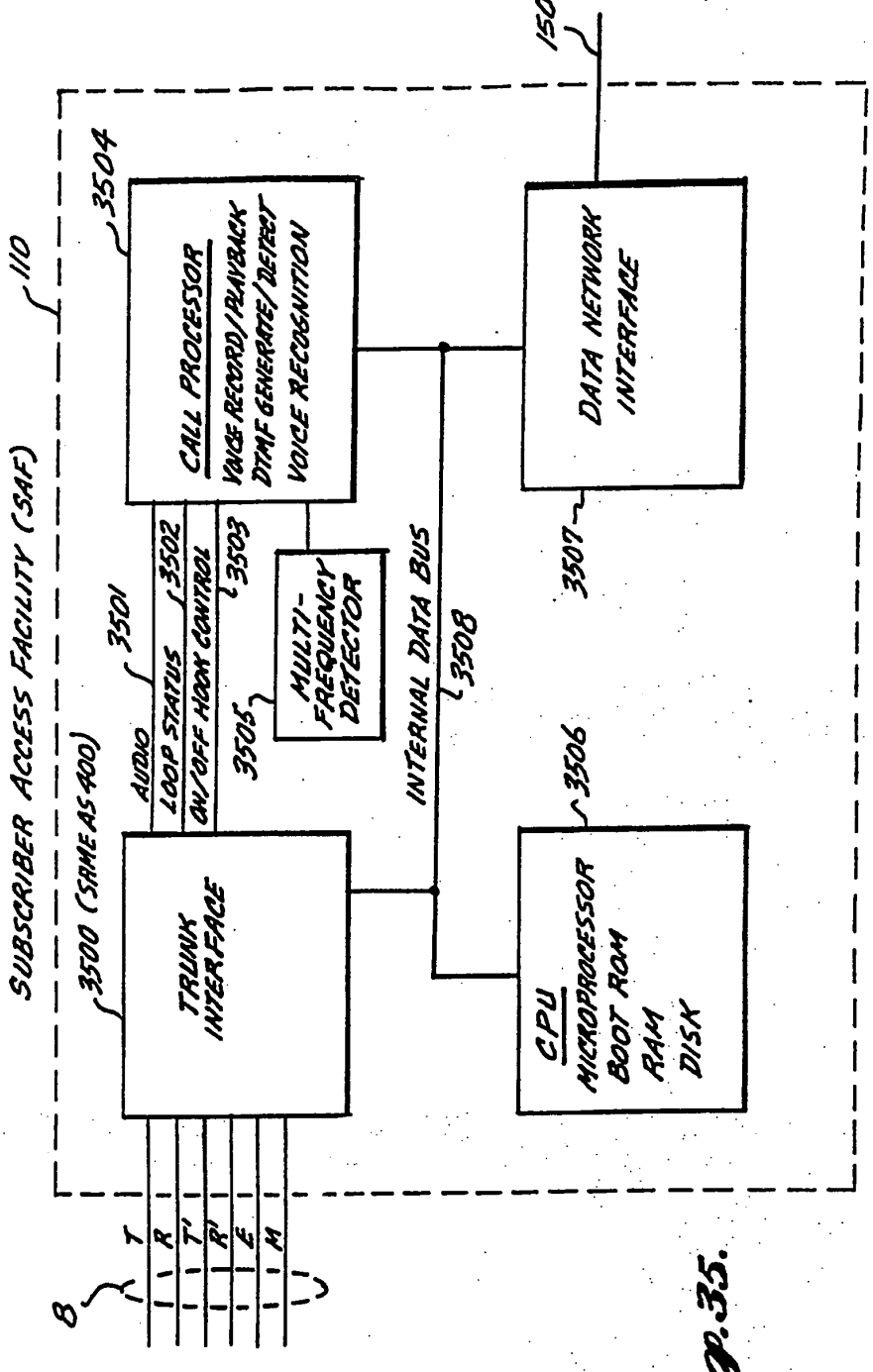

Fig. 35.

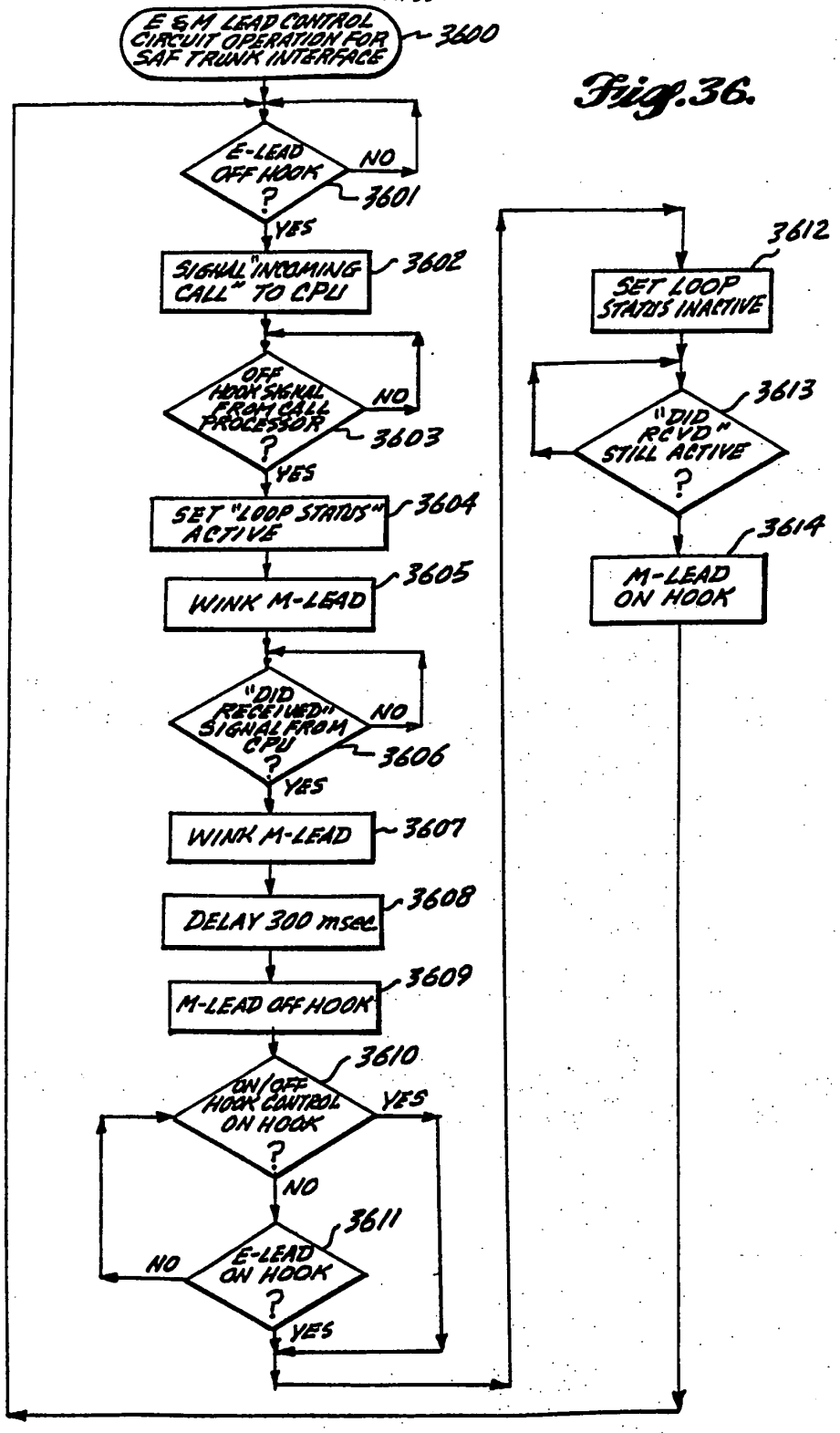

Fig. 36.

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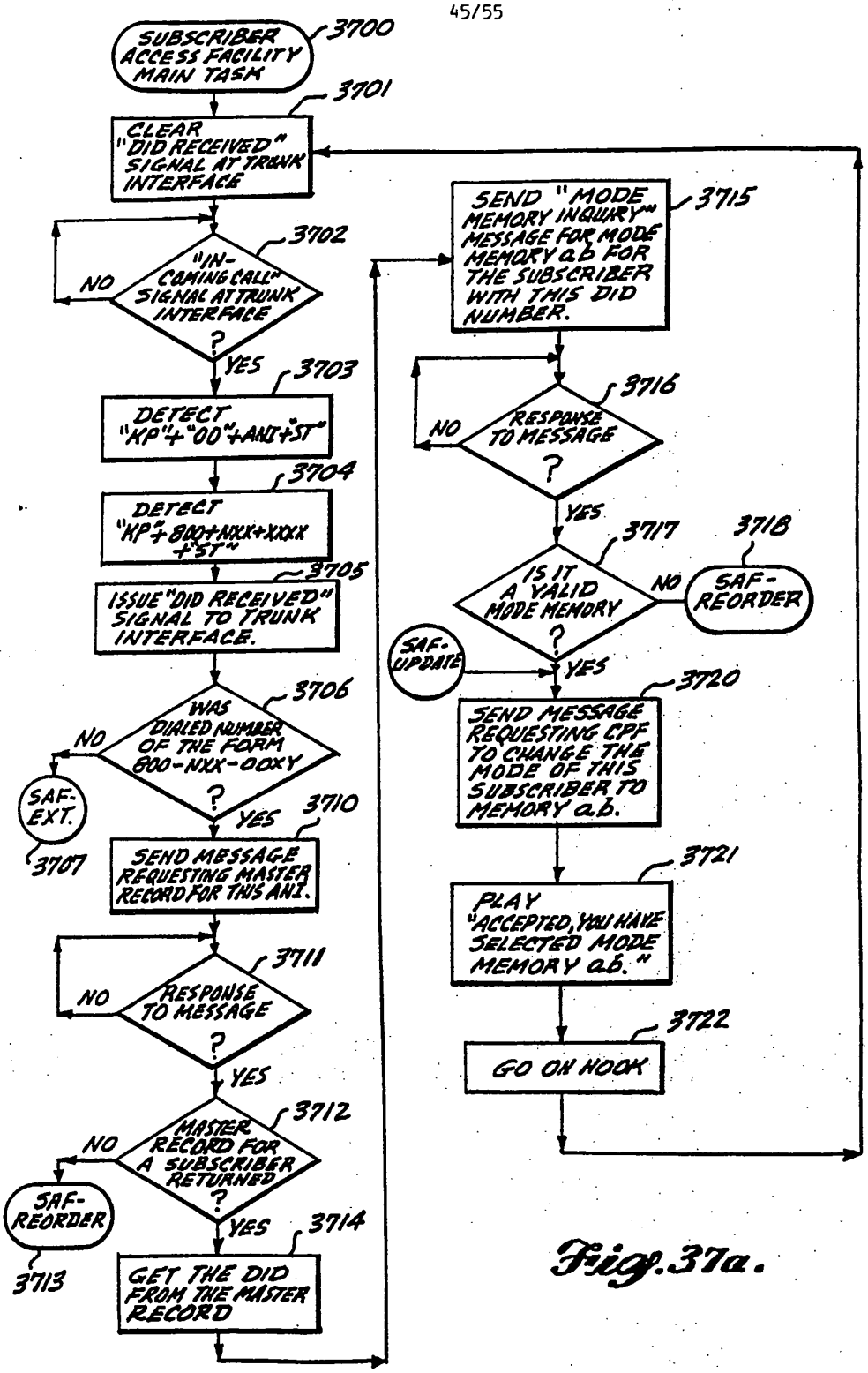


Fig. 37a.

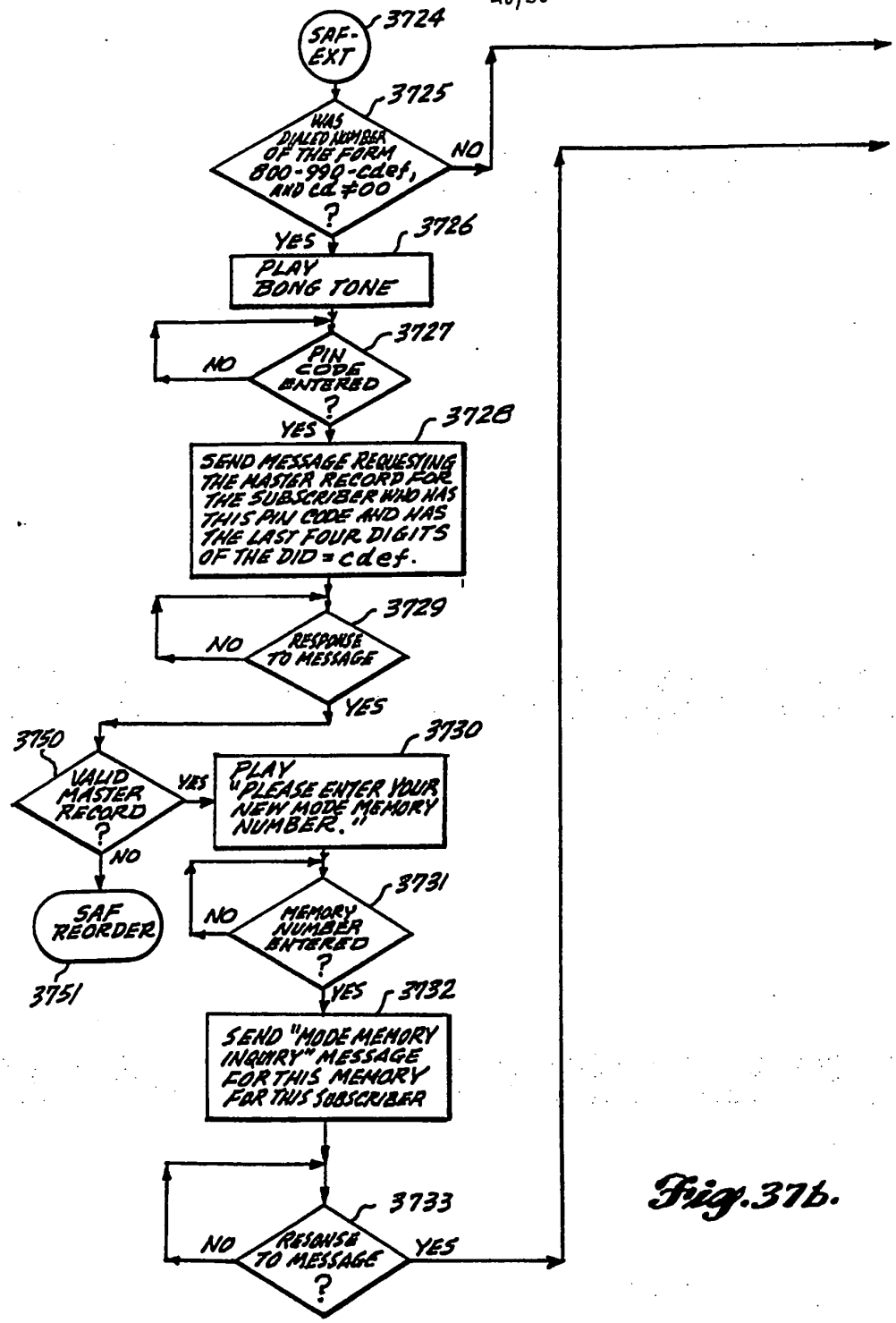


Fig. 37b.

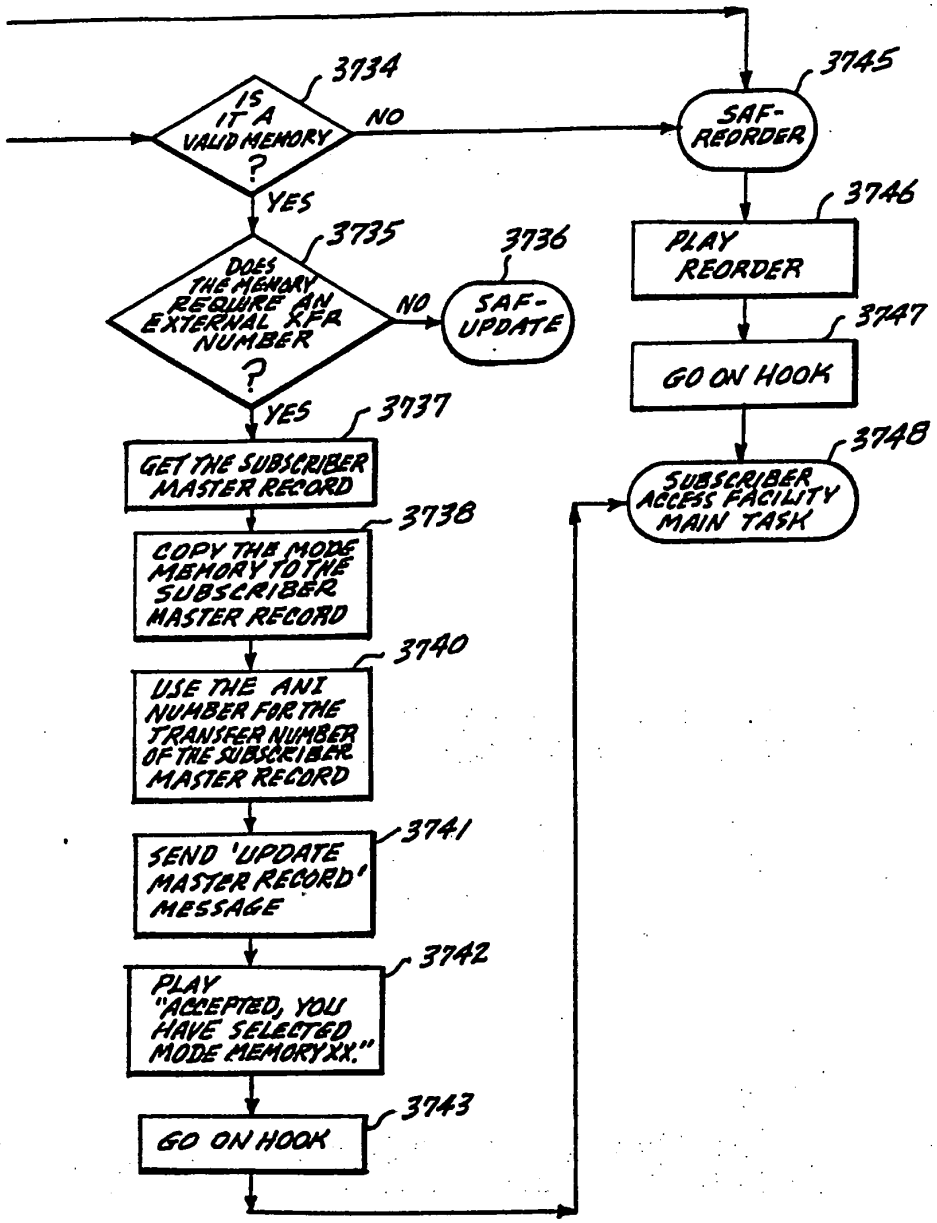


Fig. 37b.

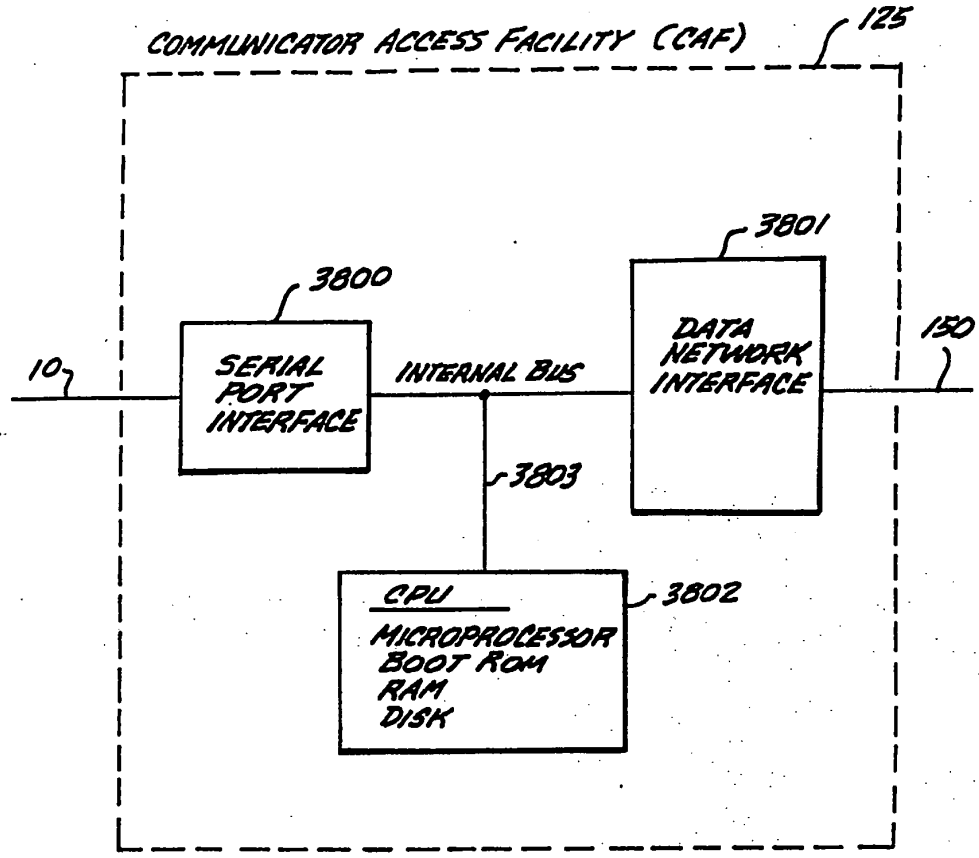


Fig. 38.

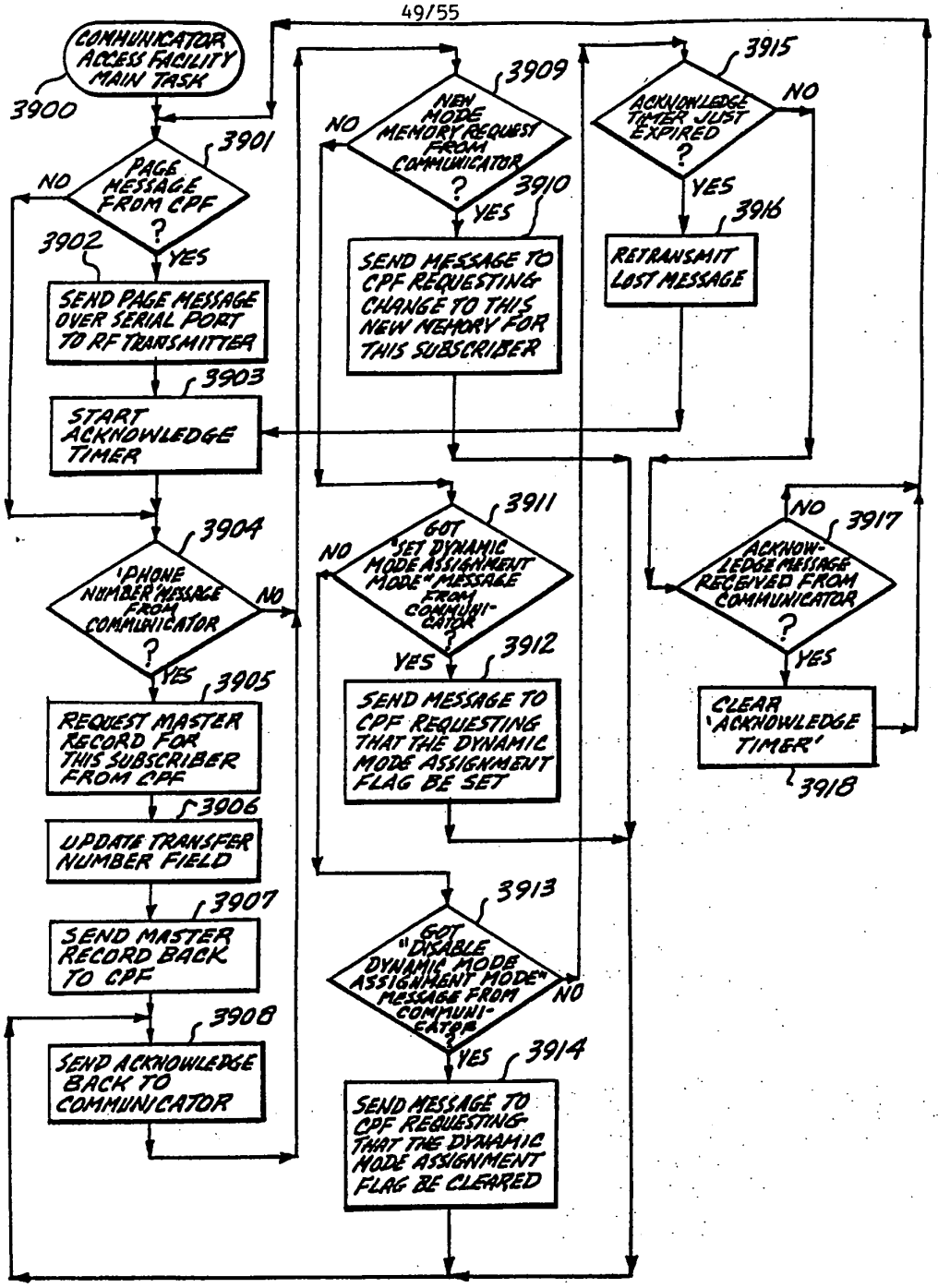


Fig. 39.

SUBSTITUTE SHEET

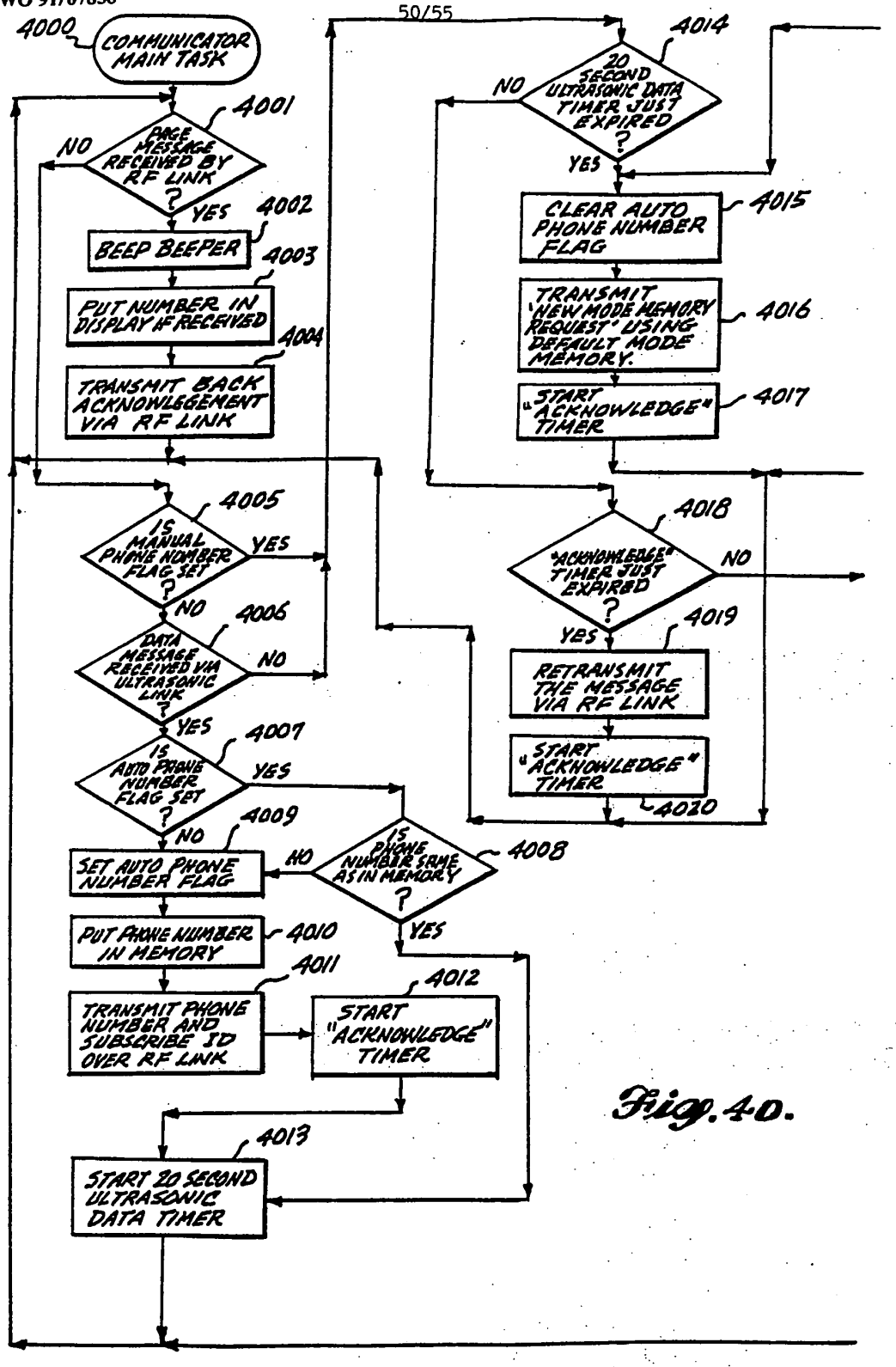


Fig. 40.

SUBSTITUTE SHEET

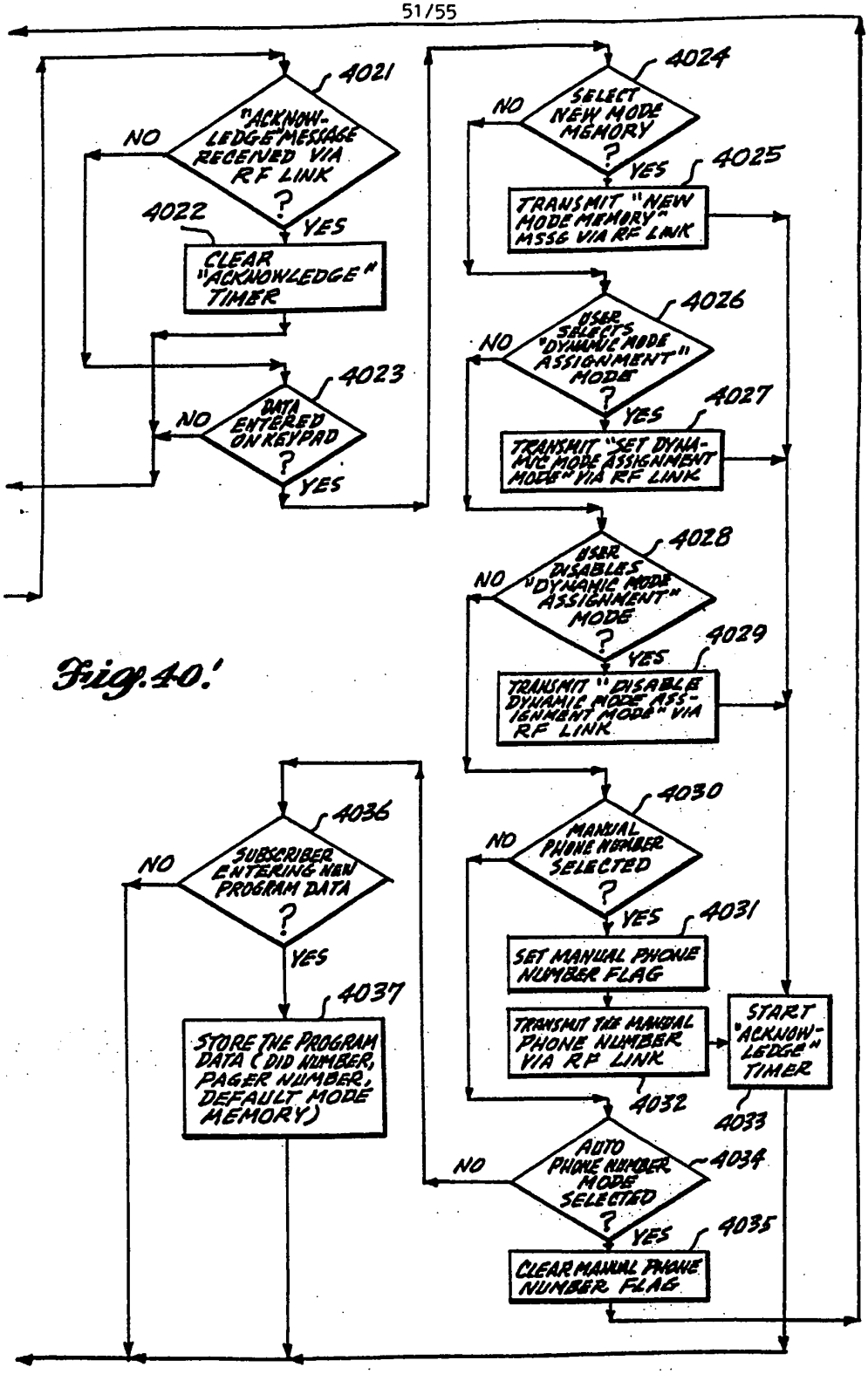


Fig. 40.

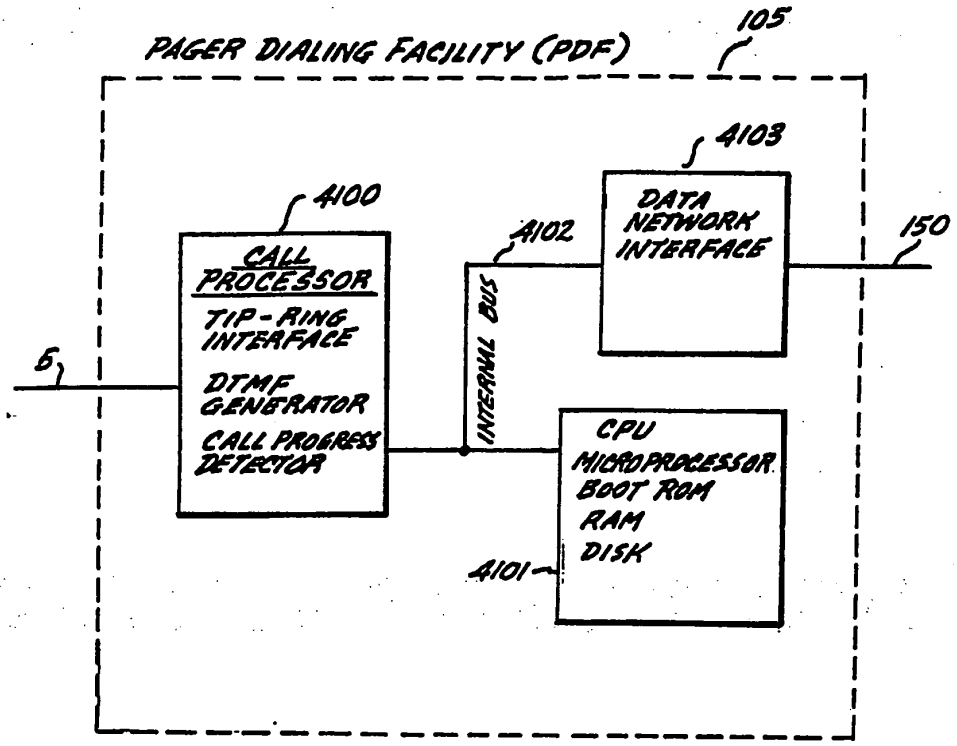


Fig. 41.

Fig. 42.

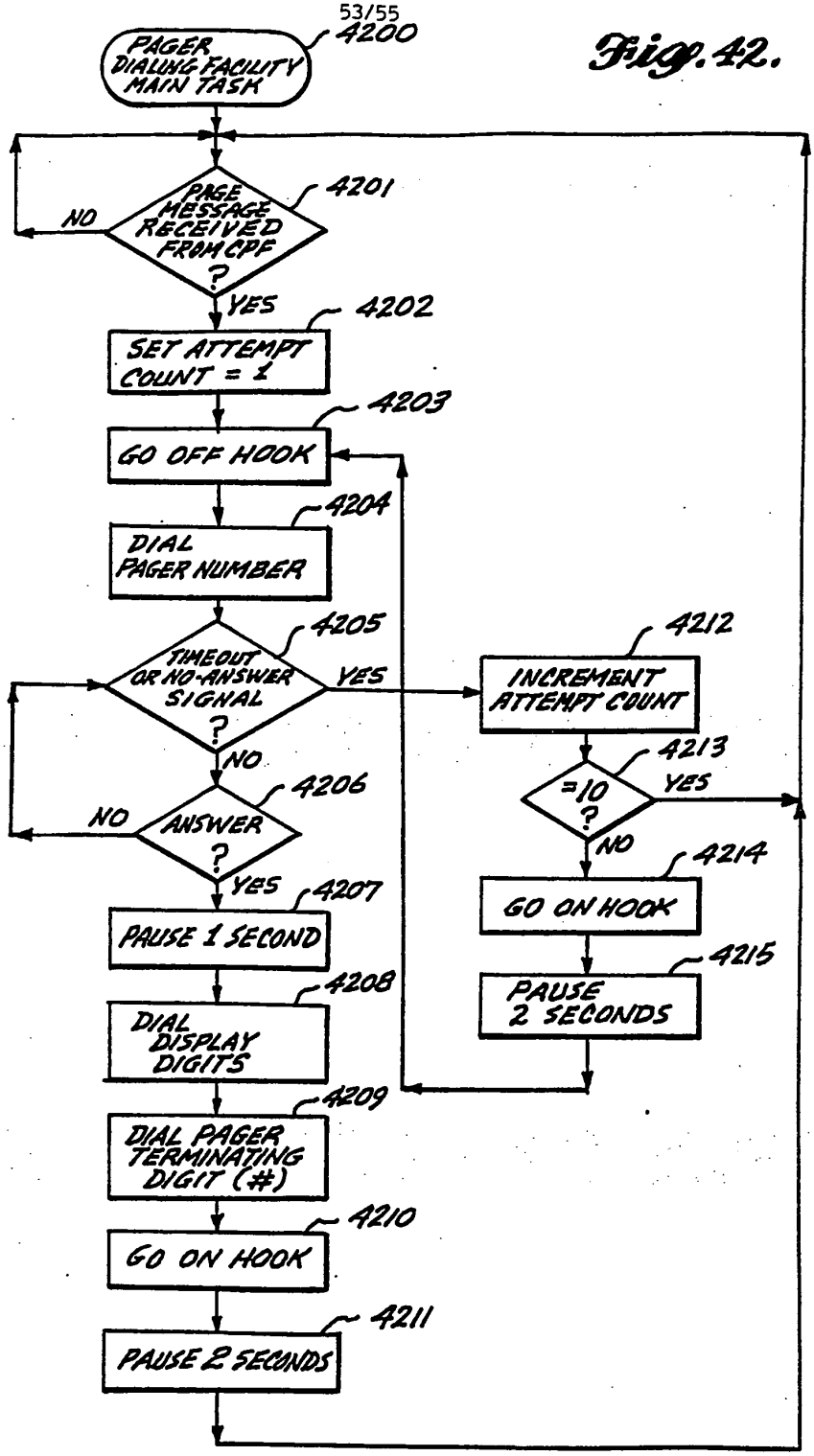
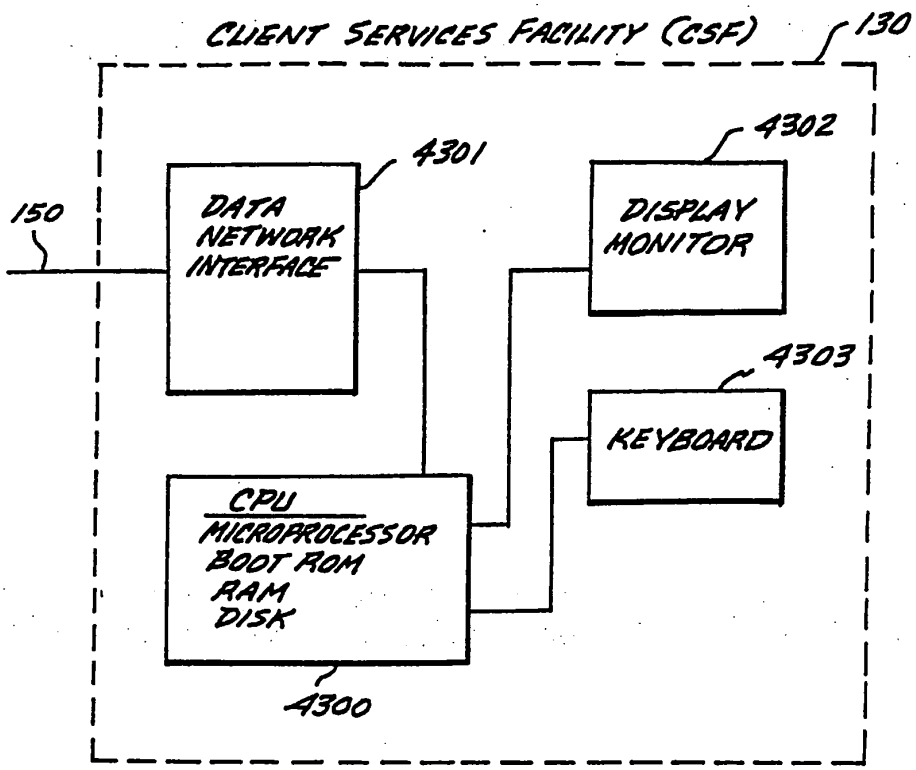


Fig. 43.



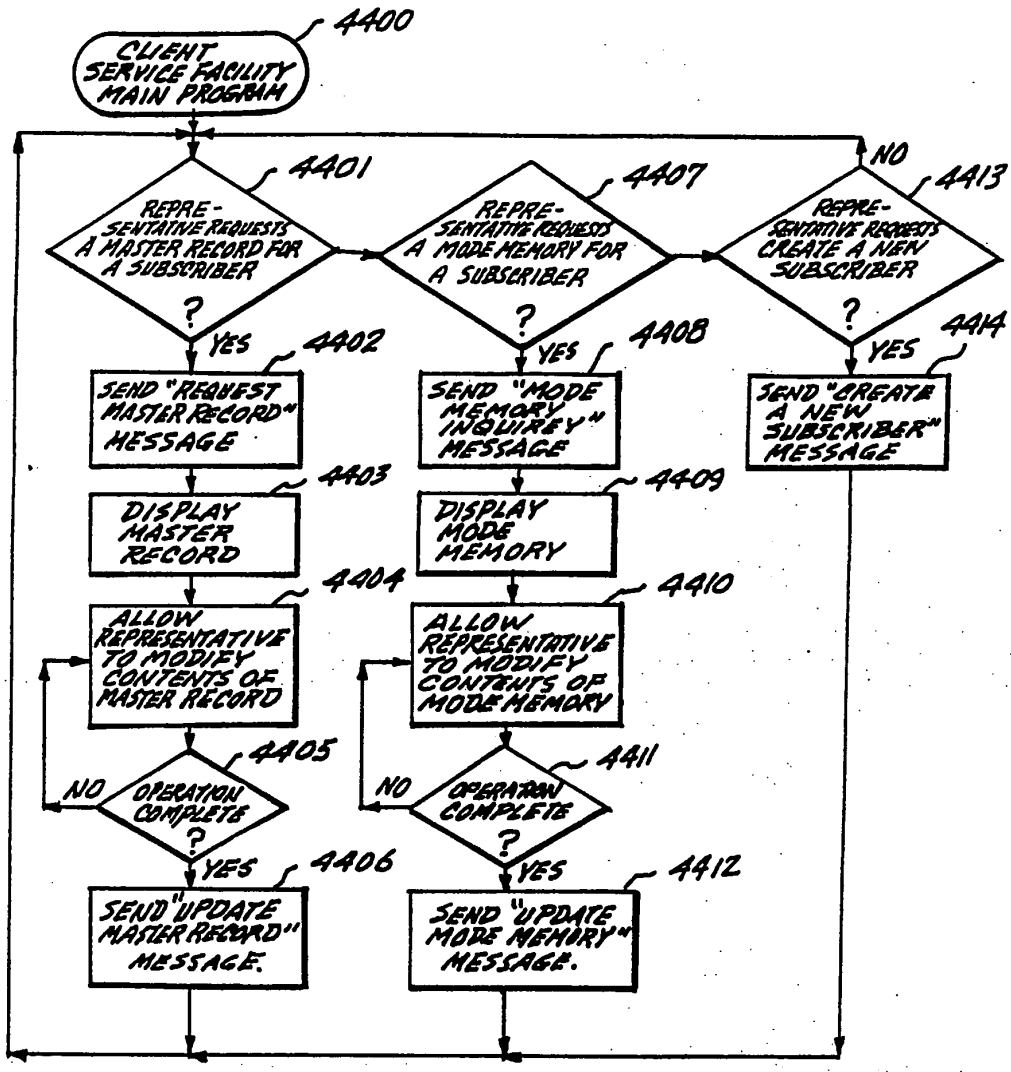


Fig. 44.

INTERNATIONAL SEARCH REPORT

International Application No PCT/US90/06729

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC(5): H04M 11/00, 1/64, 1/56, 1/66, 3/42
U.S. Cl. 379/57, 88, 142, 199, 211

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
U.S.	379/ 56, 57, 67, 88, 89, 142, 199, 200, 201, 210-212

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
Y	US, A, 4,028,498 (Mehaffey et al.) 07 June 1977, See abstract; Fig. 1; col.3, lines 13-18, 39-55; col. 11, lines 29-63; col. 13, lines 32-34, 48-51, 58, 59; col. 17, line 44-col. 118, line 12, 23-35.	1-28,31-36, 38-57,65, 71-79
Y	US, A, 4,313,035 (Jordan et al.) 26 January 1982, See col. 2, lines 29-39; col. 3, liens 16-31, 42-44; col.6, lines 25-45, 60-63; col. 7, lines 15-22; col.10, lines 1-10; col. 11, lines 43-46, line 62 through col. 12, line 25, 46-57; col. 13, lines 4-21.	1-28,31-36, 38-48,56,57, 77-79
Y	US, A, 4,625,081 (Lotito et al.) 25 November 1986, See abstract, lines 12-18; col. 3, lines 10-30, line 59 through col. 4, line 24; col. 7, lines 8-24.	2,3,10,24-28, 31036,38-48
Y	US, A, 4,674,115 (Kaleita et al.) 16 June 1987, See abstract; col. 1, lines 1-3, 27-32, 57-59; col. 2, lines 38-40; col. 5, lines 13-19; col 6, lines 43-46; col. 10, lines 46-52.	4-9,11-13, 49-55,71-76

* Special categories of cited documents: [15]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
28 FEBRUARY 1991	02 MAY 1991
International Searching Authority [1]	Signature of Authorized Officer [20]
ISA/US	DWAYNE BOST

Form PCT/ISA/210 (second sheet) (May 1986)

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

Y,P	US, A, 4,893,329 (O'Brien) 09 January 1990, See abstract.	4-9,11-13
Y,P	US, A, 4,922,490 (Blakely) 01 May 1990, See Fig. 1; col. 5, lines 39-58; col. 6, lines 22-27.	4-9,11-13, 49-55,71-76
Y,P	US, A, 4,941,203 (Patsiokas et al.) 10 June 1990 See abstract.	4-9,11-13, 49-55,71-76
Y	US, A, 4,642,425 (Guinn, Jr. et al.) 10 February 1987, See abstract, col. 1, 2 and col. 3, lines 1-20	14-23,56,57, 77-79

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE[1]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers . . . , because they relate to subject matter[1] not required to be searched by this Authority, namely:

2. ☐ Claim numbers . . . , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out[1], specifically:

3. ☐ Claim numbers_____, because they are dependent claims not drafted in accordance with the second and third sentances of PCT Rule 6.4(a).

VI. ☒ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING[2]

This International Searching Authority found multiple inventions in this international application as follows:

I. Claims 1-57, 65, 71-79 drawn to a telecommunication control system; class 379 subclass 201.

II. Claims 58-64, 66-70 drawn to a telephone paging system; class 379 subclass 57. SEE ATTACHMENT.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

1-57, 65, 71-79

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, 14 with indication, where appropriate, of the relevant passages 17	Relevant to Claim No 18
Y	US, A, 4,748,655 (Thrower et al.) 31 May 1988 See abstract; col. 5, lines 23-35.	14-23,77-79
&,P	US, A, 4,893,335 (Fuller et al.) 09 January 1990 See entrire document.	

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Kurganov	Atty Docket:	47242-00027USC1
Serial No.:	10/821,690	Group Art:	Unknown
Filed:	April 9, 2004	Examiner:	Unknown
Title:	ROBUST VOICE BROWSER AND VOICE ACTIVATED DEVICE CONTROLLER		

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §§1.97 and 1.98

CERTIFICATE OF MAILING
37 C.F.R. 1.8

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below:

12-01-04
Date

Signature

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In compliance with the duty of disclosure under 37 C.F.R. §1.56, it is respectfully requested that this Information Disclosure Statement be entered and the reference(s) listed on attached Form PTO/SB/08A be considered by the Examiner and made of record.

In accordance with 37 C.F.R. § 1.98(d), copies are enclosed only of those references not already of record or cited by the Examiner in a prior related application.

In accordance with 37 C.F.R. §§ 1.97(g),(h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to be an admission that the information disclosed is, or is considered to be, prior art with respect to the present application or material to patentability as defined in 37 C.F.R. §§ 1.56.

In accordance with 37 C.F.R. § 1.97(e)(1), Applicants hereby certify that each item of the information contained in this Information Disclosure Statement was cited in a

communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the present statement, as evidenced by the enclosed search report dated November 16, 2004 for European Patent Application No. 00905896.7.

Accordingly, no fees are believed to be due in connection with the filing of this Information Disclosure Statement. However, should any fees be deemed necessary (except payment of the issue fee), the Commissioner is authorized to charge any deficiency or to credit any over payment to Kelley Drye & Warren Deposit Account No. 11-0404/015749.0015.

Respectfully submitted,

12-01-04
Date

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Attorneys for Applicant

PTO/SB/08A (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 5,799,065	08-25-1998	Junqua et al.	
		US-			
		US-			
		US-			
		US-			
		US-			
		US-			
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		US-			
		US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
		GB 2,317,782	01-04-1998	Morin		
		WO 97/37481	10-09-1997	Wong		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

EP 22070 (1)

(12) UK Patent Application (19) GB (11) 2 317 782 (13) A

(43) Date of A Publication 01.04.1998

(21) Application No 9718126.7

(22) Date of Filing 27.08.1997

(30) Priority Data
(31) 08723914 (32) 30.09.1996 (33) US

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(51) INT CL[6]
H04M 3/42

(52) UK CL (Edition P)
H4K KFH KF42

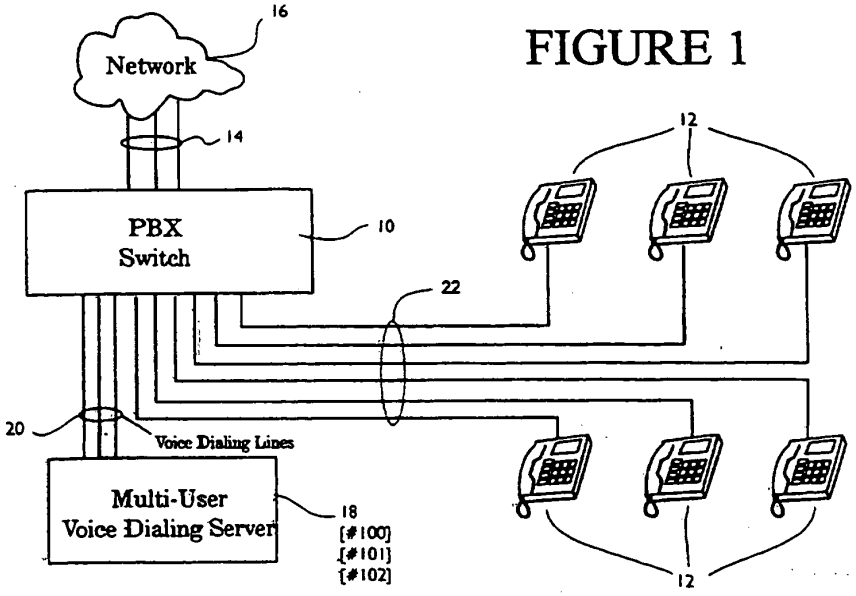
(56) Documents Cited
EP 0283120 A1 EP 0166318 A2
WPI Abstract Accession No: 97-305198/199728 & JP 9116940A Patent Abstracts of Japan, vol.94, No.10, & JP 6303320A WPI Abstract Accession No: 94-195600/199424 & JP 6133044A

(58) Field of Search
UK CL (Edition O) H4K KFH KF42
INT CL[6] H04M 3/42
ONLINE: WPI

(54) Voice dialling server for branch exchange telephone systems

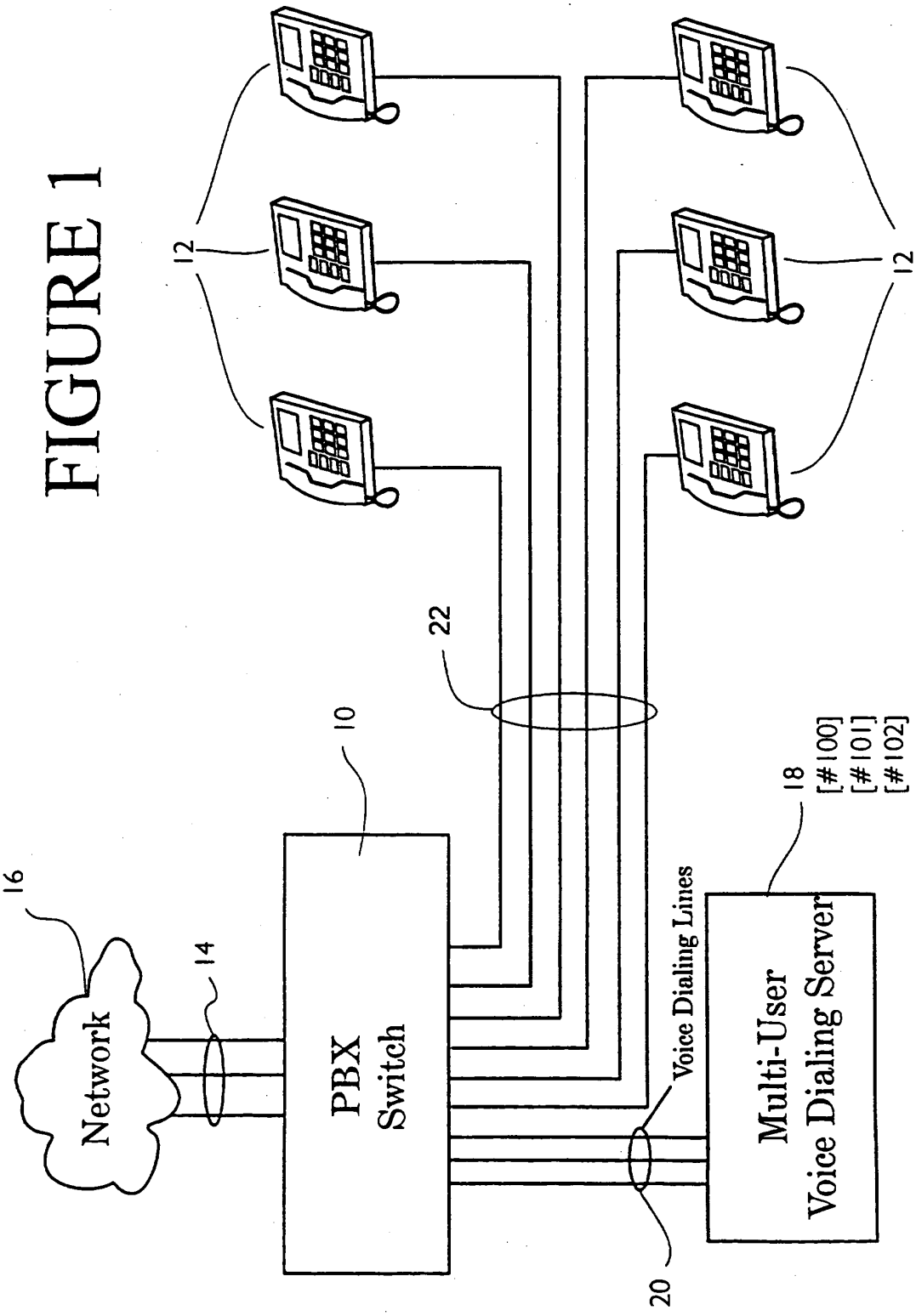
(57) The voice dialing server plugs into one or more unused extensions of a branch exchange system to provide each of the users on the system with voice dialing services. To use the system a user simply dials the extension to which the server is attached. The server then prompts the user to supply the name of a party to be called. The name is then looked up in a telephone number dictionary unique to that user. The system then places the telephone call by sending commands to the branch exchange system that simulate the operations a user would perform to connect to an outside line or inside extension and then place the call. The server incorporates a speech processing module having a multistage word recognizer that represents speech in terms of high phoneme similarity values. This representation is highly compact, allowing the word recognizer to perform the recognizer and fine match stages with far less processor overhead than frame-by-frame speech recognizers.

FIGURE 1



GB 2 317 782

FIGURE 1


12
12
22
10
16
14
Network
PBX
Switch
Voice Dialing Lines
20
18
[#100]
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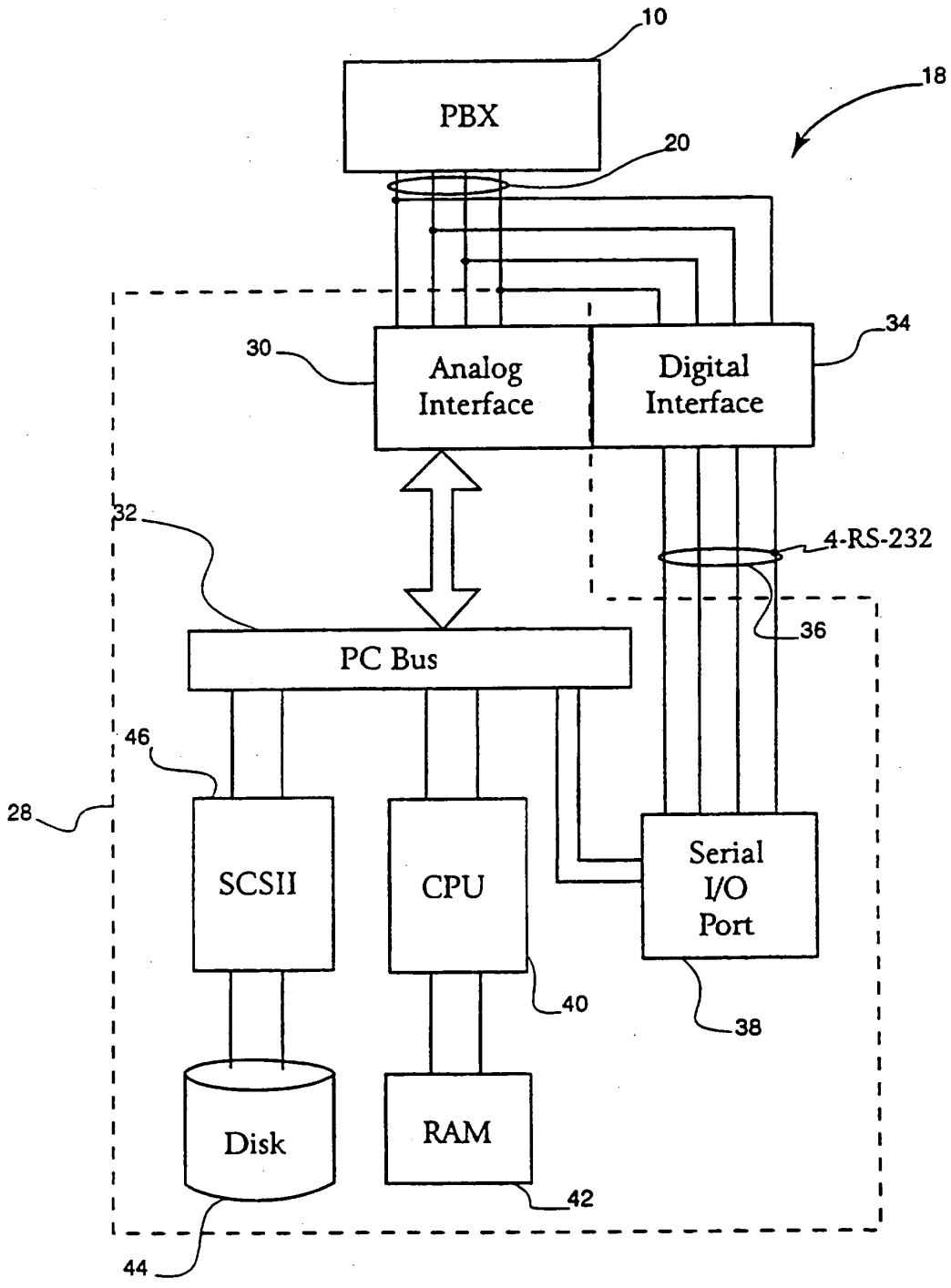
Multi-User
Voice Dialing Server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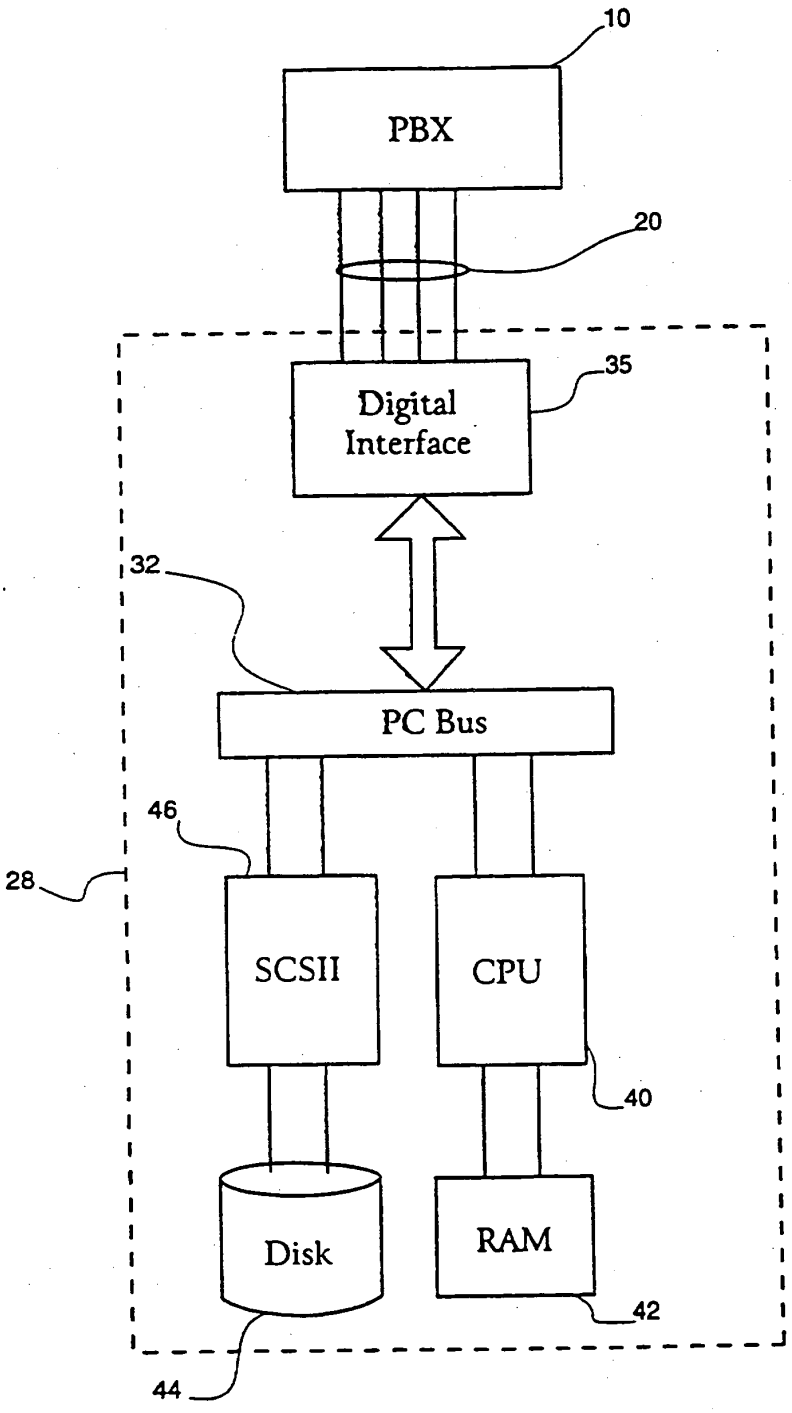
PBX
18
20
30
Analog Interface
Digital Interface
34
32
4-RS-232
36
PC Bus
46
28
SCSII
CPU
Serial I/O Port
40
38
Disk
RAM
42
44

Figure 2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PBX
20
35
Digital Interface
32
PC Bus
46
28
SCSII
CPU
40
Disk
RAM
42
44

Figure 3

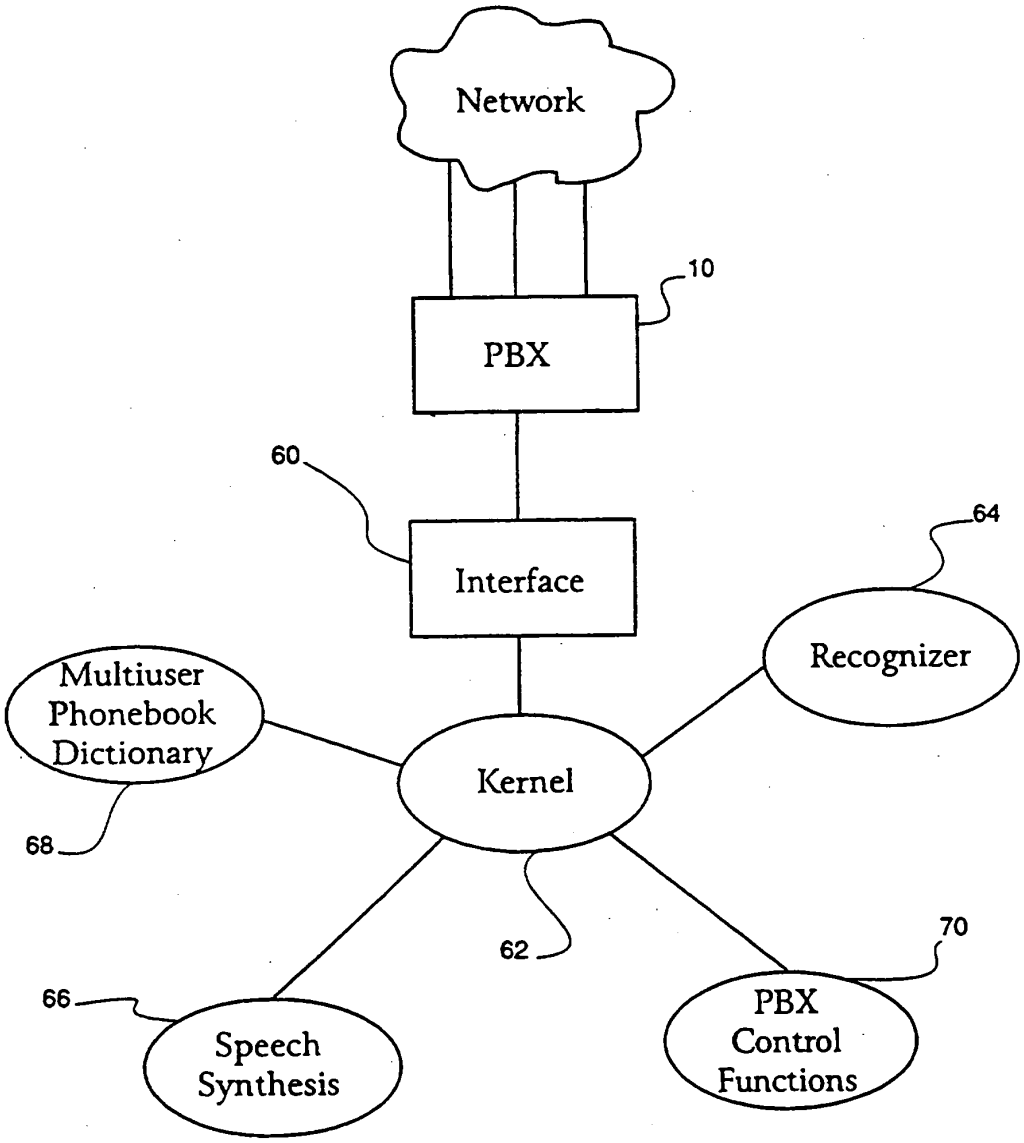
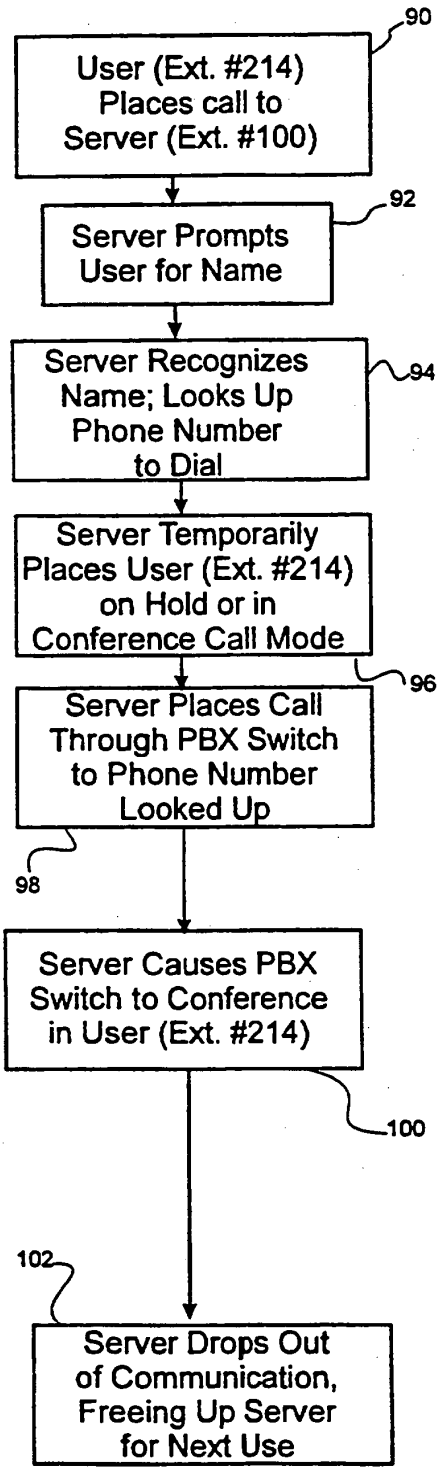
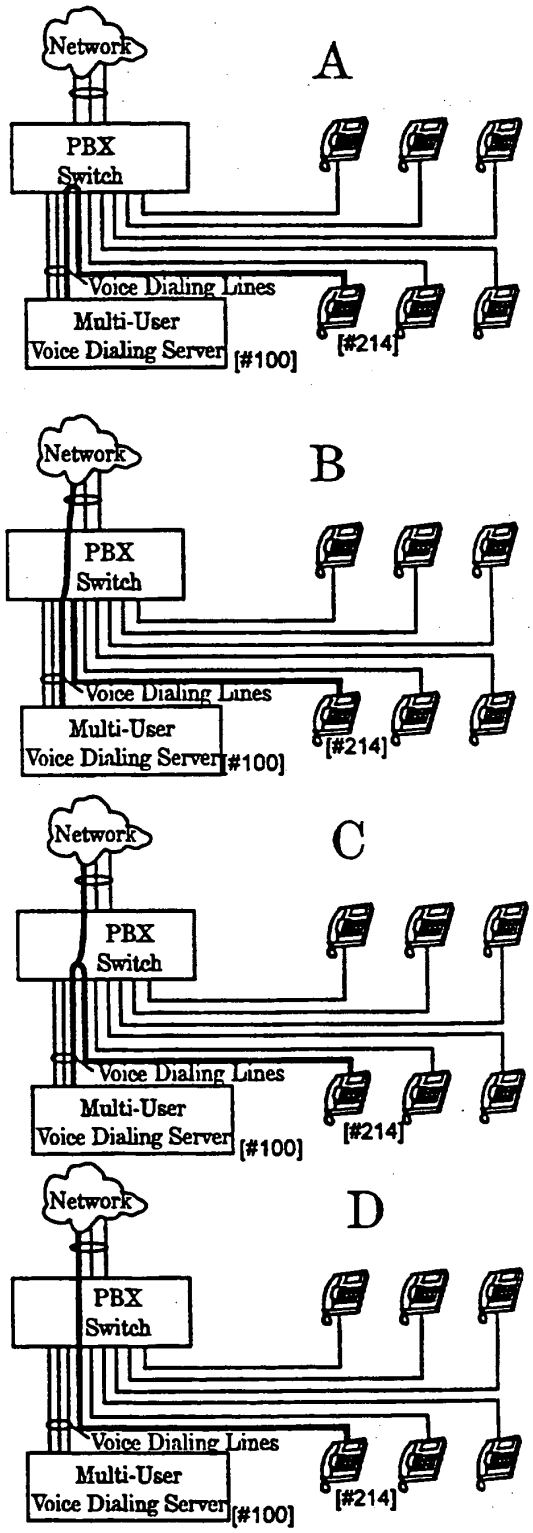

Network
10
PBX
60
Interface
64
Recognizer
Multiuser
Phonebook
Dictionary
68
Kernel
62
70
66
Speech
Synthesis
PBX
Control
Functions

Figure 4

FIGURE 5


User (Ext. #214) Places call to Server (Ext. #100)
90
Server Prompts User for Name
92
Server Recognizes Name; Looks Up Phone Number to Dial
94
Server Temporarily Places User (Ext. #214) on Hold or in Conference Call Mode
96
Server Places Call Through PBX Switch to Phone Number Looked Up
98
Server Causes PBX Switch to Conference in User (Ext. #214)
100
102
Server Drops Out of Communication, Freeing Up Server for Next Use


A
Network
PBX Switch
Voice Dialing Lines
Multi-User Voice Dialing Server
[#100]
[#214]
B
Network
PBX Switch
Voice Dialing Lines
Multi-User Voice Dialing Server
[#100]
[#214]
C
Network
PBX Switch
Voice Dialing Lines
Multi-User Voice Dialing Server
[#100]
[#214]
D
Network
PBX Switch
Voice Dialing Lines
Multi-User Voice Dialing Server
[#100]
[#214]

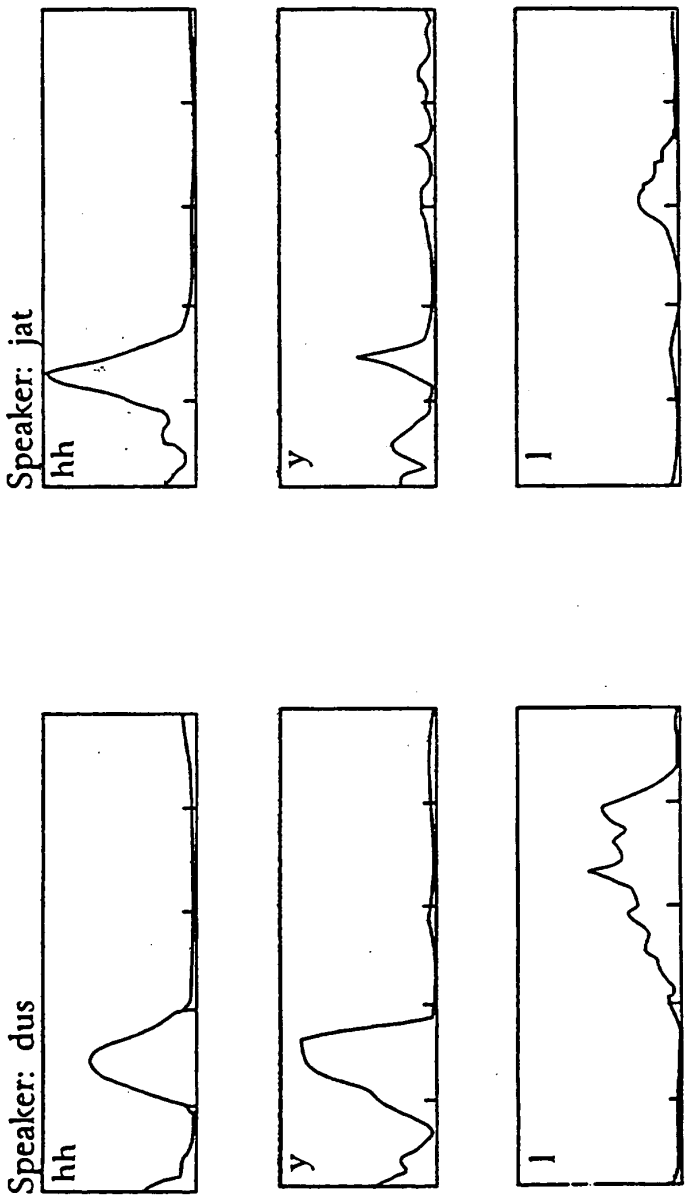


Figure 6

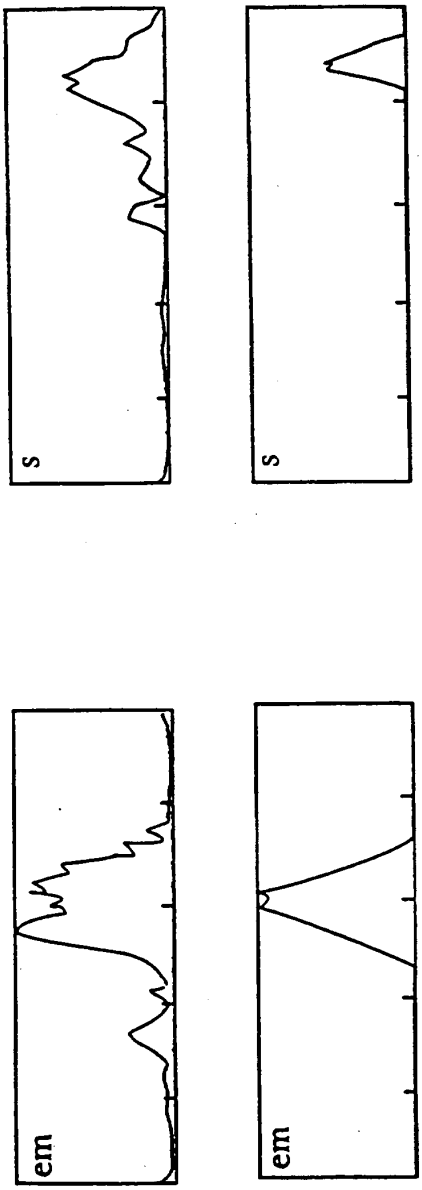


Figure 7

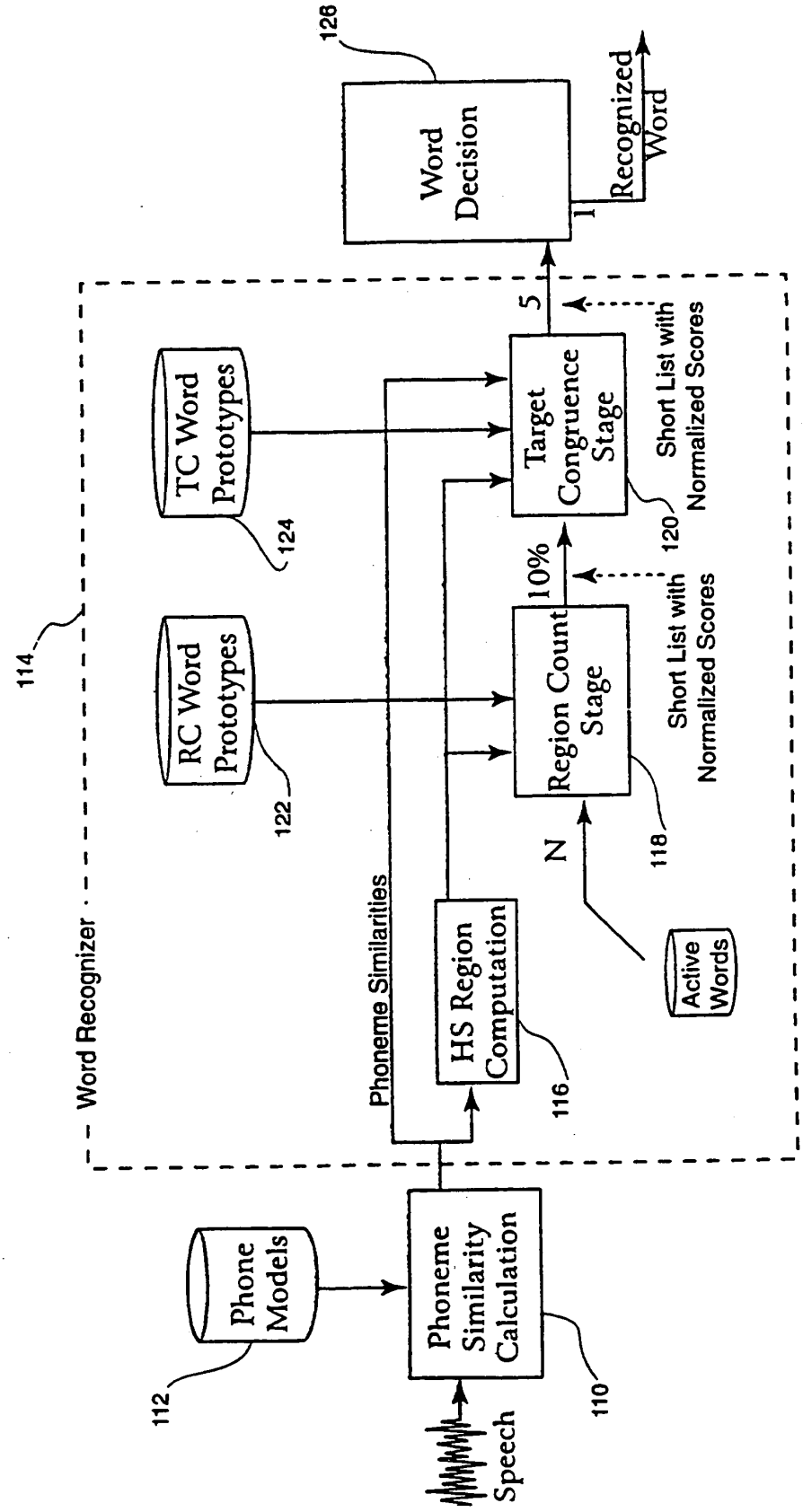

Speech
Phone Models
112
Phoneme Similarity Calculation
110
Word Recognizer
114
Phoneme Similarities
HS Region Computation
116
Active Words
N
RC Word Prototypes
122
TC Word Prototypes
124
Region Count Stage
118
10%
Short List with Normalized Scores
Target Congruence Stage
120
5
Short List with Normalized Scores
Word Decision
126
1
Recognized Word

Figure 8

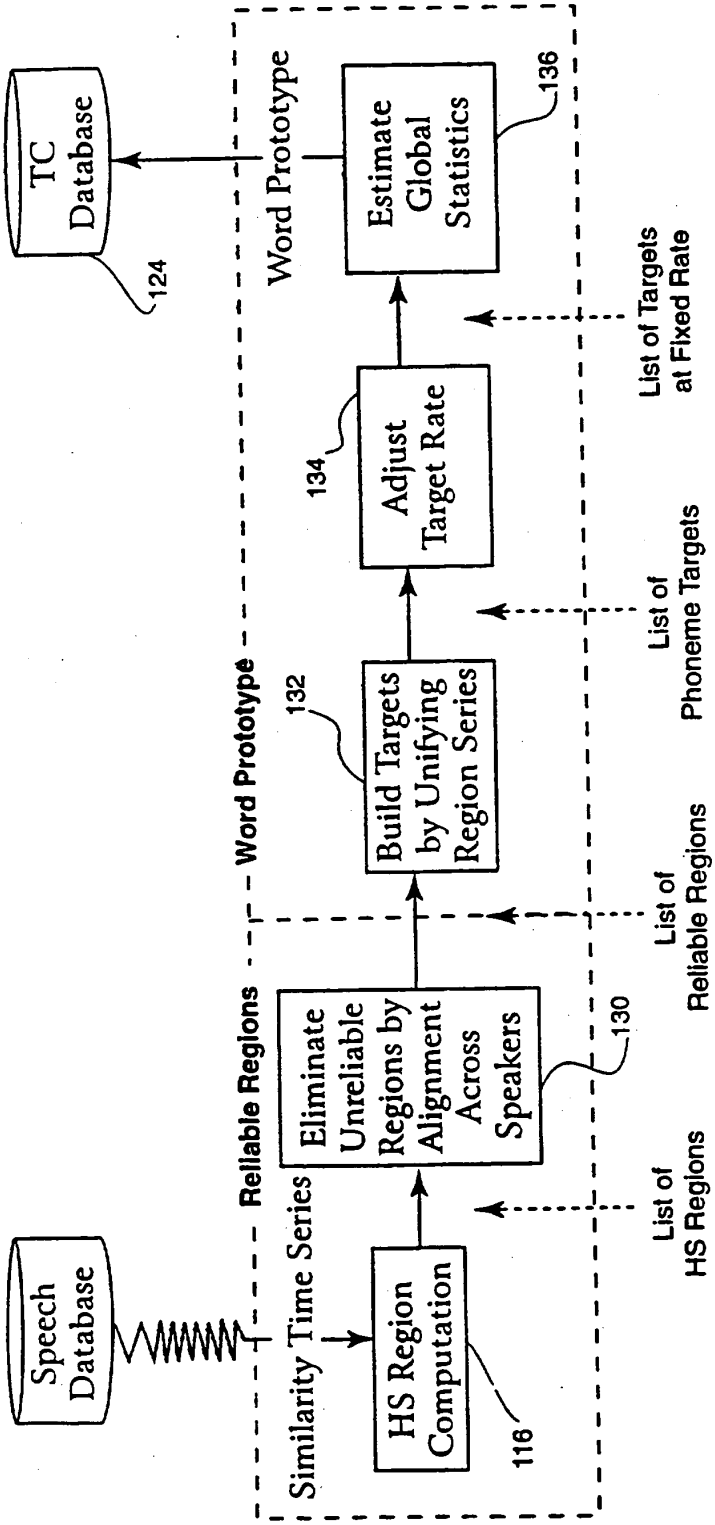

Speech Database
Similarity Time Series
HS Region Computation
116
List of HS Regions
Reliable Regions
Eliminate Unreliable Regions by Alignment Across Speakers
130
List of Reliable Regions with Probabilities
Word Prototype
Build Targets by Unifying Region Series
132
List of Phoneme Targets
Adjust Target Rate
134
List of Targets at Fixed Rate
Estimate Global Statistics
136
Word Prototype
TC Database
124

Figure 9

VOICE DIALING SERVER FOR BRANCH EXCHANGE TELEPHONE SYSTEMS

The present invention relates generally to telephone switching equipment. More particularly the invention relates to a voice dialing server that attaches to the telephone branch exchange equipment to provide voice dialing services without the need to extensively modify the branch exchange equipment. The preferred system plugs into one or more unused extensions of the branch exchange system to provide voice dialing services for multiple users of the system. Each user may have his or her own dictionary of names and phone numbers. The system integrates with the existing branch exchange network, using the existing voice and control channels to cause the existing branch exchange system to perform the necessary switching operations.

Voice dialing promises to make telephones easier to use, by allowing the user to simply speak a name and then have the voice dialing system look up the telephone number of the named party and automatically place the call. In the cellular telephone market, rudimentary voice dialing systems have been experimented with to provide hands-free operation. The primary technological focus in the cellular telephone market has been on how to overcome the high ambient noise level present in the cellular telephone

environment, particularly in car phone applications. There has also been some work in developing voice dialing units for the home. These units typically connect between the telephone and the outside telephone line. A primary technological focus of those units has been on how to overcome the presence of the dial tone when the user lifts the handset to use the voice dialer.

While voice dialing has made some inroads, particularly in the applications discussed above, voice dialing has yet to be incorporated into more complex telephone systems such as private branch exchange switching systems (PBX systems). There are a number of reasons for this. First, voice recognition is a challenging problem and current technology does not provide suitable recognition accuracy in an economical configuration. For example, the complex Hidden Markov Model-based systems employed by state-of-the-art speech recognizers (as in dictation transcription systems) require lots of memory and computational power.

Second, in the voice dialing application, the voice recognition problem is compounded where the system must be adapted for use by a large number of users. The need to respond to the spoken commands of a large number of users makes the voice dialing problem far more difficult than it is for simple voice dialing systems designed for home use.

Third, it is not a simple matter to integrate voice dialing into a complex telephone switching network. Modern-day telephone switching networks employ an intricate labyrinth of digital control signals that effect various switching functions (e.g. placing a call on hold, transferring a call, initiating a conference call, reassigning an extension to a different location

and so forth). Simple voice dialing systems of the type employed in cellular phone applications or home dialing applications will not work in this more complex environment.

Finally, office PBX equipment is expensive and difficult to replace without disrupting day-to-day office functions. Thus many businesses that would benefit from voice dialing services, were such equipment available, simply cannot afford the cost and down-time required to replace that equipment with newer equipment providing voice dialing capabilities.

Thus, while the desirability of providing voice dialing in office systems is readily appreciated, current technology does not provide the means to accomplish it.

The present invention provides a voice dialing server for coupling to a branch exchange telephone system of the type that provides call switching among a plurality of telephone extension ports. The system is designed for plug-compatible connection to the existing telephone system without the need for modifying the system extensively. The voice dialing server has an interface for connection to at least one of the telephone extension ports of the existing telephone system. The interface supports transmission of voice signals and telephone system control information.

The voice dialing server also includes a speech processing module coupled to the interface for providing the following services. The speech processing module answers calls placed to the voice dialing server by users of the system. It processes speech input from the user, corresponding to a

selected party to be called; and it looks up the telephone number of the selected party.

The voice dialing system also includes a branch exchange control module that is coupled to the interface and to the speech processing module. The control module issues control information to the telephone system, causing the telephone system to connect the user's extension to an outside line while dialing the phone number of the selected party. The preferred embodiment causes the extension that has been assigned to the interface to be connected to a second telephone port on the system. The second port can be another extension or an outside line. Then the call is placed via the second port and the user's extension is then attached to the second port. In this way the user is placed in communication with the selected party.

The system integrates fully with the existing branch exchange telephone system. Thus the invention can be readily added to an existing telephone system, simply by plugging it into an unused extension port on the system. To use the system the user simply dials the extension assigned to the voice dialing server and follows the voice prompts issued by the server. The system is preferably implemented in a multitasking environment that allows multiple threads to run concurrently. Thus multiple users may use the system simultaneously. The system is capable of providing different phone directories for different users, and these may be automatically associated with the users' telephone extension. The system is able to determine the extension of the user. By determining the user's extension the voice dialing server automatically uses the phone number dictionary created by the user at

that extension. Alteratively, the user can override the determined extension by supplying a different extension, thereby causing a different phone number dictionary to be used.

Although well integrated into the existing telephone system architecture, the invention can also be used by callers outside the system to reach persons inside the system or to look up numbers from the telephone book. For example, a user calling from home may connect to the voice dialing server by specifying the server's extension. Then, the user may enter his or her office telephone extension number, thereby telling the voice dialing server that the phone number dictionary assigned to the office extension should be used. Thereafter, the user calling from home can use his or her office telephone number directory just as if the user were from the office.

The voice dialing server uses very fast and yet remarkably accurate voice recognition technology based on reliably detected phoneme similarity regions. The preferred embodiment uses a multistage word recognizer that compactly represents speech in terms of high phoneme similarity values. This is a departure from conventional techniques that determine similarity based on a frame-by-frame alignment. The preferred embodiment uses a word recognizer that preserves only the interesting regions of high phoneme similarity or features. A word recognizer is used to narrow the search so that the subsequent fine match stage is able to perform its task more quickly. The word recognizer and fine match stages share the initial representation of speech as a sequence of multiple phoneme similarity values. By representing speech as features at a lower data rate in the initial stage

of recognition, the complexity of the matching procedure is greatly reduced.

For a more complete understanding of the invention, its objects and advantages, reference may be had to the following specification and to the accompanying drawings.

Figure 1 is a system block diagram showing the multiuser voice dialing server connected to an existing public branch exchange (PBX) switch;

Figure 2 is a block diagram of a first embodiment of the invention;

Figure 3 is a block diagram of a second embodiment of the invention;

Figure 4 is a entity relationship diagram showing how the major software subsystems are interfaced with the existing PBX switch;

Figure 5 is a flowchart with accompanying signal flow diagrams, showing how the PBX control functions are performed;

Figure 6 is a phoneme similarity time series for the word "hill" spoken by two speakers;

Figure 7 is a series of graphs showing the output of the region picking procedure whereby similarity values are converted into high similarity regions;

Figure 8 is a block diagram of the presently preferred word recognizer system;

Figure 9 is a block diagram illustrating the target congruence word prototype training procedure.

The present voice dialing server is designed to connect to an existing telephone system of the type found in small, medium and large businesses, institutions, hotels, offices and the like. For purposes of illustrating the invention the existing telephone system will be illustrated and described as a private branch exchange system or PBX system. As will be appreciated from the following description, the invention is not limited to any particular type of telephone switching system. Hence the reference to private branch exchange or PBX systems in this written description is not intended to limit the invention.

With the foregoing in mind, Figure 1 depicts a conventional PBX switch **10** to which a plurality of telephone stations **12** are connected. PBX switch **10** is connected through a plurality of outside lines **14** to the telephone network infrastructure **16**. Each of the individual stations **12** is connected to a separate extension or port, assigned a unique extension number. When calling internally from one station to another, the extension numbers may be dialed directly and the PBX switch connects the calling station to the designated receiving station. When placing calls to the telephone network **16** the full telephone number of the intended receiving station is dialed through the PBX switch.

The multiuser voice dialing server **18** of the invention is connected to one or more extension ports of the PBX switch **10**, essentially in the same fashion as telephone stations **12** are connected. Preferably the voice dialing server is assigned an extension number different from the extension numbers assigned to the telephone stations **12**. In this example the voice dialing server is assigned extension number #100. Although it is possible to implement the invention using only one extension line, the voice dialing server will handle more traffic from users if the server is connected through a plurality of lines to the PBX switch. In Figure 1 server **18** is connected through three separate lines **20** to three separate extension ports of the PBX switch **10**. These lines may be referred to as the voice dialing lines, although it will be appreciated that these lines are physically the same as the telephone station lines **22** that connect the telephone stations **12** to the PBX switch.

When multiple voice dialing lines are used, as illustrated here, one line will be assigned the primary extension number (in this case #100). The remaining lines are assigned other extension numbers. To make the system easy to use, the PBX switch **10** is programmed so that the primary extension (#100) is used by all users. When this extension is busy (in use by an earlier user) subsequent calls to the primary extension are routed to one of the unused remaining lines. If all voice dialing lines are busy when a user attempts to employ the voice dialing server, a busy signal will be received. This does not ordinarily occur because the voice dialing server is designed

to drop out of the communication path once the desired number has been dialed. The system is designed to prompt the user for a name. It then looks up the telephone number associated with that name and dials it after receiving verbal confirmation from the user. The voice recognizer of the preferred embodiment is quite fast, hence each individual use of the system does not tie up a voice dialing extension for very long.

A first embodiment of the voice dialing server is illustrated in Figure 2. In Figure 2 PBX switch 10 and the voice dialing lines 20 have been illustrated. The remaining components of the telephone system, as shown in Figure 1, have been omitted from Figure 2 to simplify the illustration. The voice dialing server can be implemented using a conventional personal computer, depicted diagrammatically at 28, that has been equipped with the voice dialing server software described more fully below. The voice dialing server embodiment of Figure 2 uses an analog interface 30 that plugs into the PC bus 32 and has ports for connecting to voice dialing lines 20. An optional digital interface 34 may be connected through a plurality of RS-232 lines 36 to the serial ports 38 of computer 28. In this case there would be a digital line for each analog line. The digital interface is connected in parallel with the analog interface to the voice dialing lines 20. Computer 28 includes a central processing unit 40 and random access memory 42. These are coupled to PC bus 32 in conventional fashion. A disk drive 44 is used to store the multiuser phone number dictionaries, as well as the boot copy of the voice dialing server software. The voice dialing server software is loaded into

RAM 42, where it is accessed by the CPU 40 during execution. Disk drive 44 may be coupled through any suitable interface such as a SCSI interface 46 to the PC bus 32.

The analog interface of this embodiment may be a model D41E voice board available from Dialogic. Analog interface 30 includes a digital signal processor (DSP) and a general purpose microprocessor. The interface is capable of handling all telephony signal and it performs DTMF (touchtone) detection and generation as well as audio/voice signal processing tasks. The D41E voice board from Dialogic supports four independent voice channels.

The digital interface 34 is a protocol converter that converts the digital control signals from PBX switch 10 into serial signals conforming to the telephony application programming interface (TAPI) protocol established by Microsoft Corporation. The digital interface 34 is optional. Essentially, it is provided to allow the voice dialing server to determine the user's extension number automatically. The TAPI protocol is used to employ a caller ID function that will tell the voice dialing server what extension the user is calling from. Knowing this extension allows the voice dialing server to automatically use the phone number dictionary that is preassigned to that caller's extension. Without the caller ID information, the voice dialing server will need to prompt the user to enter his or her extension in order to activate the correct phone number dictionary.

An alternate embodiment of the invention is depicted in Figure 3. The embodiment of Figure 3 is similar to that of Figure 2 except that a

dedicated digital interface 35 is used in place of analog interface 30 and digital interface 34. The dedicated digital interface is designed to directly connect with a predetermined make and model of PBX switch. The availability of such a dedicated digital interface 35 depends on the make and model of the PBX system. One such system is a Norstar PBX switch using a D/42-NS voice board as digital interface 35. The D/42-NS voice board is available from Dialogic. It functions similar to the D41E analog voice board described above, with additional digital control features built-in to interface with the Norstar PBX switch.

As noted above, the presently preferred embodiments are implemented using a suitably programmed personal computer. Figure 4 is a software entity relationship diagram showing the preferred software architecture that may be used to program the computer. Essentially, the software performs two functions: a voice interaction function and a PBX control function. From a voice and control signal standpoint, all communication with the PBX switch 10 is through an interface 60. The interface 60 supports both bidirectional voice communication and digital control information. The software of the preferred embodiment assumes that the voice channel has been digitized, hence the voice information communicated through interface 60 is digital audio data. If analog voice signals are present in the PBX system, they may be converted into digital signals through the analog interface hardware 30 (Figure 2).

Connected to interface **60** is the kernel module **62** that oversees the operation of the server software. Attached to the kernel module **62** is the voice recognizer module **64** and speech synthesis module **66**. The voice recognizer **64** works with a multiuser phone book dictionary **68** that contains all of the multiple users' personal phone book information, that is, the names and phone numbers that the users have entered by speaking the names and entering the numbers using DTMF tones entered through the touchtone keypad of the station handset. A subset of kernel module **62** are the PBX control functions **70**. These are a stored set of digital control commands that cause the PBX **10** to execute certain control functions, in effect mimicking the control functions that a user of a telephone station handset might employ. The PBX control functions include the ability to place a call on hold and to request the PBX switch to set up a conference call. These commands are used during dialing of the selected phone number and thereafter to connect the user to the selected party. See pseudocode in the Appendix for details.

Figure 5 is a flowchart showing how a user (at extension #214) might use the voice dialing server (at extension #100) to place an outside call using the voice dialer dictionary. Alongside the numbered boxes of the flowchart several reproductions of Figure 1 have been illustrated, showing in bold lines how the switching actually occurs. The reader may wish to refer to these switching diagrams while reading the flowchart of Figure 5.

The procedure begins at Step **90**. The user at extension #214 lifts the handset of the telephone station and dials the extension of the voice

dialing server (#100). The server answers the call and prompts the user for a name at Step 92. To effect this step the analog interface 30 (Figure 2) or the dedicated digital interface 35 (Figure 3) detects the ring signal and answers the incoming call. The extension number of the user's station is detected at this point for use in selecting the proper dictionary. The user may override by entering a different extension number. The incoming call event is transmitted through interface 60 (Figure 4) to the kernel module 62. In response, the kernel module 62 employs the speech synthesis module 66 to prompt the user for a name and then monitors the voice channel (through interface 60) while employing the recognizer module 64.

Returning to Figure 5, when the server recognizes the name spoken by the caller at Step 94, the server looks up the phone number to dial using the multiuser phone book dictionary 68 (Figure 4). If the voice recognizer does not identify a name in the dictionary, or if the recognized name is below a predetermined reliability threshold the kernel module 62 may employs the speech synthesis module 66 to prompt the user to try again.

After recognizing the name and looking up the phone number, the kernel module 62 of the server prompts the user by repeating the name and asking the user to verify that the name is correct. The user may then either answer yes or no. If the answer is yes, the server will proceed to place the call. If the answer is no, the server will prompt the user to try again.

During these first three steps (Steps 90-94) the user's extension is connected through the PBX switch to the voice dialing server. This is

shown in the switching diagram adjacent Steps 90-94. Bold lines are used to show the connection.

After obtaining the number to call and receiving the user's verification, the server then at Step 96 temporarily places the user on hold or in conference call mode. Then in Step 98 the server places a call through the PBX switch to the phone number that was determined during the lookup procedure. As illustrated at B the user's extension (#214) is temporarily placed on hold while the server is connected to an outside line via the PBX switch. Note that this technique allows the voice dialing server to connect to an outside line without the need to employ a separate inside extension. To effect this operation the kernel module 62 uses one of the PBX control functions 70 to send a request through interface 60 to the PBX. The request causes the PBX to place the user's extension on hold or in conference call mode and then causes the PBX switch to connect the server's extension (#100) to an outside line. This is done by mimicking the control signal commands that would be sent by a user of a telephone station handset to effect these same functions.

After establishing an outside line connection and receiving a dial tone, the server places the call by dialing the number that was looked up. The kernel 62 performs this operation by using the DTMF dialing capabilities of the analog interface 30 (Figure 2) or the digital interface 35 (Figure 3).

After dialing the desired number the server causes the PBX switch to conference in the user's extension at Step 100. As shown at C, the user's

extension (#214) and the voice dialing server's extension (#100) are now both connected through a conference call to the outside line. Finally, in Step 102 the server drops out of the communication as illustrated at D. This leaves the user's extension (#214) connected to the outside line and frees up the server for its next use by another user.

The present invention employs a unique compact speech representation based on regions of high phoneme similarity values. As shown in Figure 6, there is an overall consistency in the shape of the phoneme similarity time series for a given word. In Figure 6 phoneme similarity time series for the word "hill" spoken by two speakers are compared. Although the precise wave shapes differ between the two speakers, the phoneme similarity data nevertheless exhibit regions of similarity between the speakers. Similar behavior is observed in the phoneme plausibility time series that has been described by Gong and Haton in "Plausibility Functions in Continuous Speech Recognition: The VINICS System," *Speech Communication*, Vol. 13, Oct. 1993, pp. 187-196.

Conventional speech recognition systems match each input utterance to reference templates, such as templates composed on phoneme similarity vectors, as in the model speech method (MSM) of Hoshimi et al., "Speaker-Independent Speech Recognition Method Using Training Speech From a Small Number of Speakers," ICASSP, Vol. 1, pp. 469-472, 1992. In these conventional systems the reference speech representation is frame-based and requires a high data rate, typically 8 to 12 parameters every 10 to 20 milliseconds. The

frame-by-frame alignment that is required with these conventional systems is computationally costly and makes this approach unsuitable for larger vocabularies, especially when using small hardware.

The present system uses a multistage word recognizer that is applied prior to a frame-by-frame alignment, in order to reduce the search space and to achieve real time performance improvements. The number of stages in the recognizer, as well as the computational complexity of each stage and the number of word candidates preserved at each stage, can be adjusted to achieve desired goals of speed, memory size and recognition accuracy for a particular application. The word recognizer uses an initial representation of speech as a sequence of multiple phoneme similarity values. However, the word recognizer further refines this speech representation to preserve only the interesting regions of high phoneme similarity. Referring to Figure 7, the interesting regions of high phoneme similarity value are represented as high similarity regions. By representing the speech as features at a lower data rate in the initial stages of recognition, the complexity of the matching procedure is greatly reduced.

The multistage word recognizer also employs a unique scoring procedure for propagating and combining the scores obtained at each stage of the word recognizer in order to produce a final word decision. By combining the quasi-independent sources of information produced at each stage, a significant gain in accuracy is obtained.

The system's architecture features three distinct components that are applied in sequence on the incoming speech to compute the best word candidate.

Referring to Figure 8, an overview of the presently preferred system will be presented. The first component of the present system is a phoneme similarity front end **110** that converts speech signals into phoneme similarity time series. Speech is digitized at 8 kilohertz and processed by 10th order linear predictive coding (LPC) analysis to produce 10 cepstral coefficients every 100th of a second. Each block of 10 successive frames of cepstral coefficients is compared to 55 phoneme reference templates (a subset of the TIMIT phoneme units) to compute a vector of multiple phoneme similarity values. The block of analysis frames is then shifted by one frame at a time to produce a vector of phoneme similarity values each centisecond (each 100th of a second). As illustrated in Figure 8, the phoneme similarity front end works in conjunction with a phone model database **112** that supplies the phoneme reference templates. The output of the phoneme similarity front end may be stored in a suitable memory for conveying the set of phoneme similarity time series so generated to the word recognizer stages.

The word recognizer stages, depicted in Figure 8 generally at **114**, comprise the second major component of the system. A peak driven procedure is first applied on the phoneme similarity time series supplied by front end **110**. The peak driven procedure extracts High Similarity Regions (HS Regions). In this process, low peaks and local peaks of phoneme similarity values are

discarded, as illustrated in Figure 7. In the preferred embodiment regions are characterized by 4 parameters: phoneme symbol, height at the peak location and time locations of the left and right frames. Over our data corpus, an average of 60 regions per second of speech is observed. In Figure 8 the high similarity region extraction module **116** performs the peak driven procedure. The output of the HS region extraction module is supplied to two different word recognizer stages that operate using different recognizer techniques to provide a short list of word candidates for the fine match final recognizer stage **126**.

The first of the two stages of word recognizer **114** is the Region Count stage or RC stage **118**. This stage extracts a short list of word candidates that are then supplied to the next stage of the word recognizer **114**, the Target Congruence stage or TC stage **120**. The RC stage **118** has an RC word prototype database **122** that supplies compact word representations based on the novel compact speech representation (regions of high phoneme similarity values) of the invention. Similarly, the TC stage **120** also includes a TC word prototype database **124** that supplies a different compact word representation, also based on the compact speech representation of the invention. The TC stage provides a more selective short list of word candidates, essentially a further refinement of the list produced by the RC stage **118**.

The word decision stage **126**, the final major component of the present system, selects the word with the largest score from the short list supplied by TC stage **120**.

Region Count Modeling

The RC stage **118** of word recognizer **114** represents each reference word with statistical information on the number of HS regions over a predefined number of time intervals. The presently preferred embodiment divides words into three equal time intervals in which each phoneme interval is described by (1) the mean of the number of HS regions occurring in that interval and (2) a weight that is inversely proportional to the square of the variance, which indicates how reliable the region count is. Specifically for a score normalized between 0 and 100, the weight would be $100/(\text{variance}^2 + 2)$. These parameters are easily estimated from training data. In the currently preferred implementation, each word requires exactly 330 parameters, which corresponds to two statistics, each over three intervals each comprising 55 phoneme units (2 statistics x 3 intervals x 55 phoneme units).

Region count modeling was found to be very effective due to its fast alignment time (0.33 milliseconds per test word on a Sparc10 workstation) and its high top 10% accuracy.

The region count prototype is constructed as follows. A first utterance of a training word or phrase is represented as time-dependent phoneme similarity data. In the presently preferred embodiment each utterance

is divided into N time intervals. Presently each utterance is divided into three time intervals, with each time interval being represented by data corresponding to the 55 phonemes. Thus the presently preferred implementation represents each utterance as a 3 x 55 vector. In representing the utterance as a 3 x 55 vector, each vector element in a given interval stores the number of similarity regions that are detected for each given phoneme. Thus if three occurrences of the phoneme "ah" occur in the first interval, the number 3 is stored in the vector element corresponding to the "ah" phoneme.

An inductive or iterative process is then performed for each of the successive utterances of the training word or phrase. Specifically, each successive utterance is represented as a vector like that of the first utterance. The two vectors are then combined to generate the vector sum and the vector sum of the squares. In addition, a scalar count value is maintained to keep track of the current number of utterances that have been combined.

The process proceeds inductively or iteratively in this fashion, each new utterance being combined with the previous ones such that the sum and sum of squares vectors ultimately represent the accumulated data from all of the utterances.

Once all training utterances have been processed in this fashion the vector mean and vector variance are calculated. The mean vector is calculated as the sum vector divided by the number of utterances used in the training set. The vector variance is the mean of the squares minus the square of the means. The mean and variance vectors are then stored as the region

count prototype for the given word or phrase. The same procedure is followed to similarly produce a mean and variance vector for each of the remaining words or phrases in the lexicon.

When a test utterance is compared with the RC prototype, the test utterance is converted into the time dependent phoneme similarity vector, essentially in the same way as each of the training utterances were converted. The Euclidean distance between the test utterance and the prototype is computed by subtracting the test utterance RC data vector from the prototype mean vector and this difference is then squared. The Euclidean distance is then multiplied by a weighting factor, preferably the reciprocal of the prototype variance. The weighted Euclidean distance, so calculated, is then converted into a scalar number by adding each of the vector component elements. In a similar fashion the weighting factor (reciprocal of the variance) is converted into a scalar number by adding all of the vector elements. The final score is then computed by dividing the scalar distance by the scalar weight.

The above process may be repeated for each word in the prototype lexicon and the most probable word candidates are then selected based on the scalar score.

Target Congruence Modeling

The second stage of the word recognizer represents each reference word by (1) a prototype which consists of a series of phoneme targets and (2) by global statistics, namely the average word duration and the average "match

rate," which represents the degree of fit of the word prototype to its training data. In the presently preferred embodiment targets are generalized HS regions described by 5 parameters:

1. phoneme symbol;
2. target weight (percentage occurrence in training data);
3. average peak height (phoneme similarity value);
4. average left frame location;
5. average right frame location.

Word prototypes are automatically created from the training data as follows. First, HS regions are extracted from the phoneme similarity time series for a number of training speakers. The training data may be generated based on speech from a plurality of different speakers or it may be based on multiple utterances of the same training words by a single speaker. Then, for each training utterance of a word, reliable HS regions are computed by aligning the given training utterance with all other utterances of the same word in the training data. This achieves region-to-region alignment.

For each training utterance the number of occurrences (or probability) of a particular region is then obtained. At that time, regions with probabilities less than a pre-established Reliability Threshold (typically 0.25) are found unreliable and are eliminated. The word prototype is constructed by merging reliably detected, high similarity regions to form *targets*. At the end of that process a target rate constraint (i.e. desired number of targets per second) is then applied to obtain a uniform word description level for all the words in the lexicon. The desired number of

targets per second can be selected to meet system design constraints such as the ability of a given processor to handle data at a given rate. By controlling the target rate a reduction in the number of targets is achieved by keeping only the most reliable targets. Once the word prototype has been obtained in this fashion, the average match rate and average word duration are computed and stored as part of the word prototype data.

The number of parameters needed to represent a word depends on the average duration of the word and on the level of phonetic detail that is desired. For a typical 500 millisecond word at 50 targets per second, the speech representation used by the presently preferred embodiment employs 127 parameters, which correspond to 5 values per target x 50 targets per second x 0.5 seconds + 2 global statistics (average match rate and average word duration).

Figure 9 illustrates the word prototype training procedure by which the TC word prototype database **124** is constructed. The RC word prototype database **122** is constructed by similar, but far simpler process, in that only the presence or absence of an HS region occurring with each of the three equal time intervals must be detected.

Referring to Figure 9, the HS Region Computation Module **116** is used to convert the similarity time series from the speech database into a list of HS regions. The alignment module **130** operates on this list of HS regions to eliminate unreliable regions by alignment across speakers. Again,

the process can be performed across a plurality of different speakers or across a plurality of utterances by the same speaker.

Next the list of reliable regions, together with the associated probabilities of detecting those regions is passed to the target building module **132**. This module builds targets by unifying the region series to produce a list of phoneme targets associated with each word in the database. This list of phoneme targets is then supplied to a module **134** that adjusts the target rate by applying the target rate constraint. The target rate constraint (the desired number of targets per second) may be set to a level that achieves the desired target rate. After adjusting the target rate a statistical analyzer module **136** estimates the global statistics (the average match rate and the average word duration) and these statistics along with the list of targets at the selected rate are then stored as the TC word prototype database **124**.

Word Recognition

Given an active lexicon of N words, the region count stage is first applied to produce a short list of word candidates with normalized scores. A weighted Euclidean distance is used to measure the degree of fit of a test word X to a reference word P (in RC format as supplied by the RC word prototype database). Specifically, in the current implementation the weighted Euclidean distance is defined as

$$D_{RC}(X,P)=\sum_{i=1}^{3}\sum_{j=1}^{55}(x_{ij}-p_{ij})^2 w_{ij} \Big/ \sum_{i=1}^{3}\sum_{j=1}^{55} w_{ij}$$

where x_{ij} is the number of HS regions in time interval I for phoneme j, where p_{ij} is the corresponding average number of HS regions estimated on training data, and where w_{ij} is the corresponding weight. The N/10 highest scoring word prototypes are preserved as word candidates and their scores (weighted Euclidean distances) are normalized by dividing each individual score by the highest score. This defines a normalized score S_{RC} for each word. Normalized scores range from 0 to 1 and are dimensionless, making it possible to combine scores resulting from different scoring methods.

The target congruence stage is then applied on each word candidate selected by the RC stage. A region-to-target alignment procedure is used to produce a congruence score between the test word and a given word reference (in TC format as supplied by the TC word prototype database). The congruence score of a matched target CGmatch, that is, the alignment found between target t of the prototype and region r of the test word, is defined as

$$CG_{match}(t,r) = \min(A_t / A_r, A_r / A_t)$$

where A_t and A_r respectively represent the target's area and the aligned region's area in the time similarity plane.

The congruence score of an unmatched target CGunmatch is computed in the same way, using an estimate for the area A_r of the missing HS region. The estimated area A_r is computed as the area under the similarity curve for

the target's phoneme label, between the projected locations of the target's left and right frames.

The word congruence score is computed as the weighted sum of congruence scores for all the targets, divided by the sum of their weights. Normalized congruence scores S_{TC} are computed by dividing the individual congruence scores by the highest congruence score. The final score output by the word recognizer is a combination of the information obtained at each recognizer stage. In the presently preferred embodiment the final score output of the recognizer is:

$$S_{Hypo} = (S_{RC} + S_{TC})/2$$

The recognized word is the one with the highest S_{Hypo} value.

APPENDIX

Notes:

The function TransferCallDesklab(Number) does the transfer to an inside extension by calling the PBX function "feature 7 0" followed by the extension number after a hookflash. Then the line is released.

The function TransferExternalCallDeskLab(Number) does the transfer outside. In the program a message is played, then the user is put on hold (by sending "feature 7 9", then the program gets an external line, then a conference call is established, the phone number is dialed, and the line is released.

Pseudocode:

```
int TransferCallDeskLab(Number)
char *Number;
{
  int LastRet;
  int Ret;


  ghookflash((*DskLab).Desc,500);
  gdial((*DskLab).Desc,"*70",1);
  gdial((*DskLab).Desc,Number,1);
  gphone_hookswitch((*DskLab).Desc,1);
  while (Ret=gphone_status((*DskLab).Desc,&LastRet)!=G_ONHOOK)
    {
      sleep(1);
    }
}

int TransferExternalCallDeskLab (phoneNumber)
        char *phoneNumber;
```

```
{
  int LastRet;
  int Ret;
  int lastatus=-199, rtnval;
  int thereIsProblem,
      state,
      new_state,      last_state;
extern char *G_PhoneStatus[];
    char msg[] = "Calling";

    /* Play message while transfering */
    ALIPlayMessage(msg);
    esleep(1,1000);

    printf("Putting calling line on hold ...");fflush(stdout);
    ghookflash((*DskLab).Desc,500);
    gdial((*DskLab).Desc,"*79",1);
    printf("done!\n"); fflush(stdout);

    printf("Getting  external line .. "); fflush(stdout);

    gdial((*DskLab).Desc,"9",0);   /* obtain an external line */

    state = 0;
    do {
        esleep(0,1000);
        new_state = gphone_status((*DskLab).Desc,&last_state);
        if (state != new_state)  {
                state = new_state;
                printf("state = %s\n",G_PhoneStatus[state]);
        }
        thereIsProblem = 0;

        switch (state) {
           case G_ONHOOK:   /* call disconnected -- strangely */
           case G_BUSY:     /* cannot get an outside line */
           case G_REORDER:
           case G_REORDER2: thereIsProblem = 1;
           default: break;
        }
    }  while ( (state != G_DIALTONE ) && (state != G_CONNECTED)
               && !thereIsProblem );

    printf("done!\n"); fflush(stdout);
    printf("Establishing Conference Call ...");fflush(stdout);

    ghookflash((*DskLab).Desc,500);    gdial((*DskLab).Desc,"*3",1);
```

```
    ALIPlayMessage(msg);

    printf("Dialing %s... ",phoneNumber); fflush(stdout);

    gdial((*DskLab).Desc,phoneNumber,1);
    printf("done!\n"); fflush(stdout);

    state = 0;
    do  {
        esleep(0,10000);                    /* 1/4 second sleep */
        new_state = gphone_status((*DskLab).Desc,&last_state);
        if (state != new_state)  {
            state = new_state;
            printf("state = %s\n",G_PhoneStatus[state]);fflush(stdout);
        }
        thereIsProblem = 0;

        switch (state) {
          case G_ONHOOK:   /* call disconnected -- strangely */
          case G_BUSY:     /* cannot get an outside line */
          case G_REORDER:
          case G_REORDER2: thereIsProblem = 1;
          default: ;
        }
    }  while ((state !=G_CONNECTED ) && (state != G_BUSY) &&
!thereIsProblem);

    printf("Putting phone ONHOOK ...");fflush(stdout);

    gphone_hookswitch((*DskLab).Desc,G_ONHOOK);
    while ((Ret=gphone_status((*DskLab).Desc,&LastRet))!=G_ONHOOK)
    {
      sleep(1);
    }
    printf("done!\n"); fflush(stdout);
}
```

CLAIMS

1. A voice dialing server for coupling to a branch exchange telephone system of the type that provides call switching among a plurality telephone extension ports, comprising:

an interface for connection to at least a first one of said telephone extension ports to support transmission of voice signals and telephone system control information;

a speech processing module coupled to said interface for (a) answering a call placed to the voice dialing server by a user (b) processing speech input from the user corresponding to a selected party to be called and (c) looking up a phone number of a selected party;

branch exchange control module coupled to said interface and to said speech processing module for issuing control information to said telephone system (a) to cause the extension assigned to said interface to connect to second port (b) to establish communication via the second port and (c) to attach the user's extension to the second port, whereby the user is placed in communication with the selected party.

2. The server of Claim 1 wherein said speech processing module supports a plurality of user phone number dictionaries.

3. The server of Claim 2 wherein said branch exchange control module includes system for communicating with said telephone system to determine the identity of the user's extension and for using this identity to select one of said plurality of phone number dictionaries for use by said speech processing module.

4. The server of Claim 2 wherein said branch exchange control module includes system responsive to keyed user input for selecting one of said plurality of phone number dictionaries for use by said speech processing module.

5. The server of claim 1, 2, 3 and 4, wherein said branch exchange control module issues control information to said telephone system to place the user's call to the voice dialling server on hold while establishing communication via said second port.

6. The server of any one of claims 1 to 5, wherein said branch exchange control module issues control information to said telephone system to transfer the user's call to the voice dialling server to another extension on said telephone system.

7. The server of any one of claims 1 to 6, wherein said branch exchange control module is implemented on a computer having a bus and said interface comprises an analog interface coupled to the bus of said computer.

8. The server of any one of claims 1 to 6, wherein said branch exchange control module is implemented on a computer having at least one

serial port and said interface comprises an analog interface coupled to the serial port of said computer.

9. The server of any one of claims 1 to 6, wherein said branch exchange control module is implemented on a computer having a bus and said interface comprises an digital interface coupled to the bus of said computer.

10. The server of any one of claims 1 to 9, wherein said speech processing module includes a speech recognizer that represents speech as high phoneme similarity values.

11. The server of any one of claims 1 to 9, wherein said speech processing module includes a speech recognizer comprising a word recognizer that employs a region count stage that extracts a list of word candidates based on regions of high phoneme similarity values.

12. The server of any one of claims 1 to 9, wherein said speech processing module includes a speech recognizer comprising a word recognizer that employs:

a region count stage that extracts a first list of word candidates based on regions of high phoneme similarity values, and

a target congruence stage that extracts a second list of word candidates from said first list based on regions of high phoneme similarity values.

13. A server constructed and arranged to operate as hereinbefore described with reference to the accompanying drawings.

The Patent Office

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Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): H4K (KFH , KF42)

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Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	EP 0283120 A1 (BRITISH TELECOM) - see whole document	1 at least
X	EP 0166318 A2 (STANDARD ELECTRIC) - see fig.1 & US4763350	1 at least
X,P	WPI Abstract Accession No: 97-305198/199728 & JP 9116940A (MATSUSHITA) 02.05.97 (see abstract)	1 at least
X	Patent Abstracts of Japan, vol.94, No.10, & JP 6303320A (MATSUSHITA) 28.10.94 (see abstract)	1 at least
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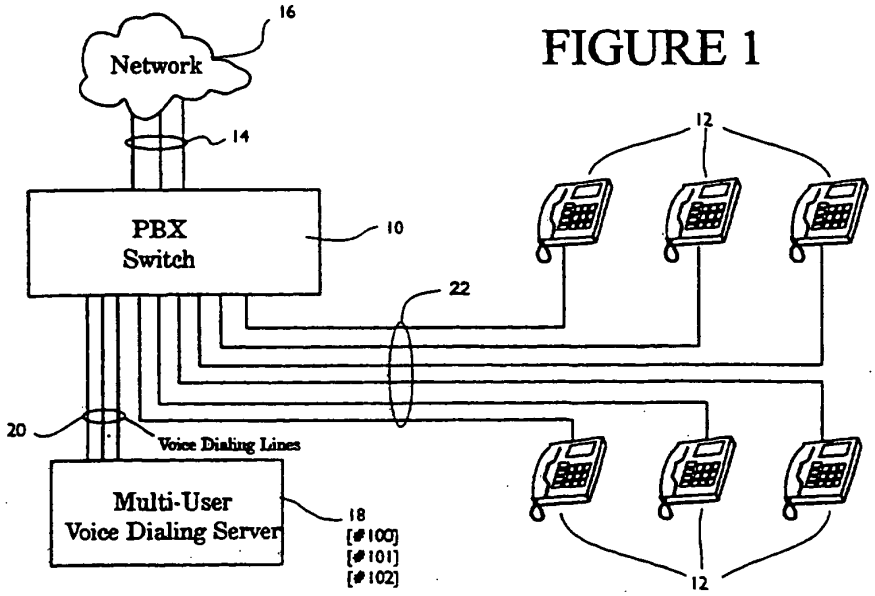
(54) Voice dialling server for branch exchange telephone systems

(57) The voice dialing server plugs into one or more unused extensions of a branch exchange system to provide each of the users on the system with voice dialing services. To use the system a user simply dials the extension to which the server is attached. The server then prompts the user to supply the name of a party to be called. The name is then looked up in a telephone number dictionary unique to that user. The system then places the telephone call by sending commands to the branch exchange system that simulate the operations a user would perform to connect to an outside line or inside extension and then place the call. The server incorporates a speech processing module having a multistage word recognizer that represents speech in terms of high phoneme similarity values. This representation is highly compact, allowing the word recognizer to perform the recognizer and fine match stages with far less processor overhead than frame-by-frame speech recognizers.

FIGURE 1



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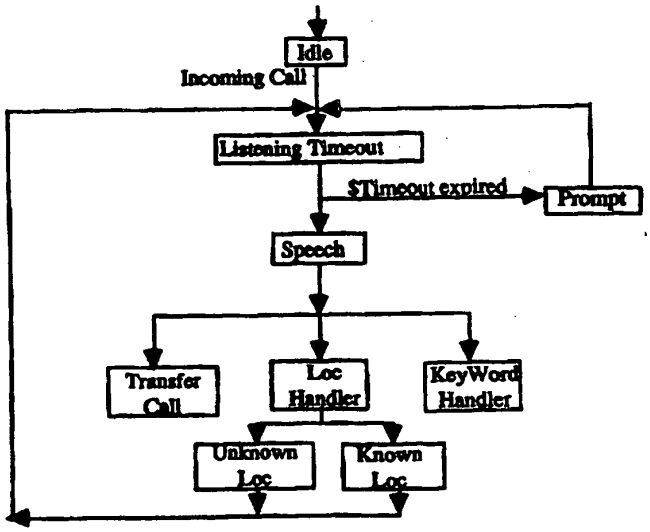

(57) Abstract

A method of reducing the perplexity of a speech recognition vocabulary and dynamically selecting speech recognition acoustic model sets used in a simulated telephone operator apparatus. The directory of users of the telephone network is subdivided into subsets wherein each subset contains the names of users within a certain location or exchange. A speech recognition vocabulary database is compiled for each subset and the appropriate database is loaded into the speech recognition apparatus in response to a requested call to the location covered by the subset. Furthermore, a site-specific acoustic model set is dynamically loaded according to the location of a calling party. An apparatus for carrying out the method is also discussed.

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APPARATUS AND METHOD FOR REDUCING SPEECH RECOGNITION VOCABULARY PERPLEXITY AND DYNAMICALLY SELECTING ACOUSTIC MODELS

Field of the Invention

This invention relates to automatic speech recognition in telecommunication systems and to the use of such systems to provide large scale voice activated dialing and information retrieval services.

Background to the Invention

In the early development of telephone systems it was commonplace for a telephone subscriber to converse directly with a telephone operator at a telephone central office. The telephone subscriber would verbally request the telephone operator to complete a connection to a called party. As telephone exchanges were small the telephone operator was aware of virtually all of the subscribers by name and manually completed the requested connection. With the advent of dial telephone services, calls within an exchange could be completed automatically, and only certain toll calls required operator assistance. Today, operator assisted calls have become the exception and are usually comparatively expensive. Machine-simulated operator functions, including limited speech recognition services, have recently been available for expediting some typical operator-assisted functions. This includes "collect" long distance calls wherein completion of the connection is contingent upon the called party agreeing to pay for the service. However, these functions are limited to the simple recognition of "yes" or "no" so there is little room for non-functionality due to uncertainty as to which word was spoken. There have also been advancements in voice recognition services relating to directory assistance but these too are directed to a very limited vocabulary.

Prior Art

The prior art contains several recent developments pertaining to voice recognition in general, and to voice recognition applicable to telecommunication systems in particular.

U.S. Patent No. 5,091,947, which issued February 25, 1992 to Ariyoshi et al, entitled "Speech Recognition Method and Apparatus", discloses a voice recognition system for comparing both speaker dependent and speaker independent utterances against stored voice patterns within a coefficient memory. The voice identification comparator selects the one voice pattern having the highest degree of similarity with the utterance in question.

In U.S. Patent No. 5,165,095, which issued on November 17, 1992, Borcherding discloses a voice recognition system to initiate dialog to determine the correct telephone number. According to the '095 patent, the calling party is first identified so that a database containing speaker templates can be accessed. These templates are then used to compare the dial command so that the dialing instructions can be recognized and executed. An example of a dialing directive in the patent is "call home", with "call" being the dial command and "home" being the destination identifier.

Gupta et al, in U.S. Patent No. 5,390,278 issued February 14, 1995, disclose a flexible vocabulary speech recognition for recognizing speech transmitted via the public switched telephone network. This voice recognition technique is a phoneme based system wherein the phonemes are modeled as hidden Markov models.

In spite of these ongoing developments, the functionality of automatic recognition of human speech by machine has not advanced to a degree wherein a calling party

can simply speak the called party's name and thereafter be connected as reliably as a human operator in situations where the database for a potential called party is very large (greater than 100 names).

Summary of the Invention

The present invention is in the field of human speech recognition performed by machines and more particularly relates to a reduction of the perplexity of the speech recognition task in the context of names spoken by a telephone user in a telephone system.

Individual users of telephone networks are divided into subsets to facilitate identification of the vast number of subscribers to the service. In the public network these subsets are local exchanges. Private switching networks such as the Nortel Electronic Switching Network (ESN) assigns individual ESN numbers to each location within the private network. The present invention relies on these subsets or location identifiers to reduce the perplexity of a speech recognition application.

Therefore in accordance with a first aspect of the present invention, there is provided a telephone network including a plurality of telephone exchanges, each for serving a plurality of telephone terminals and each being interconnected with at least one other of the telephone exchanges for providing telephone communications between users of the telephone terminals. The network function includes a simulated telephone operator apparatus for receiving a speech request from a user for connection to another telephone user and to translate this request into a directory number for use by the appropriate one of the telephone exchanges. The translation is in accordance with a speech recognition algorithm and an active speech recognition vocabulary selected in accordance with the origin of the request.

In an ESN application the active speech recognition vocabulary is limited to the names of the individuals serviced by the ESN number. In a preferred embodiment the ESN number, which is also a location code, is contained in the first two or three digits of the directory number.

In accordance with a second aspect of the invention there is provided a simulated telephone operator server for a telephone network. The server has means for storing voice utterances of a calling party telephone user and means responsive to location information in association with the telephone user for selecting an active speech recognition vocabulary. Speech detection means are provided for processing the stored voice utterance in accordance with a speech recognition algorithm and the active speech recognition vocabulary. Directory lookup means identify a directory listing of a called party corresponding to a result of the processing by the speech detection means. The server also includes means for transmitting the directory listing to a telephone exchange serving the called party.

In accordance with a further aspect of the invention there is provided a telephone exchange comprising: a plurality of ports for serving a plurality of telephone users' telephone instruments via telephone lines; a trunk facility for connection to another telephone exchange; a switching network for connecting and disconnecting the telephone instruments; a controller means for causing a newly OFF HOOK telephone instrument to be coupled via the switching network with a solicitation signal, and subsequently for being responsive to a telephone number received in association with the newly OFF HOOK telephone instrument for completing a telephone call via the switching network. The exchange also includes an originating register means for storing voice band signals received from the newly OFF HOOK telephone instrument via the switching network.

Means are provided for detecting digits represented by frequency signals, within the stored voice band signals, in accordance with a standard for key pad dialed telephone numbers and for transmitting detected digits to the call controller. A simulated telephone operator apparatus receives and translates voice band signals in accordance with a speech recognition algorithm and an active speech recognition vocabulary selected in accordance with the origin of the voice band signals into a directory number for use by the controller means. An interface facility is provided for transmitting the stored voice band signals via the switching network to the simulated telephone operator server apparatus in an event wherein the voice band signals did not include a key pad dialed digit.

In accordance with yet a further aspect of the present invention there is provided a method of detecting a voiced speech request of a calling party for connection to another user of an automatic telephone exchange. The method comprises storing a plurality of speech recognition vocabularies in association with geographic location of users; receiving the voiced request and information as to the geographic location of the user having voiced the request from the automatic telephone exchange; selecting an active speech recognition vocabulary in accordance with the information as to the geographic location of the user and, in accordance with a speech recognition algorithm and the selected active speech recognition vocabulary, translating the received request into a directory number for use by the automatic telephone exchange in setting up a telephone connection between the calling telephone user and the other telephone user.

Brief Description of the Drawings

The invention will now be described in greater detail with reference to the attached drawings wherein:

FIGURE 1 is a block diagram illustrating trunk connections between private switch locations;

FIGURE 2 is a block diagram of the system hardware architecture;

FIGURE 3 is an overall system state diagram; and

FIGURE 4 is a state diagram of the key word handler.

Detailed Description of the Invention

The following description relates to an enterprise-wide speech directory calling service within a company or corporation having a number of locations. Each location is assigned a unique electronic switching network (ESN) location code or ESN number. As shown in the block diagram of FIGURE 1, the on-site PBX 20 at each location is connected to each other location via trunk connectors 22. In this discussion the ESN comprises a three-digit code to identify the location. It is to be understood, however, that it is not essential to use all three digits to identify the location as it may be sufficient to use the first two for example.

FIGURE 2 illustrates the hardware architecture in accordance with a preferred embodiment of the invention. As shown, PBX 20 is connected to trunk 22 and to a plurality of on site telephone sets as known in the art. The speech recognition system 30 of the invention is connected to the PBX 20 via T1 line 32 via T1 card 34 and via signal link 36 and signal link card 38. Speech recognition system 30 includes a speech recognition processor operating on a speech recognition algorithm, central processor and control units as well as memory cards for storing active speech recognition vocabulary data bases.

Although FIGURE 1 refers to a private switching network using ESNs, it is to be understood that the

invention is not limited to such networks but can also be adapted to use in public switching systems.

One objective metric used to measure the accuracy of a speech recognition system is the Word Error Rate (WER). The WER is defined as the total number of incorrectly recognized words made by a speech recognition system divided by the total number of words spoken by a user of the system.

$$WER = \frac{NumberofErrorsMadebyRecognizer}{NumberofWordsSpokenbyUser}$$

The present invention makes use of information as to the calling party's location for automatically assisting in improving the WER of a speech recognition system on a spoken called party's name for the purpose of connecting a telephone call.

It has been empirically shown that the WER of a speech recognition system will vary with the square root of the perplexity of the vocabulary of words being recognized. [Kimbal, O., et al., "Recognition Performance and Grammatical Constraints", Proceedings of a Workshop on Speech Recognition, Report Number SAIC-86/1546, Defense Advanced Research Projects Agency, Palo Alto, February 19-20, 1986.]

$$WER \propto \sqrt{Perplexity}$$

The perplexity of a vocabulary is defined as the measure of the constraint imposed by a grammar, or the level of uncertainty given the grammar of a population of users. Perplexity is mathematically modeled and quantified in the following way:

$$H = -\frac{1}{|V|}\sum_{w \in V} P(w) \bullet \log P(w)$$

$$B = 2^H$$

where: H is entropy
$P(w)$ is the probability of w being spoken
B is the perplexity of the application

The vocabulary of words in this implementation consists entirely of proper names, location names, and a small number of key words for command and control. For large corporations with a large number of employees, the proper names become the determining factor in measuring the perplexity since the number of employees will overwhelm the number of location names and key words. Thus location names and key words can be ignored in this calculation. If we make a simplifying assumption that every name is spoken with equal probability, then the equation above can be simplified to the following:

$$Perplexity = \sqrt[L]{|S|}$$

where: L is the average number of words in a sentence
S is the number of sentences in the vocabulary V

If we further make the simplification that proper names contain two words -- first and last name -- and the number of sentences in the vocabulary is equivalent to the number of employee names, then we can further reduce the equation to the following:

$$Perplexity = \sqrt{|S|}$$

If we make the assumption that the amount of confusability between names within a large database will be similar between large databases, the accuracy of a speech recognition system has the following relationship with the number of names in the vocabulary:

$$WER \propto \sqrt[4]{NumberofActiveDirectoryNames}$$

We can observe from the above equations that the WER increases with the perplexity and thus increases with the number of proper names in the vocabulary.

In the past, speech recognition scientists have used various methods to reduce the perplexity in an effort to improve the WER of a speech recognition system. To achieve this result, most of these efforts have been focused at the linguistic level. For example, scientists have used statistical language models and linguistics rules of phonology to reduce perplexity or uncertainty in recognizing a spoken word or phrase.

In this implementation the list of employee names for each location is stored in a separate speech recognition vocabulary. The employee name will normally be associated with the four digits of the telephone number following the three-digit ESN or location code. According to the system of the present invention a calling party wishing to speak to another employee at the same location will simply announce the first and last name of the employee to whom a connection is desired. The speech recognition system will assume that calling party and called party are at the same location and load the active speech recognition vocabulary database containing the names of all employees at that location. Using a conventional speech recognition algorithm the name spoken by the calling party is compared by the system against the names of all employees in the database and the closest match is selected. The name selected is announced to the calling party and the call is automatically connected to the line associated with the telephone number assigned to the called party unless the calling party interrupts the process by saying, "No." Thereafter the voice recognition system releases from the call.

If the called party is at a different location than the calling party, the calling party will first announce the location of the called party followed by the called party's name. The voice recognition system responds by announcing the location and subsequently loading the active voice recognition vocabulary database including the names of all the employees at the announced location of the called party. The voice recognition system then selects the name in the loaded database that most closely matches the name of the called party. The selected name is announced to the calling party and the call is automatically connected to the line associated with the telephone number assigned to the called party unless the calling party interrupts the process by saying, "No." Thereafter the voice recognition system releases from the call.

Because the active voice recognition vocabulary set associated with each ESN or location contains only a portion of the total number of employees of the corporation or company, the WER is much lower than it would be if the complete employee directory was loaded in the database.

The actual decrease in the corporate wide WER (C_WER) is contingent upon how evenly the employees are spread over the different sites. In the best case where the employees are evenly distributed in each site, C_WER will decrease according to the following relation.

$$C\_WER = \frac{WER}{\sqrt[4]{n}}$$

where: n is the number of sites.

In the worst case, where there is only one employee in each site, except for one site which holds all of the remaining employees, there will be a negligible decrease in the C_WER.

$$C\_WER \propto \sqrt[4]{(m-n)}$$

where: m is the number of employees in the company.

$$C\_WER \approx WER$$

for: m >> n

In a similar way that ESN information is used by the speech recognition system to dynamically load the active vocabulary set, the ESN information can also be used by the speech recognition system to select the appropriate acoustic model set. Speech recognition systems use previously collected speech samples to serve as reference templates against which new spoken speech samples are matched for classification. Statistical pattern recognition techniques are used to match new speech samples against reference templates to determine the closest match. These reference templates are refereed to as acoustic models in the speech recognition system. Acoustic models may vary according to the regional accent and subsequently according to ESN locations. The speech recognition system can use site-specific acoustic models that are dynamically loaded based on the ESN information presented at the time of the call. Having site-specific acoustic models will also decrease the WER of the system.

The following specification illustrates an example of the NORTEL Speech Directory Calling Service. The state diagram shown in FIGURES 3 and 4 describes the user interface that users of the service experience and is not meant as an implementation specification. Some parts of the system, such as error recovery and instructions have been omitted.

In the description that follows, the use of *italics* denotes system state and the use of a dollar sign symbol denotes a parameter.

Description of the States in Alphabetical Order:

Cancel:

```
Play Who
go to Listening Timeout
```

Idle:

```
/* Go to Idle  anytime a user hangs up */
On an incoming call
Get ESN information
Set $Location based on ESN information
go to Listening Timeout
```

KeyWord Handler:

```
Case
     Service Locations:   go to Service Location
     Receptionist:        go to Transfer Receptionist
     Cancel:              go to Cancel
End Case
```

Known Loc:

```
Set $Location to $RecognizedWord
Play $Location
Play EmployeeName
go to Listening Timeout
```

Listening Timeout:

```
Listen for $Timeout
If the user speaks
      go to Speech
Else
      go to Prompt
```

```
Loc Handler:
If $Location is known location
     go to Known Loc
Else
     go to Unknown Loc

Prompt:

Case (state before Listening Timeout )
     Idle:
          Play Who
          go to Listening Timeout

     The rest of the states:
          When $Timeout expires on the first two times
               Play TimeoutHelp.$Location
               $Timeout = 4 sec
               go to Listening Timeout
          When $Timeout expires on the third time
               Play Difficulties
               go to Transfer Receptionist
End Case

Service Location:
Play ServiceAvailable
Play $Location list
Play Who
go to Listening Timeout

Speech:
Load the active vocabulary set from $Location
Get $RecognizedWord from Speech Recognizer
```

Case ($RecognizedWord)
Rejection: go to *Rejection Handler*
$Name: go to *Transfer Call*
$Location: go to *Loc Handler*
Key Word: go to *KeyWord Handler*
End Case

Transfer Call:
Database Lookup for Employee Phone Number
Transfer the call
go to *Idle*

Transfer Receptionist :
Play TransferReceptionist
Transfer the call to the receptionist
go to *Idle*

Unknown Loc:
Play NotServiced.$Location
go to *Listening Timeout*

Index of the Prerecorded Prompts in Alphabetical Order :

Calling:
Calling $Name?

Difficulties:
The system is having difficulties with your request. Transferring to a receptionist.

EmployeeName:
Employee name?

NotServiced:
This service is not available in $Location. Choose another location or for a list of serviced ESN locations, say "Service Locations".

ServiceAvailable:

This service is available for the following Nortel/BNR locations: $Location list.

TransferReceptionist:

Transferring to a receptionist.

Who:

Who would you like to call?

A specific embodiment of the invention has been disclosed and illustrated. It will be apparent to one skilled in the art that various changes in methodology and/or approach can be made without departing from the spirit and scope of this invention as defined in the appended claims.

I CLAIM:

1. A telephone network including:

a plurality of telephone exchanges each for serving a plurality of telephone instruments and each being interconnected with at least one other of the telephone exchanges, for providing telephone communications between telephone users associated with the telephone instruments; and

a simulated telephone operator apparatus for receiving a voiced speech request from a user for connection to another of the telephone users and translating said request into a directory number for use by one of the telephone exchanges in accordance with a speech recognition algorithm and an active speech recognition vocabulary selected in accordance with the origin of the request.

2. A simulated telephone operator server for a telephone network comprising:

means for storing voice utterances of a calling party telephone user;

means responsive to location information in association with the telephone user for selecting an active speech recognition vocabulary;

speech detection means for processing the stored voice utterances in accordance with a speech recognition algorithm and said active speech recognition vocabulary;

directory lookup means for identifying a directory listing of a called party corresponding to a result of said processing by the speech detection means; and

means for transmitting the directory listing to a telephone exchange serving said called party.

3. A simulated telephone operator server as defined in claim 2, wherein the directory lookup means defaults to identification by a telephone attendant directory listing in the event of there being no called party directory listing

corresponding to the result of said processing by the speech detection means.

4. A telephone exchange comprising:

a plurality of ports for serving a plurality of telephone users' telephone instruments via telephone lines;

a trunk facility for connection to another telephone exchange;

a switching network for connecting and disconnecting the telephone instruments;

a controller means for causing a newly OFF HOOK telephone instrument to be coupled via the switching network with a solicitation signal, and subsequently for being responsive to a telephone number received in association with the newly OFF HOOK telephone instrument for completing a telephone call via the switching network;

an originating register means for storing voice band signals received from the newly OFF HOOK telephone instrument via the switching network;

means for detecting digits represented by frequency signals, within the stored voice band signals, in accordance with a standard for key pad dialed telephone numbers, and for transmitting detecting digits to the call controller;

a simulated telephone operator apparatus for receiving and translating voice band signals in accordance with a speech recognition algorithm and an active speech recognition vocabulary selected in accordance with the origin of the voice band signals into a directory number for use by the controller means; and

an interface facility for transmitting the stored voice band signals via the switching network to the simulated telephone operator server apparatus in an event wherein the voice band signals did not include a key pad dialed digit.

5. A telephone exchange as defined in claim 4, wherein the call controller means is operative to cause the interface means to transmit said stored voice band signals via the switching network to the simulated telephone operator server apparatus in an event wherein the voice band signals included a key pad dialed digit designating the simulated telephone operator apparatus.

6. A simulated telephone operator apparatus for receiving a user voiced speech request for connection to another user of a telephone network and translating said request into a directory number for use by an automatic telephone exchange, in accordance with a speech recognition algorithm and an active speech recognition vocabulary selected in accordance with the origin of the request.

7. A method for detecting a calling telephone user voiced speech request for connection to another telephone user via an automatic telephone exchange comprising:

storing a plurality of speech recognition vocabularies in association with geographic locations of users;

receiving the voiced speech request and information as to the geographic location of the user having voiced the speech request from the automatic telephone exchange;

selecting an active speech recognition vocabulary in accordance with the information as to the geographic location of the user; and

in accordance with a speech recognition algorithm and the selected active speech recognition vocabulary, translating the received request into a directory number for use by the automatic telephone exchange in setting up a telephone connection between the calling telephone user and said another telephone user.

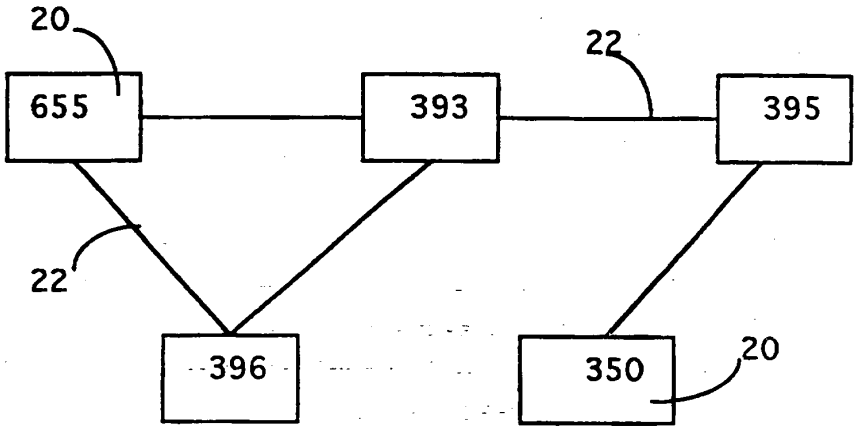

FIGURE 1

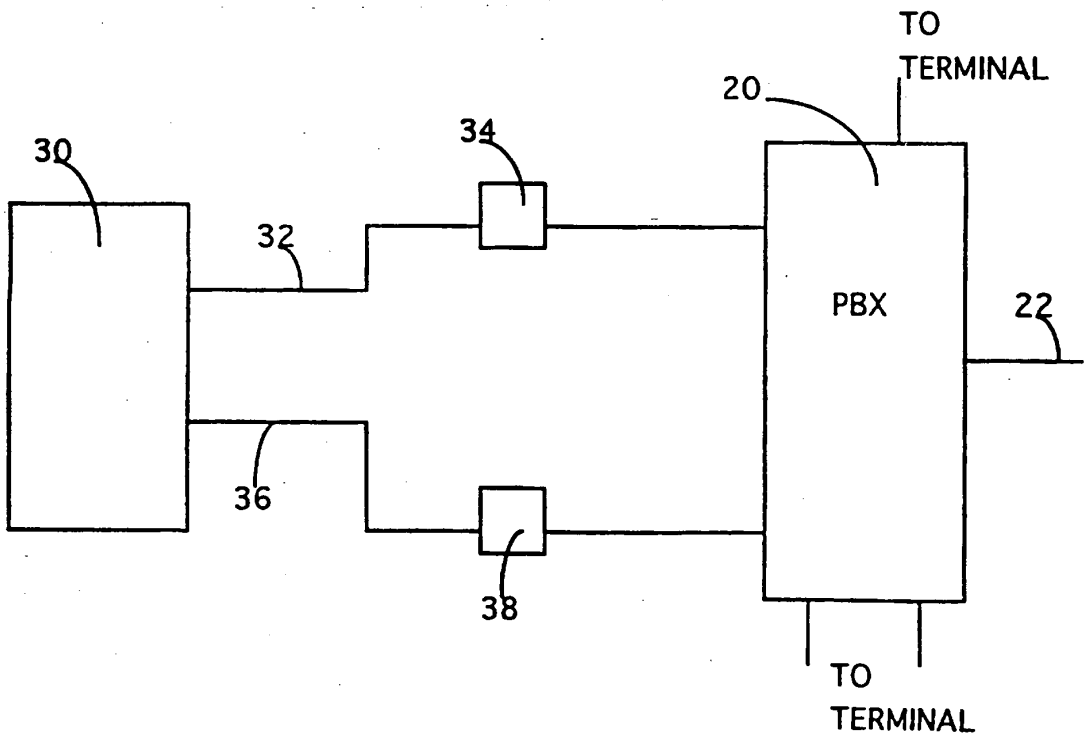

FIGURE 2

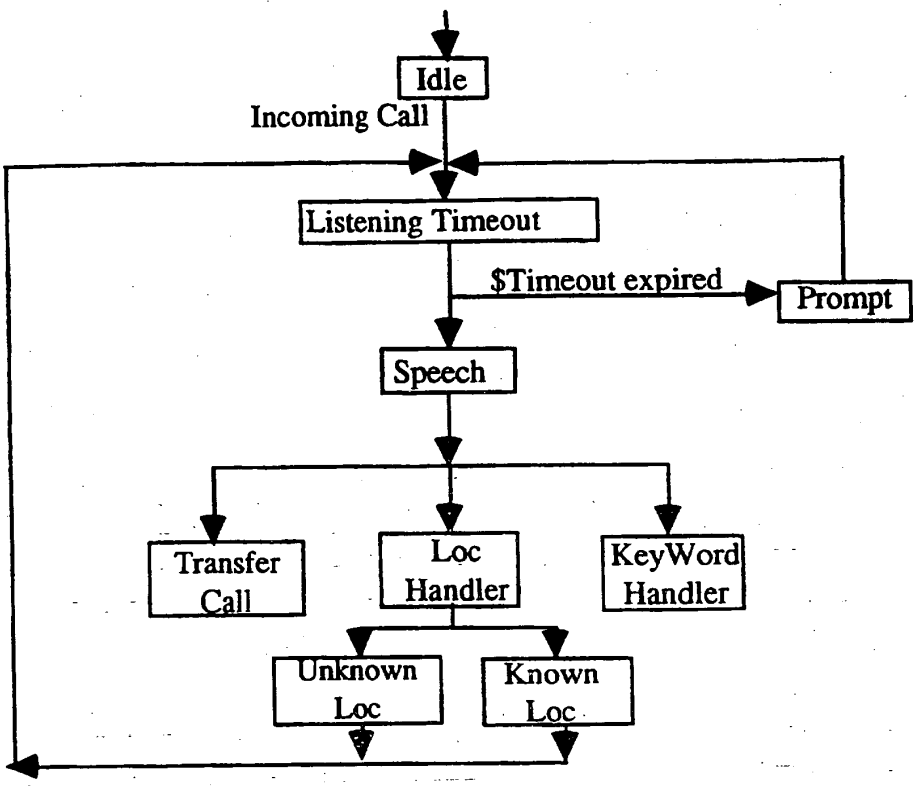

FIGURE 3

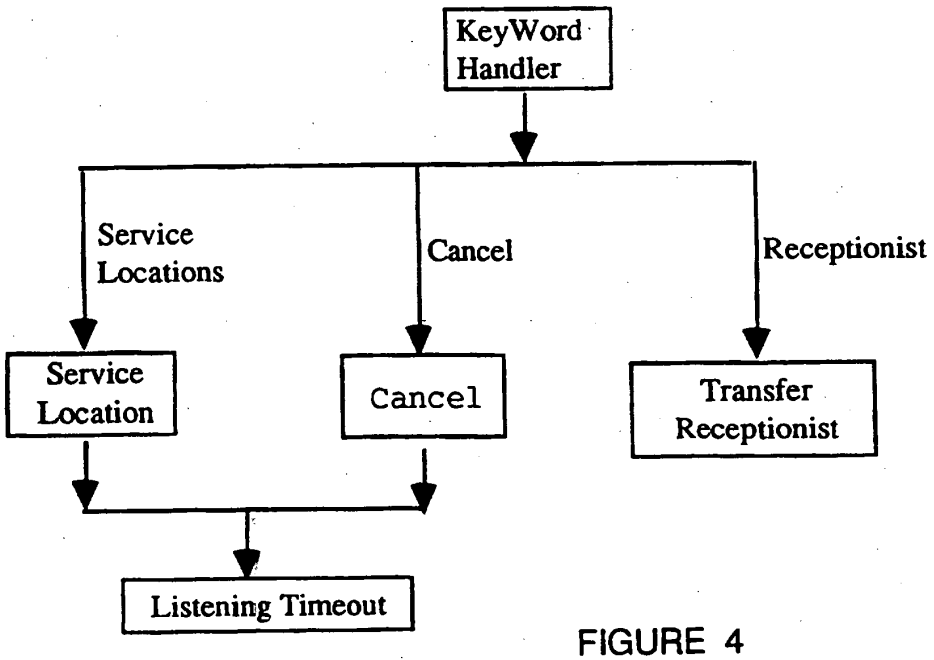

FIGURE 4

INTERNATIONAL SEARCH REPORT

International Application No PCT/CA 97/00008

A. CLASSIFICATION OF SUBJECT MATTER

H 04 M 1/27,G 10 L 5/06

According to International Patent Classification (IPC) or to both national classification and IPC6

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H 04 M,G 10 L,H 04 Q

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 practical, 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.
A	EP, A, 0 105 441 (SIEMENS) 18 April 1984 (18.04.84), page 1, line 1 - page 3, line 32; claim 1. --	1,2,4, 6,7
A	US, A, 5 165 095 (BORCHERDING) 17 November 1992 (11.11.92), abstract; column 1, line 6 - column 2, line 37; column 3, line 22 - column 6, line 27; fig. 1,2 (cited in the application). --	1,2,4, 6,7
A	EP, A, 0 568 979 (SONY CORPORATION) 10 November 1993 (10.11.93), abstract; column 1, lines	1,2,4, 6,7

[X] Further documents are listed in the continuation of box C. [ ] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 March 1997	18. 04. 97

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax (+ 31-70) 340-3016	HAJOS e.h.

C.(Conunuauon) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	43-50. --	
A	US, A, 5 390 278 (GUPTA et al.) 14 February 1995 (14.02.95), abstract (cited in the application). --	1,2,4, 6,7
A	EP, A, 0 045 941 (SIEMENS) 17 February 1982 (17.02.82), page 1, line 7 - page 4, line 9; fig.. --	1,2,4, 6,7
A	US, A, 5 091 947 (ARIYOSHI et al.) 25 February 1992 (25.02.92), abstract; column 1, line 10 - column 3, line 17 (cited in the application). ----	1,2,4, 6,7

ANHANG | ANNEX | ANNEXE

zum internationalen Recherchenbericht über die internationale Patentanmeldung Nr.

to the International Search Report to the International Patent Application No.

au rapport de recherche international relatif à la demande de brevet international n°

PCT/CA 97/00008 SAE 148639

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentdokumente angegeben. Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

This Annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The Office is in no way liable for these particulars which are given merely for the purpose of information.

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Im Recherchenbericht angeführtes Patentdokument Patent document cited in search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
EP A1 105441	18-04-84	AT E 35359 DE A1 [illegible] DE C0 3377192 EP B1 105441	15-07-88 05-04-8[illegible] 28-07-88 22-06-88
US A 516509[illegible]	17-11-92	EP A2 427688 EP A[illegible] [illegible] JP A2 6005895	01-04-9[illegible] [illegible] 25-0[illegible]-9[illegible]
EP A1 568979	10-11-93	JP A2 5216189	26-11-93
US A 5390278	14-02-95	CA A1 2069675	09-04-93
EP A1 45941	17-02-82	DE A1 3029823 DE C2 3029823 EP B1 45941	04-03-82 13-06-90 02-01-86
US A 5091947	25-02-92	JP A2 1309099 DE A1 3819178 DE C2 3819178	13-12-89 22-12-88 20-06-91

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Kurganov		Atty Docket:	47242-00027USC1
Serial No.:	10/821,690	Art Unit:	2644
Filed:	April 9, 2004	Examiner:	Unknown
Title:	ROBUST VOICE BROWSER AND VOICE ACTIVATED DEVICE CONTROLLER		

THIRD INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §§1.97 and 1.98

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I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below:

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In accordance with 37 C.F.R. § 1.98(d), copies are enclosed only of those references not already of record or cited by the Examiner in a prior related application.

In accordance with 37 C.F.R. §§ 1.97(g),(h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to be an admission that the information disclosed is, or is considered to be, prior art with respect to the present application or material to patentability as defined in 37 C.F.R. §§ 1.56.

The present Information Disclosure Statement is being filed prior to the receipt of a first Official Action reflecting an examination on the merits and hence is believed to be

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Respectfully submitted,

01-11-2005
Date

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PTO/SB/08A (08-03)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	10/821,690
Filing Date	April 9, 2004
First Named Inventor	Kurganov
Art Unit	2644
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 5,657,376	08-12-1997	Espeut et al.	
		US-			
		US-			
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Serial No.:	10/821,690	Art Unit:	2644
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3-16-2005
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Attorneys for Applicant

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First Named Inventor	Kurganov
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Attorney Docket Number	47242-00027USC1

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number / Number-Kind Code [2]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US – 5,291,479	03-01-1994	Vaziri	
		US – 5,307,399	04-26-1994	Dai	
		US – 5,559,859	09-24-1996	Dai	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Foreign Patent Document / Country Code[3] – Number[4] – Kind Code[5]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature: Date Considered:

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kind Codes of USPTO Patent Documents at www.uspto.gov, or MPEP 901 04. [3] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and use by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

CH01/KASPS/194152.1

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Kurganov	Atty Docket:	47242-00027USC1; (015749-0015)
Serial No.:	10/821,690	Art Unit:	2644
Filed:	April 9, 2004	Examiner:	Unknown
Title:	COMPUTER, INTERNET AND TELECOMMUNICATIONS BASED NETWORK		

FIFTH INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §§ 1.97 and 1.98

CERTIFICATE OF MAILING
37 C.F.R. § 1.8

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below:

3-21-05 M. Hammonds
Date Signature

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56, it is respectfully requested that the present Information Disclosure Statement be entered and the reference listed on attached Form PTO/SB/08B be considered by the Examiner and made of record. This reference was listed on the Information Disclosure Statement filed September 16, 2004; however, Applicant is filing the present Information Disclosure Statement to ensure that a copy of the actual reference has been submitted.

In accordance with 37 C.F.R. §§ 1.97(g) and (h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to be an admission that the information disclosed is, or is considered to be, prior

art with respect to the present application or material to patentability as defined in 37 C.F.R. § 1.56.

The present Information Disclosure Statement is being filed prior to the receipt of a first Official Action reflecting an examination on the merits and hence is believed to be timely in accordance with 37 C.F.R. § 1.97(b).

Accordingly, no fees are believed to be due in connection with the filing of this Information Disclosure Statement. However, should any fees be deemed necessary (except payment of the issue fee), the Commissioner is authorized to charge any deficiency or to credit any over payment to Kelley Drye & Warren Deposit Account No. 11-0404/015749.0015.

Respectfully submitted,

3-21-2005
Date

Steve Z. Szczepanski
Reg. No. 27,957
Scott R. Kaspar
Reg. No. 54,583
Kelley Drye & Warren LLP
333 W. Wacker Dr., Suite 2600
Chicago, IL 60606
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Attorneys for Applicant

	Application Number	10/821,690
	Filing Date	April 9, 2004
	First Named Inventor	Kurganov
	Art Unit	2644
	Examiner Date	TBA
Sheet 1 of 1	Attorney Docket Number	47242-00027USC1 (015749-0015)

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. [1]	Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T [2]
		"Wildfire Communications, Inc.," Harvard Business School, March 21, 1996, Publ. No. 9-396-305, pp. 1-22.	
Examiner Signature:		Date Considered:	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and use by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

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CH01/KASPS/194433.1

IPW

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	Kurganov	Atty Docket:	47242-00027USC1; (015749-0015)
Serial No.:	10/821,690	Art Unit:	2644
Filed:	April 9, 2004	Examiner:	Unknown
Title:	ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER		

SIXTH INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §§ 1.97 and 1.98

CERTIFICATE OF MAILING
37 C.F.R. § 1.8

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below:

3-25-05
Date

Signature

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56, it is respectfully requested that the present Information Disclosure Statement be entered and the references listed on attached Form PTO/SB/08B be considered by the Examiner and made of record.

In accordance with 37 C.F.R. §§ 1.97(g) and (h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to be an admission that the information disclosed is, or is considered to be, prior art with respect to the present application or material to patentability as defined in 37 C.F.R. § 1.56.

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Respectfully submitted,

3-25-05
Date

Steve Z. Szczepanski
Reg. No. 27,957
Scott R. Kaspar
Reg. No. 54,583
Kelley Drye & Warren LLP
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Chicago, IL 60606
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Attorneys for Applicant

		Application Number	10/821,690
		Filing Date	April 9, 2004
		First Named Inventor	Kurganov
		Art Unit	2644
		Examiner Date	TBA
Sheet 1 of 1		Attorney Docket Number	015749-0015

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. [1]	Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T [2]
		DAX Systems, Inc., Press Release, "Speech Recognition Success in DAX's Grasp," Nov. 22, 1995, pp. 1-2, Pine Brook, NJ.	
		AT&T, Press Release, "AT&T customers can teach systems to listen and respond to voice," Jan. 17, 1995, pp. 1-2, Basking Ridge, NJ., available at www.lucent.com/press/0195/950117.gbb.html (accessed Mar. 15, 2005).	
		MARCO SARTORI, "Speech Recognition," April 1995, pp. 1-9, Mercury Communications, available at www.gare.co.uk/technology_watch/speech.htm (accessed Mar. 15, 2005).	
		JUDITH MARKOWITZ, "The ultimate computer input device may be right under your nose," *Byte*, December 1995, pp. 1-13, available at www.byte.com/art/9512/sec8/art1.htm (accessed Mar. 15, 2005).	
Examiner Signature:		Date Considered:	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and use by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

CH01/KASPS/194679.1

TFW

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Kurganov		Atty Docket:	47242-00027USC1; (015749-0015)
Serial No.:	10/821,690	Art Unit:	2644
Filed:	April 9, 2004	Examiner:	Unknown
Title:	ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER		

SEVENTH INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §§ 1.97 and 1.98

CERTIFICATE OF MAILING
37 C.F.R. § 1.8

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below:

4-5-05
Date

Signature

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56, it is respectfully requested that the present Information Disclosure Statement be entered and the references listed on attached Form PTO/SB/08A be considered by the Examiner and made of record.

In accordance with 37 C.F.R. §§ 1.97(g) and (h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to be an admission that the information disclosed is, or is considered to be, prior art with respect to the present application or material to patentability as defined in 37 C.F.R. § 1.56.

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Accordingly, no fees are believed to be due in connection with the filing of this Information Disclosure Statement. However, should any fees be deemed necessary (except payment of the issue fee), the Commissioner is authorized to charge any deficiency or to credit any over payment to Kelley Drye & Warren Deposit Account No. 11-0404/015749.0015.

Respectfully submitted,

4-5-05
Date

Steve Z. Szczepanski
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Scott R. Kaspar
Reg. No. 54,583
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Attorneys for Applicant

PTO/SB/08A (08-03)
Approved for use through 7/31/2006. OMB 0651-0031
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Substitute for form 1449/USPTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if known	
Application Number	10/821,690
Filing Date	April 9, 2004
First Named Inventor	Kurganov
Art Unit	2644
Examiner Name	TBA
Attorney Docket Number	015749-0015

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number / Number-Kind Code[2]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US – 5,243,643	09-07-1993	Sattar et al.	
		US – 6,195,357	02-27-2001	Polcyn	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document: Country Code[3] — Number[4] – Kind Code[5]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature: Date Considered:

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kind Codes of USPTO Patent Documents at www.uspto.gov. or MPEP 901 04. [3]Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached.

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If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

CH01/KASPS/195022.1

IFW

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Kurganov		Atty Docket:	47242-00027USC1; (015749-0015)
Serial No.:	10/821,690	Art Unit:	2644
Filed:	April 9, 2004	Examiner:	Unknown
Title:	ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER		

EIGHTH INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §§ 1.97 and 1.98

CERTIFICATE OF MAILING
37 C.F.R. § 1.8

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05-02-2005
Date

Signature

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56, it is respectfully requested that the present Information Disclosure Statement be entered and the references listed on attached Forms PTO/SB/08A and PTO/SB/08B be considered by the Examiner and made of record.

In accordance with 37 C.F.R. §§ 1.97(g) and (h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to be an admission that the information disclosed is, or is considered to be, prior art with respect to the present application or material to patentability as defined in 37 C.F.R. § 1.56.

The present Information Disclosure Statement is being filed prior to the receipt of a first Official Action reflecting an examination on the merits and hence is believed to be timely in accordance with 37 C.F.R. § 1.97(b).

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Respectfully submitted,

05-02-2005
Date

Steve Z. Szczepanski
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Scott R. Kaspar
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Kelley Drye & Warren LLP
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Chicago, IL 60606
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(312) 857-7095 (Fax)
Attorneys for Applicant

PTO/SB/08A (08-03)
Approved for use through 7/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449/USPTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 3

Complete if known	
Application Number	10/821,690
Filing Date	April 9, 2004
First Named Inventor	Kurganov
Art Unit	2644
Examiner Name	TBA
Attorney Docket Number	015749-0015

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code [2]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US – 4,585,906	04/29/1986	Matthews	
		US – 4,926,462	05/15/1990	Ladd	
		US – 4,811,381	03/07/1989	Woo	
		US – 4,850,012	07/18/1989	Mehta	
		US – 4,481,574	11/06/1984	DeFind	
		US – 4,489,438	12/18/1984	Hughes	
		US – 4,792,968	12/20/1988	Katz	
		US – 4,748,656	05/31/1988	Gibbs	
		US - 4,893,335	01/09/1990	Fuller	
		US – 4,747,127	05/24/1988	Hansen	
		US - 4,755,932	07/05/1988	Diedrich	
		US – 4,782,517	11/01/1988	Bernardis	
		US – 4,922,520	05/01/1990	Bernard	
		US – 4,930,150	05/29/1990	Katz	
		US – 5,054,054	10/01/1991	Pessia	
		US - 5,133,004	07/21/1992	Heileman, Jr.	
		US – 4,799,144	01/17/1989	Parruch	
		US – 4,852,149	07/25/1989	Zurich	
		US – 4,879,743	11/07/1989	Burke	
		US – 4,903,289	02/20/1990	Hashimoto	
		US – 4,985,913	01/15/1991	Shalom	
		US – 4,996,704	02/26/1991	Brunsen	
		US – 5,003,577	03/26/1991	Ertz	

		US – 5,036,533	07/30/1991	Carter	
		US – 4,942,598	07/17/1990	Davis	
		US – 4,959,854	09/25/1990	Cave	
		US – 5,109,405	04/28/1992	Morganstein	
		US – 5,128,984	07/07/1992	Katz	
		US – 4,100,377	07/11/1978	Flanagan	
		US – 4,771,425	09/13/1988	Baran	
		US – 4,969,184	11/06/1990	Gordon	
		US – 5,526,353	06/11/1996	Henley	
		US – 5,608,786	03/04/1997	Gordon	
		US – 5,610,910	03/11/1997	Focsaneanu	
		US – 5,884,032	03/16/1999	Bateman	
		US – 5,764,736	06/09/1998	Shachar	
		US – 5,838,682	11/07/1998	Dekelbaum	
		US – 5,943,399	08/24/1999	Bannister	
		US – 5,712,903	01/27/1998	Bartholomew	
		US – 5,479,487	12/26/1995	Hammond	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Foreign Patent Document Country Code[3] — Number[4] – Kind Code[5]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature:		Date Considered:	

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If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

		Application Number	10/821,690
		Filing Date	April 9, 2004
		First Named Inventor	Kurganov
		Art Unit	2644
		Examiner Date	TBA
Sheet 3 of 3		Attorney Docket Number	015749-0015

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. [1]	Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T [2]
		YANG, C., "INETPhone – Telephone Services and Servers on the Internet," April 1995, University of North Texas, pp. 1-6.	
		ROBERT J. PERDUE & EUGENE L. RISSANEN, "Conversant® 1 Voice System: Architecture and Applications," July 17, 1986, AT&T Technical Journal, pp. 1-14.	
Examiner Signature:		Date Considered:	

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[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and use by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Kurganov		Atty Docket:	47242-00027USC1; (015749-0015)
Serial No.:	10/821,690	Art Unit:	2644
Filed:	April 9, 2004	Examiner:	Unknown
Title:	ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER		

NINTH INFORMATION DISCLOSURE STATEMENT UNDER 37 C.F.R. §§ 1.97 and 1.98

CERTIFICATE OF MAILING
37 C.F.R. § 1.8

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6/3/05
Date

Signature

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P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56, it is respectfully requested that the present Information Disclosure Statement be entered and the references listed on attached Form PTO/SB/08B be considered by the Examiner and made of record.

In accordance with 37 C.F.R. §§ 1.97(g) and (h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to be an admission that the information disclosed is, or is considered to be, prior art with respect to the present application or material to patentability as defined in 37 C.F.R. § 1.56.

The present Information Disclosure Statement is being filed prior to the receipt of a first Official Action reflecting an examination on the merits and hence is believed to be timely in accordance with 37 C.F.R. § 1.97(b).

Accordingly, no fees are believed to be due in connection with the filing of this Information Disclosure Statement. However, should any fees be deemed necessary (except payment of the issue fee), the Commissioner is authorized to charge any deficiency or to credit any over payment to Kelley Drye & Warren Deposit Account No. 11-0404/015749.0015.

Respectfully submitted,

6/3/05
Date

Scott R. Kaspar
Reg. No. 54,583
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Attorneys for Applicant

	Application Number	10/821,690
	Filing Date	April 9, 2004
	First Named Inventor	Kurganov
	Art Unit	2644
	Examiner Date	TBA
Sheet 1 of 1	Attorney Docket Number	015749-0015

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. [1]	Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T [2]
		MATTHEW TALIN MARX, "Toward Effective Conversational Messaging" (Thesis). As indicated on the cover page, the thesis was presented to the Departmental Committee on Graduate Students, Program in Media Arts and Sciences, School of Architecture and Planning, Massachusetts Institute of Technology on May 12, 1995. According to the web site *http://www.theses.mit.edu/Dienst/Repository/2.0/Body/0018.mit.theses/1995-314/rfc1807bib*, attached hereto as Attachment I, the thesis was indexed on March 21, 2000.	
		MATT MARX & CHRIS SCHMANDT, "Mail Call: Message Presentation and Navigation in a Nonvisual Environment," *SIGCHI Conference on Human Factors in Computing Systems*, Vancouver, B.C., Canada, April 13-18, 1996. As shown on Attachment 2, the web site http://www.usabilityviews.com/uv001673.html shows a date of April 16, 1996. The distribution date is not presently known.	
		F. KUBALA, S. AUSTIN, C. BARRY, J. MAKHOUL, P. PLACEWAY & R. SCHWARTZ, "BYBLOS Speech Recognition Benchmark Results," *Workshop on Speech & Natural Language*, February 19-22, 1991. According to the web site http://portal.acm.org/citation.cfm?id=112405.112415&coll..., attached hereto as Attachment 3, the reference was published in 1991, Morgan Kaufman Publishers, San Francisco, CA. The distribution date is not presently known.	
		CHARLES T. HEMPHILL, PHILIP R. THRIFT & JOHN C. LINN, "Speech-Aware Multimedia," *IEEE MultiMedia*, Spring 1996, Vol. 3, No. 1, pp. 74-78, IEEE. As indicated on the cover page of the journal, a copy of which is attached hereto as Attachment 4, the reference was received by Cornell University on March 25, 1996.	
Examiner Signature:		Date Considered:	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional). [2] Applicant is to place a check mark here if English language Translation is attached. This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and use by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**

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WEST Search History

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DATE: Tuesday, July 05, 2005

Hide?	Set Name	Query	Hit Count
		DB=USPT; PLUR=YES; OP=OR	
☐	L6	L4 and (information adj sources or web adj site) and phone	3
☐	L5	L4 and (information adj sources or web adj site)	3
☐	L4	L1 and (information adj request or search)	7
☐	L3	L1 and (request or search)	10
☐	L2	L1 and browser	4
☐	L1	(speech or voice) adj commands and speaker-independent adj speech adj recognition and database and (network or Internet)	10

END OF SEARCH HISTORY

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,690	04/09/2004	Alexander Kurganov	47242-00027USC1	1367

7590 07/07/2005

Steve Z Szczepanski-Kelley Drye & Warren LLP
Suite 2600
333 West Wacker Drive
Chicago, IL 60606

EXAMINER	
MCFADDEN, SUSAN IRIS	
ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 07/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)	
	10/821,690	KURGANOV ET AL.	
	Examiner	Art Unit	
	Susan McFadden	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 1-17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 9 of U.S. Patent No. 6,807,257. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim a computer, Internet and Telecommunications based network which comprises: a system for gathering information from information sources connected to a network by using speech commands indicating specific actions to be performed, said system comprising: a voice enabled device employed by users to communicate speech commands indicating specific actions to be performed, said speech commands comprising information requests selectable by the user; a database

operatively connected with a computer said database containing stored digital-form commands for operating said system, a speaker-independent speech recognition device for receiving from users said speech commands indicating specific actions to be performed, said speaker-independent speech recognition device configured to convert said speech commands to data messages, a computer operatively connected with said database and said speech recognition device and configured to match said data messages with said stored digital-form commands and configured to carry out the specific actions indicated by said speech commands, said computer further configured to search information sources connected to a network to gather information from said information sources connected to said network in response to said information requests. Claims 1 and 9 are similar to claim 9 of the US 6807257. Claim 2 is similar to claim 4. Claim 3 is similar to claim 10. Claim 5 is similar to claim 13. Claim 6 is similar to claim 12. Claim 7 is similar to claim 14. Claims 14-17 are similar to claim 15.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-7 and 14-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Perrone (6,157,705).

In regard to claim 1, Perrone shows in Figure 1 B, a system for gathering information from information sources connected to a network by using speech commands indicating specific actions to be performed, said system comprising: a voice enabled device employed by users to communicate speech commands indicating specific actions to be performed (items 2,4), said speech commands comprising information requests selectable by the user; a database operatively connected with a computer said database containing stored digital-form commands for operating said system (col. 6), a speaker-independent speech recognition device for receiving from users said speech commands indicating specific actions to be performed (item 16), said speaker-independent speech recognition device configured to convert said speech commands to data messages (col. 5-6), a computer operatively connected with said database and said speech recognition device and configured to match said data messages with said stored digital-form commands and configured to carry out the specific actions indicated by said speech commands (item 8), said computer further configured to search information sources connected to a network to gather information from said information sources connected to said network in response to said information requests (col. 5-6).

In regard to claim 2, Perrone shows that an Internet network is used (claim 19).

In regard to claim 3, Perrone shows that the information sources can be web sites (col. 20, ln 1-3).

In regard to claim 4, Perrone shows that the voice-enabled device can be a standard telephone (col. 5, Fig 1A, item 10).

In regard to claims 5 and 6, Perrone shows that a speaker independent speech recognizer inherently analyzes phonemes to recognize naturally spoken speech commands (col. 8, ln 4-35).

In regard to claim 7, Perrone show a database that contains a list of information sources connected to the network that can be searched (col. 9, ln 53-60).

In regard to claims 14-17, Perrone shows that information gathered by said system from said information sources in response to said information requests is stored by said database and processed by said computer into a message, said system further configured to transmit said message to said voice enabled device or such other destination as designated by said user (col. 9, ln 1-10), which can be an audio message inherently output from a speech synthesis engine configured to create said audio message (Fig. 1B, item 14), which inherently comprises a pre-recorded audio concatenation application configured to create said audio message.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perrone (cited above).

In regard to claims 8-13, Perrone show the system discussed above. They do not specifically show that the database contains a list of information sources connected to

the network that can be searched, ranked, and updated. The Examiner takes Official Notice that one of ordinary skill in the art at the time of the invention would know how to store and rank information sources in a database.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan McFadden whose telephone number is 571-272-7621. The examiner can normally be reached on Monday-Friday, 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on 571-272-7582. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Susan McFadden
Primary Examiner
Art Unit 2655

July 5, 2005

	Application Number	10/821,690
	Filing Date	April 9, 2004
	First Named Inventor	Kurganov
	Art Unit	2644
	Examiner Date	TBA
Sheet 1 of 1	Attorney Docket Number	015749-0015

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. [1]	Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T [2]
DM		MATTHEW TALIN MARX, "Toward Effective Conversational Messaging" (Thesis). As indicated on the cover page, the thesis was presented to the Departmental Committee on Graduate Students, Program in Media Arts and Sciences, School of Architecture and Planning, Massachusetts Institute of Technology on May 12, 1995. According to the web site *http://www.theses.mit.edu/Dienst/Repository/2.0/Body/0018.mit.theses/1995-314/rfc1807bib*, attached hereto as Attachment 1, the thesis was indexed on March 21, 2000.	
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Examiner Signature:		Date Considered: 7/7/2005	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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PTO/SB/08A (08-03)
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Substitute for form 1449/USPTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 3

Complete if known	
Application Number	10/821,690
Filing Date	April 9, 2004
First Named Inventor	Kurganov
Art Unit	2644
Examiner Name	TBA
Attorney Docket Number	015749-0015

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code [2]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
JM		US – 4,585,906	04/29/1986	Matthews	
JM		US – 4,926,462	05/15/1990	Ladd	
JM		US – 4,811,381	03/07/1989	Woo	
JM		US – 4,850,012	07/18/1989	Mehta	
JM		US – 4,481,574	11/06/1984	DeFind	
JM		US – 4,489,438	12/18/1984	Hughes	
JM		US – 4,792,968	12/20/1988	Katz	
JM		US – 4,748,656	05/31/1988	Gibbs	
JM		US - 4,893,335	01/09/1990	Fuller	
JM		US – 4,747,127	05/24/1988	Hansen	
JM		US - 4,755,932	07/05/1988	Diedrich	
JM		US – 4,782,517	11/01/1988	Bernardis	
JM		US – 4,922,520	05/01/1990	Bernard	
JM		US – 4,930,150	05/29/1990	Katz	
JM		US – 5,054,054	10/01/1991	Pessia	
JM		US - 5,133,004	07/21/1992	Heileman, Jr.	
JM		US – 4,799,144	01/17/1989	Parruch	
JM		US – 4,852,149	07/25/1989	Zurich	
JM		US – 4,879,743	11/07/1989	Burke	
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JM		US – 4,985,913	01/15/1991	Shalom	
JM		US – 4,996,704	02/26/1991	Brunsen	
JM		US – 5,003,577	03/26/1991	Ertz	

JM		US – 5,036,533	07/30/1991	Carter	
JM		US – 4,942,598	07/17/1990	Davis	
JM		US – 4,959,854	09/25/1990	Cave	
JM		US – 5,109,405	04/28/1992	Morganstein	
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JM		US – 4,100,377	07/11/1978	Flanagan	
JM		US – 4,771,425	09/13/1988	Baran	
JM		US – 4,969,184	11/06/1990	Gordon	
JM		US – 5,526,353	06/11/1996	Henley	
JM		US – 5,608,786	03/04/1997	Gordon	
JM		US – 5,610,910	03/11/1997	Focsaneanu	
JM		US – 5,884,032	03/16/1999	Bateman	
JM		US – 5,764,736	06/09/1998	Shachar	
JM		US – 5,838,682	11/07/1998	Dekelbaum	
JM		US – 5,943,399	08/24/1999	Bannister	
JM		US – 5,712,903	01/27/1998	Bartholomew	
JM		US – 5,479,487	12/26/1995	Hammond	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] — Number[4] – Kind Code[5]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature: [signature] Date Considered: July 7, 2005

*Examiner: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kind Codes of USPTO Patent Documents at www.uspto.gov. or MPEP 901 04. [3]Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached.

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		Application Number	10/821,690
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		First Named Inventor	Kurganov
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Sheet 3 of 3		Attorney Docket Number	015749-0015

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DM		YANG, C., "INETPhone – Telephone Services and Servers on the Internet," April 1995, University of North Texas, pp. 1-6.	
DM		ROBERT J. PERDUE & EUGENE L. RISSANEN, "Conversant® 1 Voice System: Architecture and Applications," July 17, 1986, AT&T Technical Journal, pp. 1-14.	
Examiner Signature:	DM	Date Considered: July 1, 2005	

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Sheet 1 of 1

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Application Number	10/821,690
Filing Date	April 9, 2004
First Named Inventor	Kurganov
Art Unit	2644
Examiner Name	TBA
Attorney Docket Number	015749-0015

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number / Number-Kind Code[2]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
DM		US – 5,243,643	09-07-1993	Sattar et al.	
DM		US – 6,195,357	02-27-2001	Polcyn	

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Examiner Initials*	Cite No.[1]	Foreign Patent Document: Country Code[3] — Number[4] – Kind Code[5]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature: [signature] Date Considered: 7-1-05

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	First Named Inventor	Kurganov
	Art Unit	2644
	Examiner Date	TBA
Sheet 1 of 1	Attorney Docket Number	015749-0015

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. [1]	Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T [2]
DM		DAX Systems, Inc., Press Release, "Speech Recognition Success in DAX's Grasp," Nov. 22, 1995, pp. 1-2, Pine Brook, NJ.	
DM		AT&T, Press Release, "AT&T customers can teach systems to listen and respond to voice," Jan. 17, 1995, pp. 1-2, Basking Ridge, NJ., available at www.lucent.com/press/0195/950117.gbb.html (accessed Mar. 15, 2005).	
DM		MARCO SARTORI, "Speech Recognition," April 1995, pp. 1-9, Mercury Communications, available at www.gare.co.uk/technology_watch/speech.htm (accessed Mar. 15, 2005).	
DM		JUDITH MARKOWITZ, "The ultimate computer input device may be right under your nose," *Byte*, December 1995, pp. 1-13, available at www.byte.com/art/9512/sec8/art1.htm (accessed Mar. 15, 2005).	
Examiner Signature:	DM	Date Considered: 7-1-05	

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	Art Unit	2644
	Examiner Date	TBA
Sheet 1 of 1	Attorney Docket Number	47242-00027USC1 (015749-0015)

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. [1]	Include name of author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T [2]
JM		"Wildfire Communications, Inc.," Harvard Business School, March 21, 1996, Publ. No. 9-396-305, pp. 1-22.	
Examiner Signature:	JM	Date Considered: 7-1-08	

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Sheet 1 of 1

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Art Unit	2644
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

U.S. PATENT DOCUMENTS

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DM		US – 5,291,479	03-01-1994	Vaziri	
DM		US – 5,307,399	04-26-1994	Dai	
DM		US – 5,559,859	09-24-1996	Dai	

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JK		US- 5,657,376	08-12-1997	Espeut et al.	
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Examiner Signature		Date Considered	7-1-05

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dm		US- 5,799,065	08-25-1998	Junqua et al.	
		US-			
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dm		GB 2,317,782	01-04-1998	Morin		
dm		WO 97/37481	10-09-1997	Wong		

Examiner Signature		Date Considered	7-1-05

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Sheet 1 of 13

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JM		US- 3,728,486	04-17-1973	Kraus	
JM		US- 4,058,838	11-15-1997	Crager	
JM		US- 4,313,035	01/26/1982	Jordan	
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JM		US- 4,585,906	04-29-1986	Matthews	
JM		US- 4,596,900	06-24-1986	Jackson	
JM		US- 4,596,900 B1	10-10-1995	Jackson	
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JM		US- 4,696,028	09-22-1987	Morganstein	

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JM		GB 2211698	07-05-1989			
JM		GB 2240693	08-07-1991			
JM		JP 1-258526	10-16-1989			✓
JM		WO 9107838	05-30-1991			
JM		WO 9118466	11-28-1991			
JM		CA 1329852	05-24-94			

Examiner Signature	Date Considered
Jason M. Kurganov	7-1-05

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JM		US- 4,713,837	12-15-1987	Gordon	
JM		US- 4,748,656	05-31-1988	Gibbs	
JM		US- 4,757,525	07-12-1988	Matthews	
JM		US- 4,761,807	08-02-1988	Matthews	
JM		US- 4,763,317	08-09-1988	Lehman	
JM		US- 4,769,719	09-06-1988	Endo	
JM		US- 4,776,016	10-04-1998	Hansen	
JM		US- 4,809,321	02-28-1989	Morganstein	
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JM		US- 4,873,719	10-10-1989	Reese	
JM		US- 4,893,333	01-09-1990	Baran	
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JM		US- 4,907,079	03-01-1990	Turner	
JM		US- 4,918,722	04-17-1990	Buehren	
JM		US- 4,922,518	05-01-1990	Gordon	
JM		US- 4,922,526	05-01-1990	Morganstein	

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JM		WO 9609710	03-28-1996			
JM		WO 9823058	05-28-1998			

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JM		US- 4,933,966	06-12-1990	Hird	
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Examiner Signature		Date Considered	7-1-05

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Sheet 4 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

U. S. PATENT DOCUMENTS

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JM		US- 5,095,445	03-10-1992	Sekiguchi	
JM		US- 5,099,509	03-24-1992	Morganstein	
JM		US- 5,109,405	04-28-1992	Morganstein	
JM		US- 5,131,024	07-14-1992	Pugh	
JM		US- 5,145,452	09-08-1992	Pekarske	
JM		US- 5,166,974	11-24-1992	Morganstein	
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JM		US- 5,233,600	08-03-1993	Pekarske	
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JM		US- 5,291,302	03-01-1994	Gordon	
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Examiner Signature	JM Zahn	Date Considered	7-1-05

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Sheet 5 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

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DM		US- 5,347,574	09-13-1994	Morganstein	
DM		US- 5,355,403	10-11-1994	Richardson, Jr.	
DM		US- 5,365,524	11-15-1994	Hiller	
DM		US- 5,375,161	12-01-1994	Fuller	
DM		US- 5,384,771	01-24-1995	Isidoro	
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Sheet 6 of 13

Complete if Known	
Application Number	10/821,690
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First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

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JM		US- 5,608,786	03-01-1997	Gordon	
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JM		US- 5,752,191	05-01-1998	Fuller	
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Sheet 7 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

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JM		US- 5,819,306	10-06-1998	Goldman	
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Sheet 8 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

U. S. PATENT DOCUMENTS

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		US- 6,038,305	03-01-2000	McAllister	
		US- 6,047,053	04-01-2000	Miner	
		US- 6,067,516	05-01-2000	Levay	
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Sheet 9 of 13

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Art Unit	TBA
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Attorney Docket Number	47242-00027USC1

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JM		US- 6,721,705	04-13-2004	Kurganov	
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JM		US- 5,721,908	02-24-1998	Lagarde	
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Filing Date	04-09-2004
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Art Unit	TBA
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Attorney Docket Number	47242-00027USC1

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
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SM		Bellcore Technology Licensing, "The Electronic Receptionist -- A Knowledge-Based Approach to Personal Communications", 1994, pp. 1-8.	
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Examiner Signature	Susan McFadden	Date Considered	7-6-06

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DM		SCHMANDT, ET AL., "Phone Shell: The Telephone as Computer Terminal," ACM Multimedia, 1993, 11 pgs.	
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DM		"Wildfire Communications, Inc.," Harvard Business School, March 21, 1996, Publ. No. 9-396-305, pp. 1-22.	

Examiner Signature		Date Considered	7-1-05

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

PTO/SB/08B (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 12 of 13

	Complete if Known
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
DM		"WordPerfect: New Telephony Features Boost Office", WordPerfect Office TechBrief, 1994, Info-World Publg. Co., Vol. 10, Issue 2, pp. 2-3.	
DM		Internet web page, "Wildfire Communications, Inc.", November 5, 1997, including the following URL addresses:	
DM		http://www.wildfire.com (1 pg);	
DM	-	http://www.wildfire.com/consumerhome.html (2 pgs.);	
DM		http://www.wildfire.com/106.html (2pgs.);	
DM		http://www.wildfire.com/carrierhome.html (2pgs.);	
DM		http://www.wildfire.com/sfandb.html (3 pgs.);	
DM		http://www.wildfire.com/about.html (1 pg.);	
DM		http://www.wildfire.com/abtmgmt.html (3 pgs.);	
DM		http://www.wildfire.com/scoop.html (2 pgs.); and	

Examiner Signature		Date Considered	7-1-05

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1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 13 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
JM		http://www.wildfire.com/intel.html (1 pg.); and	
JM		http://www.wildfire.com/msft.html (2 pgs.).	

Examiner Signature		Date Considered	7-1-08

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1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

Index of Claims

Application No.	Applicant(s)	
10/821,690	KURGANOV ET AL.	
Examiner	**Art Unit**	
Susan McFadden	2655	

	Rejected	–	(Through numeral) Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

Claim		Date
Final	Original	7/5/05
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BIBDATASHEET

Bib Data Sheet

CONFIRMATION NO. 1367

SERIAL NUMBER	FILING DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/821,690	04/09/2004 RULE	704	2655	47242-00027USC1

APPLICANTS

Alexander Kurganov, Buffalo Grove, IL;

Valery Zhukoff, Deerfield, IL;

** CONTINUING DATA **********

This application is a CON of 09/776,996 02/05/2001 PAT 6,721,705
which claims benefit of 60/180,344 02/04/2000
and claims benefit of 60/233,068 09/15/2000

** FOREIGN APPLICATIONS **********

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
** 06/24/2004

		STATE OR	SHEETS	TOTAL	INDEPENDENT
Foreign Priority claimed	☐ yes ☒ no	COUNTRY	DRAWING	CLAIMS	CLAIMS
35 USC 119 (a-d) conditions met	☐ yes ☒ no ☐ Met after Allowance	IL	4	17	1
Verified and Acknowledged	Examiner's Signature Initials				

ADDRESS
Steve Z Szczepanski-Kelley Drye & Warren LLP
Suite 2600
333 West Wacker Drive
Chicago , IL
60606

TITLE
Robust voice browser system and voice activated device controller

FILING FEE	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of

Search Notes	Application No.	Applicant(s)	
	10/821,690	KURGANOV ET AL.	
	Examiner	Art Unit	
	Susan McFadden	2655	

SEARCHED			
Class	Subclass	Date	Examiner
704	270	7/5/2005	SM
	275		
379	88.01 $8.02		
455	563		

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Searched West	7/5/2005	SM

Notice of References Cited	Application/Control No. 10/821,690	Applicant(s)/Patent Under Reexamination KURGANOV ET AL.	
	Examiner Susan McFadden	Art Unit 2655	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-6,081,782	06-2000	Rabin, Michael D.	704/275
	B	US-6,157,705	12-2000	Perrone, Jeffrey	379/88.01
	C	US-6,185,535	02-2001	Hedin et al.	704/270
	D	US-6,230,132	05-2001	Class et al.	704/270
	E	US-6,501,966	12-2002	Bareis et al.	455/563
	F	US-6,807,257	10-2004	Kurganov, Alex	379/88.22
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

IFW

PTO/SB/17 (12-04v2)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL
For FY 2005

☑ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 300

Complete if Known	
Application Number	10/821,690
Filing Date	April 9, 2004
First Named Inventor	Kurganov
Examiner Name	McFadden, Susan
Art Unit	2644
Attorney Docket No.	015749-0015

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☑ Deposit Account Deposit Account Number: 11-0404 Deposit Account Name: Kelley Drye & Warren

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☑ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☑ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☑ Credit any overpayments

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

	FILING FEES		SEARCH FEES		EXAMINATION FEES		
		Small Entity		Small Entity		Small Entity	
Application Type	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee ($)	Fee Paid ($)
32 - 20 or HP =	12	x 25	= 300

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	Extra Claims	Fee ($)	Fee Paid ($)
_____ - 3 or HP =	_____	x _____	= _____

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	
Fee ($)	Fee Paid ($)
_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee ($)	Fee Paid ($)
_____ - 100 =	_____	/ 50 = _____ (round up to a whole number)	x _____	= _____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English Specification, $130 fee (no small entity discount)	
Other (e.g., late filing surcharge): _____	

SUBMITTED BY

Signature		Registration No. (Attorney/Agent) 54,583	Telephone 312-857-7088
Name (Print/Type)	Scott R. Kaspar		Date January 6, 2006

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	: 10/821,690	Confirmation No.	: 1367
Applicant	: Kurganov et al.		
Filed	: April 9, 2004		
Title	: Robust Voice Browser System and Voice Activated Device Controller		
TC/A.U.	: 2644		
Examiner	: McFadden, Susan		
Docket No.	: 015749-0015; old (47242-00027USC1)		
Customer No.	: 47670		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING
37 C.F.R. 1.8

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below:

06 JANUARY 2006 [signature]
Date Signature

AMENDMENT

Sir:

In response to the Office Action mailed July 7, 2005 concerning the above application, please enter the following amendment and remarks:

Please update the record to reflect Applicant's new docket number, which is 015749-0015.

Amendments to the Claims are reflected in the Listing of Claims which begins on page 2 of this paper.

Remarks begin on page 11 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended): A system for retrieving ~~gathering~~ information from pre-selected web sites ~~information sources connected to a network~~ by uttering ~~using~~ speech commands into a voice enabled device and for providing to users retrieved information in an audio form via said voice enabled device ~~indicating specific actions to be performed~~, said system comprising:

a computer, said computer operatively connected to the internet;

a voice enabled device operatively connected to said computer, said voice enabled device configured to receive ~~employed by users to communicate~~ speech commands ~~indicating specific actions to be performed~~ from users;

at least one speaker-independent speech recognition device, said speaker-independent speech recognition device operatively connected to said computer and to said voice enabled device;

at least one speech synthesis device, said speech synthesis device operatively connected to said computer and to said voice enabled device;

at least one instruction set for identifying said information to be retrieved, said instruction set being associated with said computer, said instruction set comprising:

a plurality of pre-selected web site addresses, each said web site address identifying a web site containing said information to be retrieved;

at least one recognition grammar associated with said computer, each said recognition grammar corresponding to each said instruction set and corresponding to a speech command;

said speech command ~~commands~~ comprising an information request ~~requests~~ selectable by the user;

~~a database operatively connected with a computer said database containing stored digital form commands for operating said system;~~

said ~~a~~ speaker-independent speech recognition device configured to receive ~~for receiving~~ from users via said voice enabled device said speech command ~~commands~~ and to select the

corresponding recognition grammar upon receiving said speech command ~~indicating specific actions to be performed, said speaker-independent speech recognition device configured to convert said speech commands to data messages~~;

said ~~a~~ computer configured to retrieve said instruction set corresponding to said recognition grammar selected by said speaker-independent speech recognition device ~~operatively connected with said database and said speech recognition device and configured to match said data messages with said stored digital form commands and configured to carry out the specific actions indicated by said speech commands~~;

said computer further configured to ~~search~~ access at least one of said plurality of web sites identified by said instruction set to obtain said information to be retrieved, said computer configured to first access said first web site of said plurality of web sites and, if said information to be retrieved is not found at said first web site, said computer configured to sequentially access said plurality of web sites until said information to be retrieved is found or until said plurality of web sites has been accessed; ~~information sources connected to a network to gather information from said information sources connected to said network in response to said information requests.~~

said speech synthesis device configured to produce an audio message containing any retrieved information from said pre-selected web sites, and said speech synthesis device further configured to transmit said audio message to said users via said voice enabled device.

2. (Currently Amended): The system of claim 1 wherein said internet ~~network~~ is the Internet.

3. (Currently Amended): The system of claim 1 wherein said internet is a local area network ~~information sources are web sites~~.

4. (Currently Amended): The system of claim 1 wherein ~~the~~ said voice enabled device is a standard telephone, an IP telephone, a cellular phone, a PDA, a personal computer, a DVD player, a television or other video display device, a CD player, a MP3 player, or any other device capable of transmitting said audio message ~~audio playing an audio signal~~.

5. (Currently Amended): The system of claim 1 wherein said speaker-independent speech recognition device is configured to analyze ~~analyzes~~ phonemes to recognize said speech commands.

6. (Currently Amended): The system of claim 1 wherein said speaker-independent speech recognition device is configured to recognize ~~recognizes~~ naturally spoken speech commands.

7. (Currently Amended): The system of claim 1 wherein said ~~database contains a stored list of said information sources connected to said network~~ instruction set further comprises a content descriptor associated with each said web site address, said content descriptor pre-defining a portion of said web site containing said information to be retrieved.

8. (Currently Amended): The system of claim 1 ~~7~~ wherein said computer is further configured to periodically ~~search~~ poll each of said web sites without being instructed by said user to determine the availability of each said web site, the duration of time for each said web site to respond to a request from said computer, and changes to the location of said information to be retrieved from each said web site, said computer further configured to create a ranking of said plurality of web sites based on said periodic polling ~~information sources contained in said stored list and also configured to assign ranks to said information sources to reflect the results of said periodic search~~.

9. (Currently Amended): The system of claim 1 ~~7~~ wherein said computer is further configured to periodically search said internet ~~network~~ to identify new web sites ~~information sources~~ and to add said new web sites ~~information sources~~ to said plurality of web sites ~~stored list~~.

10. (Currently Amended): The system of claim 1 ~~9~~ wherein said ~~computer is further configured to periodically search said information sources contained in said stored list and also configured to assign ranks to said information sources to reflect the results of said periodic search~~

instruction set further comprises a ranking associated with each said web site address, said ranking indicating the order in which the plurality of pre-selected web sites are accessed.

11. (Currently Amended): The system of claim 10 ~~8~~ wherein said computer is configured to modify ~~ranks are established or modified~~ said rankings based upon ~~utility considerations of said information sources~~ at least one of a plurality of criteria, said plurality of criteria comprising:

the availability of each said web site;

the duration of time for each said web site to respond to a request from said computer; and

changes to the location of said information to be retrieved from each said web site.

12. (Currently Amended): The system of claim 11 wherein said ~~utility considerations comprise one or more of the following list: functionality of said information sources, speed of said information sources, or changes to said information sources that lower its utility for a specific information request~~ computer is configured to weigh said criteria with respect to one another when modifications to said rankings are based on more than one of said plurality of criteria.

13. (Currently Amended): The system in claim 10 ~~8~~ wherein said computer is configured to access ~~searches~~ said plurality of web sites in order of ranking ~~information sources with the highest rank in order~~ to retrieve said information requested by said user, said computer further configured to first access said web site having the highest ranking.

14. (Currently Amended): The system of claim 1 further comprising a database operatively connected to said computer, ~~wherein~~ said database configured to store said information gathered ~~by said system~~ from said web sites ~~information sources~~ in response to said information requests ~~is stored by said database and processed by said computer into a message, said system further configured to transmit said message to said voice enabled device or such other destination as designated by said user~~.

15. (Currently Amended): The system of claim 10 ~~14~~ wherein said ~~message is an audio message~~ computer is further configured to modify said rankings associated with said plurality of web sites such that said web site having said information to be retrieved is assigned the highest ranking and any web sites not having said information to be retrieved are assigned lower rankings.

16. (Currently Amended): The system of claim 14 ~~15 further comprising a speech synthesis engine configured to create said audio message~~ wherein each said recognition grammar and each said instruction set are stored in said database.

17. (Currently Amended): The system of claim 9 ~~15 further comprising a pre-recorded audio concatenation application configured to create said audio message~~ wherein said computer is configured to search each of said new web sites without being instructed by said user to determine the availability of each said new web site, the duration of time for each said new web site to respond to a request from said computer, and changes to the location of said information to be retrieved from each said new web site, said computer further configured to create a ranking of said plurality of new web sites based on said periodic searches.

18. (New): A method for retrieving information from pre-selected web sites by uttering speech commands into a voice enabled device and for providing to users retrieved information in an audio form via said voice enabled device, said method comprising the steps of:

providing a computer operatively connected to the internet, said computer further being operatively connected to at least one speaker-independent speech recognition engine and to at least one speech synthesis engine;

providing a voice enabled device operatively connected to said computer, said voice enabled device configured to receive speech commands from users;

providing at least one instruction set stored in a database operatively connected to said computer, said instruction set comprising:

a plurality of pre-selected web site addresses, each said web site address identifying a web site containing said information to be retrieved;

providing a speech command to said speaker-independent speech recognition engine, said speech command corresponding to said instruction set;

said speaker-independent speech recognition engine assigning said speech command to a recognition grammar, said speech command and said recognition grammar corresponding to said instruction set;

transmitting said speech command to said speaker-independent speech recognition engine;

said speaker-independent speech recognition engine receiving said speech command and selecting the corresponding recognition grammar upon receiving said speech command;

said computer retrieving said instruction set corresponding to said recognition grammar selected by said speaker-independent speech recognition engine;

said computer accessing at least one of said plurality of web sites identified by said instruction set to obtain said information to be retrieved, said computer first accessing said first web site of said plurality of web sites and, if said information to be retrieved is not found at said first web site, said computer sequentially accessing said plurality of web sites until said information to be retrieved is found or until said plurality of web sites has been accessed;

said speech synthesis engine producing an audio message containing any retrieved information from said pre-selected web sites; and

said speech synthesis engine transmitting said audio message to said users via said voice enabled device.

19. (New): The method of claim 18 wherein said instruction set further comprises a content descriptor associated with each said web site address, said content descriptor pre-defining a portion of said web site containing said information to be retrieved.

20. (New): The method of claim 18 wherein said instruction set further comprises a ranking from highest to lowest associated with each said web site, said ranking indicating the order in which the plurality of pre-selected web sites are accessed.

21. (New): The method of claim 20 wherein said computer accesses said plurality of web sites based on said ranking, said computer first accessing said web site having the highest ranking.

22. (New): The method of claim 21 further comprising the step of adjusting said rankings associated with said plurality of web sites such that said web site having said information to be retrieved is assigned the highest ranking and any web sites not having said information to be retrieved are assigned lower rankings.

23. (New): The method of claim 18 further comprising the step of periodically polling each said web site to determine whether said web site contains said information to be retrieved.

24. (New): The method of claim 23 wherein the computer periodically polls each said web site without being instructed by said user to determine the availability of each said web site, the duration of time for each said web site to respond to a request from said computer, and changes to the location of said information to be retrieved from each said web site, said computer creating a ranking of said plurality of web sites based on said periodic polling.

25. (New): The method of claim 18 further comprising the step of periodically searching said internet to find new web sites containing said information to be retrieved, and adding said new web sites to said plurality of web sites.

26. (New): A system for retrieving information from pre-selected web sites by uttering speech commands into a phone and for providing to users retrieved information in an audio form via said phone, said system comprising:

a computer, said computer operatively connected to the internet and to at least one phone;

at least one speaker-independent speech recognition engine, said speaker-independent speech recognition engine operatively connected to said computer;

at least one speech synthesis engine, said speech synthesis engine operatively connected to said computer;

a database, said database operatively connected to said computer;

at least one instruction set stored in said database for identifying said information to be retrieved, said instruction set comprising:

a plurality of pre-selected web site addresses, each said web site address identifying a web site containing said information to be retrieved;

a content descriptor associated with each said web site address, said content descriptor pre-defining a portion of said web site containing said information to be retrieved;

a ranking from highest to lowest associated with each said web site address, said ranking indicating the order in which the plurality of pre-selected web sites are accessed;

at least one recognition grammar stored in said database, each said recognition grammar corresponding to each said instruction set and corresponding to a speech command;

said speaker-independent speech recognition engine configured to receive from users via said phone a speech command and to select the corresponding recognition grammar upon receiving said speech command;

said computer configured to retrieve said instruction set corresponding to said recognition grammar selected by said speaker-independent speech recognition device;

said computer further configured to access at least one of said plurality of web sites identified by said instruction set to obtain said information to be retrieved, said computer configured to first access said web site having the highest ranking and, if said information to be retrieved is not found at said web site having the highest ranking, said computer configured to subsequently access said plurality of web sites in order of rankings until said information to be retrieved is found or until said plurality of web sites has been accessed;

said computer further configured to establish or adjust said rankings associated with said plurality of web sites such that said web site having said information to be retrieved is assigned the highest ranking and any web sites not having said information to be retrieved are assigned lower rankings;

said speech synthesis engine configured to produce an audio message containing any retrieved information from said pre-selected web sites, and said speech synthesis engine further configured to transmit said audio message to said users via said phone.

27. (New): The system of claim 26 wherein said phone comprises a standard telephone, a cellular phone, or an IP phone.

28. (New): The system of claim 26 wherein said internet is a local area network.

29. (New): The system of claim 26 wherein said internet is a wide area network.

30. (New): The system of claim 26 wherein said internet is the Internet.

31. (New): The system of claim 26 wherein said computer is configured to establish or adjust said rankings associated with said plurality of web sites when instructed by said user to access said plurality of web sites to retrieve said information.

32. (New): The system of claim 26 wherein said computer is configured to establish or adjust said rankings associated with said plurality of web sites based on periodic polling of each of said web sites without being instructed by said user to determine the availability of each said web site, the duration of time for each said web site to respond to a request from said computer, and changes to the location of said information to be retrieved from each said web site.

REMARKS

Before addressing the merits of the Office Action mailed July 7, 2005, Applicant wishes to point out some important features of the present invention. Applicant's invention allows for users to retrieve desired information from pre-selected web sites containing the desired information by uttering speech commands, and the retrieved information is provided to the users in an audio form. Applicant's invention allows users to retrieve the desired information using a voice enabled device, such as a standard telephone, cell phone, or IP phone, whereby users utter speech commands into the voice enabled device, and the retrieved information is provided to the users in audio form via the voice enabled device. Applicant's invention retrieves the desired information from one of a plurality of pre-selected web sites by accessing the web sites sequentially until the desired information is found or until all of the pre-selected web sites have been accessed. Once the desired information is found at one of the pre-selected web sites, the information is converted into audio form and transmitted via the voice enabled device to the user.

For example, Applicant's invention may be configured to provide financial information, such as current stock values for various publicly-traded companies. As such, the system may be set up with a plurality of pre-selected web sites containing current stock values for various companies. For instance, fifty web sites containing current stock values for various companies may be pre-selected for use by the system. A user desiring the current stock value for a company may utter a speech command relating to the particular company, and the system accesses the pre-selected web sites sequentially until the desired information is located. For example, a user desiring the current stock value of Southwest Airlines may utter the speech command "Southwest" into a voice enabled device, such as a standard telephone, cell phone, or IP phone, and the system accesses the pre-selected web sites beginning with the first web site and sequentially accessing each web site until the current stock value for Southwest Airlines is found or until all of the pre-selected web sites have been accessed. Once the information is found, the system converts the retrieved information into audio form, which may be transmitted via the voice enabled device to the user. For example, once the current stock value for Southwest Airlines is found, the system may transmit an audio message containing the retrieved

information, such as "$16.65" or "The current stock value of Southwest Airlines is $16.65," to the user over the voice enabled device.

These features of the present invention are important advancements over the prior art. In the system disclosed by U.S. Patent No. 6,157,705 to Perrone ("the Perrone Patent"), users cannot retrieve desired information from a plurality of pre-selected web sites by uttering speech commands. *See* Perrone Patent, col. 11, ll. 19-29. Rather, speech commands correspond to specific resources on specific web sites, and uttering speech commands allows users to retrieve the specific resources from the specific web sites. *Id.* The system disclosed by the Perrone Patent does not access a plurality of pre-selected web sites in a sequential manner until the desired information is found. *Id.*

Applicant has amended claims 1-17 to further emphasize these important features of the present invention. Additionally, claims 18-32 have been added to further protect Applicant's invention. Accordingly, the Examiner is requested to withdraw the rejections and enter a timely Notice of Allowance

Rejection Under Double Patenting:

The amendment is believed to obviate the rejection of claims 1-17 under non-statutory double patenting as being unpatentable over U.S. Patent No. 6,807,257 to Kurganov ("the Kurganov Patent"). Independent claim 1 as amended includes several patentable features not disclosed, suggested, or implied by the Kurganov Patent.

For example, claim 1 as amended includes "at least one instruction set for identifying said information to be retrieved, said instruction set being associated with said computer, said instruction set comprising: a plurality of pre-selected web site addresses, each said web site address identifying a web site containing said information to be retrieved." The Kurganov Patent does not disclose, suggest, or imply this feature.

As another example, claim 1 as amended includes "said computer further configured to access at least one of said plurality of web sites identified by said instruction set to obtain said information to be retrieved, said computer configured to first access said first web site of said plurality of web sites and, if said information to be retrieved is not found at said first web site,

said computer configured to sequentially access said plurality of web sites until said information to be retrieved is found or until said plurality of web sites has been accessed."

The Kurganov Patent does not disclose, suggest, or imply "said computer further configured to access at least one of said plurality of web sites identified by said instruction set to obtain said information to be retrieved, said computer configured to first access said first web site of said plurality of web sites and, if said information to be retrieved is not found at said first web site, said computer configured to sequentially access said plurality of web sites until said information to be retrieved is found or until said plurality of web sites has been accessed." Rather, with the system disclosed by the Kurganov Patent, speech commands are used to carry out specific functions, such as make telephone calls or compose e-mail messages. *See* Kurganov Patent, col. 6, ll. 18-52. The system disclosed by the Kurganov Patent does not access a plurality of pre-selected web sites in a sequential manner until desired information is found. *Id.*

The Kurganov Patent does not disclose, suggest, or imply all of the elements of independent claim 1 as amended. As such, the rejection based on non-statutory double patenting should be withdrawn. *See In re Braat*, 937 F.2d 589, 592-93 (Fed. Cir. 1991) (stating that the Federal Circuit "has endorsed an obviousness determination similar to . . . that undertaken under 35 U.S.C. § 103 in determining the propriety of a rejection for double patenting"); *see also In re Vogel*, 422 F.2d 438, 441-42 (C.C.P.A. 1970) (stating that a rejection under double patenting cannot be sustained where the prior art does not disclose, suggest, or imply all of the elements of the claimed invention).

Accordingly, amended independent claim 1, and those claims depending therefrom, should be allowed.

Rejection Under 35 U.S.C. § 102:

The amendment is believed to obviate the rejection of claims 1-7 and 14-17 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,157,705 to Perrone ("the Perrone Patent"). Independent claim 1 as amended includes several patentable features not disclosed by the Perrone Patent.

For example, claim 1 as amended includes "at least one instruction set for identifying said information to be retrieved, said instruction set being associated with said computer, said

instruction set comprising: a plurality of pre-selected web site addresses, each said web site address identifying a web site containing said information to be retrieved." The Perrone Patent does not disclose this feature.

As another example, claim 1 as amended includes "said computer further configured to access at least one of said plurality of web sites identified by said instruction set to obtain said information to be retrieved, said computer configured to first access said first web site of said plurality of web sites and, if said information to be retrieved is not found at said first web site, said computer configured to sequentially access said plurality of web sites until said information to be retrieved is found or until said plurality of web sites has been accessed."

The Perrone Patent does not disclose "said computer further configured to access at least one of said plurality of web sites identified by said instruction set to obtain said information to be retrieved, said computer configured to first access said first web site of said plurality of web sites and, if said information to be retrieved is not found at said first web site, said computer configured to sequentially access said plurality of web sites until said information to be retrieved is found or until said plurality of web sites has been accessed." Rather, speech commands correspond to specific resources on specific web sites, and uttering speech commands allows users to retrieve the specific resources from the specific web sites. *See* Perrone Patent, col. 11, ll. 19-29. The system disclosed by the Perrone Patent does not access a plurality of pre-selected web sites in a sequential manner until the desired information is found. *Id.*

The Perrone Patent does not disclose all of the elements of independent claim 1 as amended. As such, the rejection based on anticipation should be withdrawn. *See Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987) ("A claim is anticipated only if each and every element as set forth in the claim is found").

Accordingly, amended independent claim 1, and those claims depending therefrom, should be allowed.

Rejection Under 35 U.S.C. § 103:

The amendment is believed to obviate the rejection of claims 8-13 under 35 U.S.C. § 103(a) as being unpatentable over the Perrone Patent. Independent claim 1 as amended includes several patentable features not disclosed, suggested, or implied by the Perrone Patent.

For example, claim 1 as amended includes "at least one instruction set for identifying said information to be retrieved, said instruction set being associated with said computer, said instruction set comprising: a plurality of pre-selected web site addresses, each said web site address identifying a web site containing said information to be retrieved." The Perrone Patent does not disclose, suggest, or imply this feature.

As another example, claim 1 as amended includes "said computer further configured to access at least one of said plurality of web sites identified by said instruction set to obtain said information to be retrieved, said computer configured to first access said first web site of said plurality of web sites and, if said information to be retrieved is not found at said first web site, said computer configured to sequentially access said plurality of web sites until said information to be retrieved is found or until said plurality of web sites has been accessed."

The Perrone Patent does not disclose, suggest, or imply "said computer further configured to access at least one of said plurality of web sites identified by said instruction set to obtain said information to be retrieved, said computer configured to first access said first web site of said plurality of web sites and, if said information to be retrieved is not found at said first web site, said computer configured to sequentially access said plurality of web sites until said information to be retrieved is found or until said plurality of web sites has been accessed." Rather, speech commands correspond to specific resources on specific web sites, and uttering speech commands allows users to retrieve the specific resources from the specific web sites. *See* Perrone Patent, col. 11, ll. 19-29. The system disclosed by the Perrone Patent does not access a plurality of pre-selected web sites in a sequential manner until the desired information is found. *Id.*

The Perrone Patent does not disclose, suggest, or imply all of the elements of independent claim 1 as amended. As such, the rejection based on obviousness should be withdrawn. *See In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974) (stating that all elements of a claim must be disclosed by the prior art to support a *prima facie* case of obviousness).

Accordingly, amended independent claim 1, and those claims depending therefrom, should be allowed.

Additional Claims:

Applicant has added claims 18-32 to further protect Applicant's invention. New claims 18-32 have patentable elements not disclosed by the prior art applied by the Examiner. For example, claim 21 includes the step of "access[ing] said plurality of web sites based on said ranking, said computer first accessing said web site having the highest ranking." This feature is not disclosed by the prior art applied by the Examiner.

As another example, claim 22 includes the step of "adjusting said rankings associated with said plurality of web sites such that said web site having said information to be retrieved is assigned the highest ranking and any web sites not having said information to be retrieved are assigned lower rankings." This feature is not disclosed by the prior art applied by the Examiner.

As a further example, claim 23 includes the step of "periodically polling each said web site to determine whether said web site contains said information to be retrieved." This feature is not disclosed by the prior art applied by the Examiner.

As yet a further example, claim 26 includes an instruction set comprising "a content descriptor associated with each said web site address, said content descriptor pre-defining a portion of said web site containing said information to be retrieved." This feature is not disclosed by the prior art applied by the Examiner.

As still a further example, the instruction set of claim 26 further includes "a ranking associated with each said web site address, said ranking indicating the order in which the plurality of pre-selected web sites are accessed." This feature is not disclosed by the prior art applied by the Examiner.

CONCLUSION

In view of the above amendments and remarks, Applicant believes claims 1-32 are in position for allowance and respectfully requests that a timely Notice of Allowance be issued in this case.

Applicant has enclosed a Petition for Extension of Time and a fee transmittal to cover the related fees. Should any additional fees be required (except for payment of the issue fee), the Commissioner is authorized to deduct the fees from Kelley Drye & Warren LLP Deposit Account No. 11-0404, Order No. 015749-0015.

Respectfully submitted,

By_____

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PTO/SB/22 (12-04)
Approved for use through 07/31/2006. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARMENT OF COMMERCE

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2005** *(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)*	Docket Number (Optional) 015749.0015
Application Number 10/821,690	Filed April 9, 2004
For Robust Voice Browser System and Voice Activated Device Controller	
Art Unit 2644	Examiner McFadden, Susan

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$120	$60	$
☐	Two months (37 CFR 1.17(a)(2))	$450	$225	$
☒	Three months (37 CFR 1.17(a)(3))	$1020	$510	$ 510
☐	Four months (37 CFR 1.17(a)(4))	$1590	$795	$
☐	Five months (37 CFR 1.17(a)(5))	$2160	$1080	$

☒ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 11-0404. I have enclosed a duplicate copy of this sheet.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☒ attorney or agent of record. Registration Number 54,583

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____

Signature — Date: 1/6/06

Scott R. Kaspar — Typed or printed name

312-857-7088 — Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☒ Total of 1 forms are submitted.

01/10/2006 YPOLITE1 00000057 110404 10821690
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01/11/2006 YPOLITE1 00000002 110404 10821690
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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 10/821,690

CLAIMS AS FILED – PART I

FOR	(Column 1) NUMBER FILED		(Column 2) NUMBER EXTRA	SMALL ENTITY RATE	SMALL ENTITY FEE	OR	OTHER THAN SMALL ENTITY RATE	OTHER THAN SMALL ENTITY FEE
BASIC FEE (37 CFR 1.16(a))					$____	OR		$____
TOTAL CLAIMS (37 CFR 1.16(c))	17	minus 20 =	*	X $____ =		OR	X $____ =	
INDEPENDENT CLAIMS (37 CFR 1.16(b))	1	minus 3 =	*	X $____ =		OR	X $____ =	
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(d))				+ $____ =		OR	+ $____ =	
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL		OR	TOTAL	

CLAIMS AS AMENDED – PART II

1-9-06

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE	SMALL ENTITY ADDITIONAL FEE	OR	OTHER THAN SMALL ENTITY RATE	OTHER THAN SMALL ENTITY ADDITIONAL FEE
Total (37 CFR 1.16(c))	* 32	Minus	** 20	= 12	X $25 =	300	OR	X $50 =	
Independent (37 CFR 1.16(b))	* 3	Minus	*** 3	=	X $____ =		OR	X $____ =	
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(d))					+ $____ =		OR	+ $____ =	
					TOTAL ADD'L FEE	300	OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
Total (37 CFR 1.16(c))	*	Minus	**	=	X $____ =		OR	X $____ =	
Independent (37 CFR 1.16(b))	*	Minus	***	=	X $____ =		OR	X $____ =	
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(d))					+ $____ =		OR	+ $____ =	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT C

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE	ADDITIONAL FEE	OR	RATE	ADDITIONAL FEE
Total (37 CFR 1.16(c))	*	Minus	**	=	X $____ =		OR	X $____ =	
Independent (37 CFR 1.16(b))	*	Minus	***	=	X $____ =		OR	X $____ =	
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(d))					+ $____ =		OR	+ $____ =	
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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☐	L5	L3 and voice	1
☐	L4	L3 and voice	1
☐	L3	pre-selected adj web adj sites	4
☐	L2	pre-selected adj web adj sites and voice and recognition and speech adj synthesis and grammar	0
☐	L1	pre-selected adj web adj sites and voice adj enabled and speaker-independent and recognition and speech adj synthesis	0

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NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 01/23/2006

Steve Z Szczepanski-Kelley Drye & Warren LLP
Suite 2600
333 West Wacker Drive
Chicago, IL 60606

EXAMINER	
MCFADDEN, SUSAN IRIS	
ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 01/23/2006

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,690	04/09/2004	Alexander Kurganov	47242-00027USC1	1367

TITLE OF INVENTION: ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$700	$300	$1000	04/24/2006

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

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B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

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PTOL-85 (Rev. 07/05) Approved for use through 04/30/2007.

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7590 01/23/2006

Steve Z Szczepanski-Kelley Drye & Warren LLP
Suite 2600
333 West Wacker Drive
Chicago, IL 60606

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(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,690	04/09/2004	Alexander Kurganov	47242-00027USC1	1367

TITLE OF INVENTION: ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$700	$300	$1000	04/24/2006

EXAMINER	ART UNIT	CLASS-SUBCLASS
MCFADDEN, SUSAN IRIS	2655	704-275000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
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- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

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- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.
NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,690	04/09/2004	Alexander Kurganov	47242-00027USC1	1367

7590 01/23/2006

Steve Z Szczepanski-Kelley Drye & Warren LLP
Suite 2600
333 West Wacker Drive
Chicago, IL 60606

EXAMINER	
MCFADDEN, SUSAN IRIS	

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 01/23/2006

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571) 272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

PTOL-85 (Rev. 07/05) Approved for use through 04/30/2007.

Notice of Allowability	Application No.	Applicant(s)	
	10/821,690	KURGANOV ET AL.	
	Examiner	Art Unit	
	Susan McFadden	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Amendment filed 1-9-06*.

2. ☒ The allowed claim(s) is/are *1-32*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Susan McFadden
Primary Examiner
Art Unit: 2655

Issue Classification	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/821,690	KURGANOV ET AL.	
	Examiner	Art Unit	
	Susan McFadden	2655	

ISSUE CLASSIFICATION

ORIGINAL		CROSS REFERENCE(S)	
CLASS	SUBCLASS	CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)
704	275		
INTERNATIONAL CLASSIFICATION			
G 1 0 L	21/06		
	/		
	/		
	/		
	/		

/ (Assistant Examiner) (Date)

(Legal Instruments Examiner) 1/10/06 (Date)

Susan McFadden 1-18-06

(Primary Examiner) (Date)

Total Claims Allowed: 32

O.G. Print Claim(s)	O.G. Print Fig.
1	1

☒ **Claims renumbered in the same order as presented by applicant** ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		31		61		91		121		151		181
	2		32		62		92		122		152		182
	3		33		63		93		123		153		183
	4		34		64		94		124		154		184
	5		35		65		95		125		155		185
	6		36		66		96		126		156		186
	7		37		67		97		127		157		187
	8		38		68		98		128		158		188
	9		39		69		99		129		159		189
	10		40		70		100		130		160		190
	11		41		71		101		131		161		191
	12		42		72		102		132		162		192
	13		43		73		103		133		163		193
	14		44		74		104		134		164		194
	15		45		75		105		135		165		195
	16		46		76		106		136		166		196
	17		47		77		107		137		167		197
	18		48		78		108		138		168		198
	19		49		79		109		139		169		199
	20		50		80		110		140		170		200
	21		51		81		111		141		171		201
	22		52		82		112		142		172		202
	23		53		83		113		143		173		203
	24		54		84		114		144		174		204
	25		55		85		115		145		175		205
	26		56		86		116		146		176		206
	27		57		87		117		147		177		207
	28		58		88		118		148		178		208
	29		59		89		119		149		179		209
	30		60		90		120		150		180		210

Search Notes	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/821,690	KURGANOV ET AL.	
	Examiner	Art Unit	
	Susan McFadden	2655	

SEARCHED			
Class	Subclass	Date	Examiner

INTERFERENCE SEARCHED			
Class	Subclass	Date	Examiner
704	275	1/18/2006	SM

SEARCH NOTES (INCLUDING SEARCH STRATEGY)		
	DATE	EXMR
Searched West Interference Search	1/18/2006	SM

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BIBDATASHEET

Bib Data Sheet

CONFIRMATION NO. 1367

SERIAL NUMBER	FILING OR 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
10/821,690	04/09/2004 RULE	704	2655	47242-00027USC1

APPLICANTS

Alexander Kurganov, Buffalo Grove, IL;
Valery Zhukoff, Deerfield, IL;

**** CONTINUING DATA ***************************

This application is a CON of 09/776,996 02/05/2001 PAT 6,721,705
which claims benefit of 60/180,344 02/04/2000
and claims benefit of 60/233,068 09/15/2000

**** FOREIGN APPLICATIONS *********************

IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY **
** 06/24/2004

Foreign Priority claimed	STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
☐ yes ☑ no	IL	4	17	1

35 USC 119 (a-d) conditions met: ☐ yes ☐ no ☐ Met after Allowance

Verified and Acknowledged: Examiner's Signature _____ Initials

ADDRESS

Steve Z Szczepanski-Kelley Drye & Warren LLP
Suite 2600
333 West Wacker Drive
Chicago ,IL 60606

TITLE

Robust voice browser system and voice activated device controller

FILING FEE RECEIVED	FEES: Authority has been given in Paper	
685	No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 11 of 13

	Complete if Known
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
dm		"GLOBECOM '85 IEEE Global Telecommunications Conference, " New Orleans, La., December 2-5, 1985, pp. 1295-1300.	
dm		"Introducing PIC SuperFax, First PC/Fax System to Run Under Windows", Pacific Image Communications, Pasadena, CA, Date Unknown, (received at COMDEX show, Nov. 3, 1987), 4 pgs.	
dm		GARCIA, ET AL, "Issues in Multimedia Computer-Based Message Systems Design and Standardization," NATO ASI Series, Vol. 1-6, 1984, 18 pgs.	
dm		DON HUNT & BRIAN EDWARDS, "Long-Distance Remote Control to the Rescue," Chicago Tribune, June 15, 2002, Section 4, page 15.	
dm		SCHMANDT, ET AL., "Phone Slave: A Graphical Telecommunications Interface," Proceedings of the SID, 1985, Vol. 26/1, pp. 79-82.	
dm		SCHMANDT, ET AL., "Phone Shell: The Telephone as Computer Terminal," ACM Multimedia, 1993, 11 pgs.	
dm		Proceedings of the IFIP World Computer Congress, Dublin, Ireland, September 1-5, 1986.	
dm		Shimamura, K., et al., "Review of the Electrical Communication Laboratories," Vol. 418 (33), No. 1, Tokyo, Japan, 1985, pp. 31-39.	
dm		"Secretarial Branch Exchanged," IBM Technical Disclosure Bulletin, Vol. 26 (5), October 1983, pp. 2645-47.	
dm		"Wildfire Communications, Inc.," Harvard Business School, March 21, 1996, Publ. No. 9-396-305, pp. 1-22.	

Examiner Signature		Date Considered	7-1-05

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

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Sheet 12 of 13

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First Named Inventor	Kurganov
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NON PATENT LITERATURE DOCUMENTS

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DM		"WordPerfect: New Telephony Features Boost Office", WordPerfect Office TechBrief, 1994, Info-World Publg. Co., Vol. 10, Issue 2, pp. 2-3.	
DM		Internet web page, "Wildfire Communications, Inc.", November 5, 1997, including the following URL addresses:	
DM		http://www.wildfire.com (1 pg);	
DM	-	http://www.wildfire.com/consumerhome.html (2 pgs.);	
DM		http://www.wildfire.com/106.html (2pgs.);	
DM		http://www.wildfire.com/carrierhome.html (2pgs.);	
DM	1.	http://www.wildfire.com/sfandb.html (3 pgs.);	
DM		http://www.wildfire.com/about.html (1 pg.);	
DM		http://www.wildfire.com/abtmgmt.html (3 pgs.);	
DM		http://www.wildfire.com/scoop.html (2 pgs.); and	

Examiner Signature		Date Considered	7-1-05

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 13 of 13

	Complete if Known
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

NON PATENT LITERATURE DOCUMENTS

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SM		http://www.wildfire.com/intel.html (1 pg.); and	
SM		http://www.wildfire.com/msft.html (2 pgs.).	

NO dates found

Examiner Signature		Date Considered	7-1-08

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 10 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

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Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
SM		"A PABX that Listens and Talks," Speech Technology, January/February 1984, pp. 74-79.	
SM		MAEDA, ET AL., "An Intelligent Customer-Controlled Switching System," IEEE Global Telecommunications Conference, Hollywood, Florida, Nov. 28-Dec. I 1988, pp. 1499-1503.	
SM		COLE, ET AL., "An Architecture for a Mobile OSI Mail Access System," IEEE Journal on Selected Areas in Communications, Vol. 7 (2), February 1989, pp. 249-256.	
SM		"Business Phone Systems for Advanced Offices," NTT Review, Vol. 2 (6), November 1990, pp. 52-54.	
SM		LY, "Chatter: A Conversational Telephone Agent," submitted to Program in Media Arts & Sciences, MIT, 1993, pp. 1-130.	
SM		SCHMANDT ET AL., "A Conversational Telephone Messaging Systems", IEEE Transactions on Consumer Electronics, 1984, Vol. CE-30, No. 3, pp. xxi-xxdv.	
SM		"Data Communications Networks: Message Handling Systems," Fascicle, VIII. 7- Recommendations X.400-X.430, 38 pages, date unknown.	
SM		Bellcore Technology Licensing, "The Electronic Receptionist -- A Knowledge-Based Approach to Personal Communications", 1994, pp. 1-8.	no month
SM		"Faxpak Store and Forward Facsimile Transmission Service, " Electrical Communication, Vol. 54 (3), 1979, pp. 251-55.	1
SM		BRACHMAN, ET AL., "Fragmentation in Store-and-Forward Message Transfer," IEEE Communications Magazine, Vol. 26(7), July 1988, pp. 18-27.	

Examiner Signature	Susan McFadden	Date Considered	7-1-05

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1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.
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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571) 273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 01/23/2006

Steve Z Szczepanski-Kelley Drye & Warren LLP
Suite 2600
333 West Wacker Drive
Chicago, IL 60606

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

SCOTT KASPAR	(Depositor's name)
	(Signature)
APRIL 24, 2006	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,690	04/09/2004	Alexander Kurganov	47242-00027USC1	1367

TITLE OF INVENTION: ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$700	$300	$1000	04/24/2006

EXAMINER	ART UNIT	CLASS-SUBCLASS
MCFADDEN, SUSAN IRIS	2655	704-275000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list
(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 KELLEY DRYE & WARREN LLP
2
3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: PARUS HOLDINGS, INC.
(B) RESIDENCE: (CITY and STATE OR COUNTRY): BANNOCKBURN, IL

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are enclosed:
☑ Issue Fee
☑ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):
☑ A check in the amount of the fee(s) is enclosed. CHECK NO. 52813B FOR $1000.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)
☑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

The Director of the USPTO is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.
NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date APRIL 24, 2006

Typed or printed name SCOTT KASPAR Registration No. 54,583

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01 FC:2501 700.00 OP
02 FC:1504 300.00 OP

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 7 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number: Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
JM		US- 5,812,796	09-22-1998	Broedner	
JM		US- 5,819,306	10-06-1998	Goldman	
JM		US- 5,822,727	10-13-1998	Garberg	
JM		US- 5,832,063	11-03-1998	Vysotsky	
JM		US- 5,835,570	11-10-1998	Wattenbarger	
JM		US- 5,867,494	02-02-1999	Krishnaswamy	
JM		US- 5,867,495	02-02-1999	Elliott	
JM		US- 5,873,080	02-16-2000	Coden	
JM		US- 5,881,134	03-01-1999	Foster	
JM		US- 5,884,262	03-16-1999	Wise	
JM		US- 5,890,123	03-30-1999	Brown	
JM		US- 5,915,001	06-22-1999	Uppaluru	
JM		US- 5,974,413	10-26-1999	Beauregard	
JM		US- 5,999,525	12-07-1999	Krishnaswamy	
JM		US- 6,012,088	01-04-2000	Li	
JM		US- 6,014,437	01-11-2000	Acker	
JM		US- 6,018,710	01-01-2000	Wynblatt	
JM		US- 6,021,181	02-01-2000	Miner	
JM		US- 6,031,904	02-01-2000	An	

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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document: Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	7-1-05

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 2 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

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U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
DM		US- 4,713,837	12-15-1987	Gordon	
DM		US- 4,748,656	05-31-1988	Gibbs	
DM		US- 4,757,525	07-12-1988	Matthews	
DM		US- 4,761,807	08-02-1988	Matthews	
DM		US- 4,763,317	08-09-1988	Lehman	
DM		US- 4,769,719	09-06-1988	Endo	
DM		US- 4,776,016	10-04-1988	Hansen	
DM		US- 4,809,321	02-28-1989	Morganstein	
DM		US- 4,837,798	06-06-1989	Cohen	
DM		US- 4,847,891	07-11-1989	Kotani	
DM		US- 4,850,012	07-18-1989	Mehta	
DM		US- 4,866,758	09-12-1989	Heinzelmann	
DM		US- 4,873,719	10-10-1989	Reese	
DM		US- 4,893,333	01-09-1990	Baran	
DM		US- 4,905,273	02-27-1990	Gordon	
DM		US- 4,907,079	03-01-1990	Turner	
DM		US- 4,918,722	04-17-1990	Buehren	
DM		US- 4,922,518	05-01-1990	Gordon	
DM		US- 4,922,526	05-01-1990	Morganstein	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
DM		WO 9609710	03-28-1996			
DM		WO 9823058	05-28-1998			

Examiner Signature	Date Considered	7-1-05

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 1 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

U.S. PATENT DOCUMENTS

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JM		US- 3,728,486	04-17-1973	Kraus	
JM		US- 4,058,838	11-15-1997	Crager	
JM		US- 4,313,035	01/26/1982	Jordan	
JM		US- 4,327,251	04-27-1982	Fomenko	
JM		US- 4,340,783	07-20-1982	Sugiyama	
JM		US- 4,371,752	02-01-1983	Matthews	
JM		US- 4,500,751	02-19-1985	Darland	
JM		US- 4,513,390	04-23-1985	Walter	
JM		US- 4,523,055	06-11-1985	Hohl	
JM		US- 4,549,047	10-22-1985	Brian	
JM		US- 4,584,434	04-22-1986	Hashimoto	
JM		US- 4,585,906	04-29-1986	Matthews	
JM		US- 4,596,900	06-24-1986	Jackson	
JM		US- 4,596,900 B1	10-10-1995	Jackson	
JM		US- 4,596,900 B2	08-26-1997	Jackson	
JM		US- 4,602,129	07-32-1986	Matthews	
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JM		US- 4,652,700	03-24-1987	Matthews	
JM		US- 4,696,028	09-22-1987	Morganstein	

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JM

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
JM		GB 2211698	07-05-1989			
JM		GB 2240693	08-07-1991			
JM		JP 1-258526	10-16-1989			✓
JM		WO 9107838	05-30-1991			
JM		WO 9118466	11-28-1991			
JM		CA 1329852	05-24-94			

Examiner Signature		Date Considered	7-1-05

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Sheet 3 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
JM		US- 4,933,966	06-12-1990	Hird	
JM		US- 4,935,955	06-19-1990	Neudorker	
JM		US- 4,935,958	06-19-1990	Morganstein	
JM		US- 4,941,170	07-10-1990	Herbst	
JM		US- 4,953,204	08-28-1990	Cuschleg Jr.	
JM		US- 4,955,047	09-04-1990	Morganstein	
JM		US- 4,956,835	09-11-1990	Grover	
JM		US- 4,967,288	10-30-1990	Mizutori	
JM		US- 4,972,462	11-20-1990	Shibata	
JM		US- 4,974,254	11-27-1990	Perine	
JM		US- 4,975,941	12-04-1990	Morganstein	
JM		US- 4,994,926	02-01-1991	Gordon	
JM		US- 5,003,575	03-26-1991	Chamberlin	
JM		US- 5,008,926	04-16-1991	Misholi	
JM		US- 5,020,095	05-281991	Morganstein	
JM		US- 5,~~207,384~~ 5027384	06-25-1991	Morganstein	
JM		US- 5,029,196	07-02-1991	Morganstein	
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JM		US- 5,086,385	02-04-1991	Launey	

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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]

Examiner Signature		Date Considered	7-1-05

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 6 of 13

Complete if Known	
Application Number	10/821,690
Filing Date	04-09-2004
First Named Inventor	Kurganov
Art Unit	TBA
Examiner Name	TBA
Attorney Docket Number	47242-00027USC1

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JM		US- 5,566,236	10-15-1996	MeLampby	
JM		US- 5,603,031	02-11-1997	White	
JM		US- 5,608,786	03-01-1997	Gordon	
JM		US- 5,610,970	03-01-1997	Fuller	
JM		US- 5,611,031	03-11-1997	Hertzfield	
JM		US- 5,652,789	07-29-1997	Miner	
JM		US- 5,659,597	08-01-1997	Bareis	
JM		US- 5,666,401	09-09-1997	Morganstein	
JM		US- 5,675,507	10-01-1997	Bobo II	
JM		US- 5,675,811	10-07-1997	Broedner	
JM		US- 5,689,669	11-18-1997	Lynch	
JM		US- 5,692,187	11-25-1997	Goldman	
JM		US- 5,719,921	02-01-1998	Vysotsky	
JM		US- 5,724,408	03-03-1998	Morganstein	
JM		US- 5,742,905	04-01-1998	Pepe	
JM		US- 5,752,191	05-01-1998	Fuller	
JM		US- 5,787,298	07-28-1998	Broedner	
JM		US- 5,793,993	08-11-1998	Broedner	
JM		US- 5,809,282	09-15-1998	Cooper	

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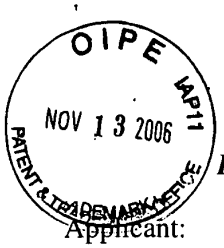

Atty. Dkt. No. 078616-1026

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Alex Kurganov
Title:	Robust Voice Browser System and Voice Activated Device Controller
Appl. No.:	10/821,690
Filing Date:	4/9/2004
Examiner:	Susan McFadden
Art Unit:	2644
Confirmation Number:	1367

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450**, on the date below.

Sherry Cunningham-Page
(Printed Name)

(Signature)

November 8, 2006
(Date of Deposit)

REVOCATION AND POWER OF ATTORNEY AND CHANGE OF CORRESPONDENCE ADDRESS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant's attorney respectfully requests that the records of the United States Patent and Trademark Office in connection with the above-identified application be changed to show the following customer number for all future communications by virtue of the attached Power of Attorney to Prosecute Applications Before the U.S. Patent and Trademark Office (PTO/SB/80) and by the enclosed Statement under 3.73(b).

Correspondence Customer Number: 27433

Respectfully submitted,

Date 11-8-06

By _____

FOLEY & LARDNER LLP
Customer Number: 27433
Telephone: (312) 832-5113
Facsimile: (312) 832-4700

Scott R. Kaspar
Attorney for Applicant
Registration No. 54,583

PTO/SB/80 (12-03)
Approved for use through 11/30/2005. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☒ Practitioners associated with the Customer Number: 27433

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☒ The address associated with Customer Number: 27433

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Fax	

Assignee Name and Address:

Parus Interactive Holdings
3000 Lakeside Dr.
Suite 300N
Bannockburn, Illinois 60015

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Company Name	PARUS INTERACTIVE HOLDINGS		
Name	Robert C. McConnell		
Signature		Date	
Title	Sr. Vice President	Telephone	888-387-3481

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STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner:	Alex Kurganov		
Application No.:	10/821,690	Filed:	4/9/2004
Patent No.:	7,076,431	Issue Date:	7/11/2006
Docket Number:	078616-1026		
Entitled:	Robust Voice Browser System and Voice Activated Device Controller		

Webley Systems, Inc.
(Name of Assignee)

Corporation
(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest; or
2. ☐ an assignee of less than the entire right, title, and interest
   The extent (by percentage) of its ownership interest is %

in the patent application/patent identified above by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel/Frame 011795/0293 or for which a copy thereof is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as shown below:

1. From:__ To:
   The document was recorded in the United States Patent and Trademark Office at Reel ___, Frame ___, or for which a copy thereof is attached.

2. From:__ To:
   The document was recorded in the United States Patent and Trademark Office at Reel ___, Frame ___, or for which a copy thereof is attached.

3. From:__ To:
   The document was recorded in the United States Patent and Trademark Office at Reel ___, Frame ___, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet.

☒ Copies of assignments or other documents in the chain of title are attached.

[**NOTE**: A separate copy (i.e., a true copy of the original document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, if the assignment is to be recorded in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature	November 8, 2006 Date
Scott R. Kaspar Printed or Typed Name	(312) 832-5113 Telephone Number
Attorney for Applicant Title	

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

PATENT
47242-00027

ASSIGNMENT

WHEREAS, We, **Alexander Kurganov** and **Valery Zhukoff** have invented certain new and useful improvements in the following: **Robust Voice Browser System and Voice Activated Device Controller** for which we have made application for United States Letters Patent; and,

WHEREAS, Assignee, **Webley Systems, Inc.**, a corporation organized and existing under the laws of **Illinois**, having its principal place of business at **570 Lake Cook Road, Suite 406, Deerfield, IL 60015** (hereinafter referred to as "ASSIGNEE"), is desirous of acquiring our entire right, title and interest in and to the invention, and in and to the said application and any Letters Patent that may issue thereon;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, we do hereby sell, assign and transfer unto ASSIGNEE, its successors, assigns and legal representatives the entire right, title and interest in and to said invention and in and to said applications and all patents which may be granted therefore, and all provisionals, divisions, reissues, substitutions, continuations, continuation-in-part and extensions thereof; and we hereby authorize and request the Commissioner of Patents and Trademarks to issue all patents for said invention, or patents resulting therefrom, insofar as our interest is concerned, to the said ASSIGNEE of our entire right, title and interest.

We also hereby sell and assign to said ASSIGNEE, its successors, assigns and legal representatives the full and exclusive rights, title and interest to the invention disclosed in said applications throughout the world, including the right to file applications and obtain patents, utility models, industrial models and designs for said invention in its own name throughout the world including all rights of priority, all rights to publish cautionary notices reserving ownership of said invention and all rights to register said invention in appropriate registries; and

We further agree to execute any and all powers of attorney, applications, assignments, declarations, affidavits, and any other papers in connection therewith necessary to perfect such rights, title and interest in ASSIGNEE, its successors, assigns and legal representatives.

We hereby further agree that we will communicate to said ASSIGNEE, or its successors, assigns and legal representatives, any facts known to us respecting any improvements; and, at the expense of said ASSIGNEE, to testify in any legal proceedings, sign all lawful papers, execute all divisional, continuation, continuation-in-part, reissue and substitute applications, make all lawful oaths, and generally do everything possible to vest title in said ASSIGNEE and to aid said ASSIGNEE, its successors, assigns and legal representatives to obtain and enforce proper protection for said invention in all countries.

We further authorize and direct our attorneys to insert below* the serial number and filing date of said application now identified as Case Docket No. **47242-00027** as soon as the same shall have been made known to them by the United States Patent Office.

*Serial Number:	09/776,996
Filing Date:	February 5, 2001

IN WITNESS WHEREOF. I have hereunto set my hand and seal this 4th day of May, 2001.

Name: Alexander Kurganov
Address: 2099 Sheridan Road
Buffalo Grove, Illinois 60089

STATE OF Illinois)
) ss.
COUNTY OF Lake)

On this 4th day of May, 2001, before me, a Notary Public in and for the State and County aforesaid, personally appeared , known by me to be the person of the above name who signed and sealed the foregoing instrument, and acknowledged the same to be his own free act and deed.

Notary Public
My Commission Expires:

[seal]

"OFFICIAL SEAL"
Susan K. Oehlwein
Notary Public, State of Illinois
My Commission Exp. 01/21/2002

IN WITNESS WHEREOF, I have hereunto set my hand and seal this 4th day of May, 2001.

Name: Valery Zhukoff
Address: 821 Rosemary Terrace
Deerfield, IL 60015

STATE OF Illinois)
) ss.
COUNTY OF Lake)

On this 4th day of May, 2001, before me, a Notary Public in and for the State and County aforesaid, personally appeared , known by me to be the person of the above name who signed and sealed the foregoing instrument, and acknowledged the same to be his own free act and deed.

Notary Public
My Commission Expires:

"OFFICIAL SEAL"
Susan K. Oehlwein
Notary Public, State of Illinois
My Commission Exp. 01/21/2002

[seal]

BEST AVAILABLE COPY

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/821,690	04/09/2004	Alexander Kurganov	078616-1026

CONFIRMATION NO. 1367

OC000000021442313

27433
FOLEY & LARDNER LLP
321 NORTH CLARK STREET
SUITE 2800
CHICAGO, IL 60610-4764

Date Mailed: 12/01/2006

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/13/2006.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

SHARON KUANG
PTOSS (703) 305-3006

OFFICE COPY

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/821,690	04/09/2004	Alexander Kurganov	47242-00027USC1

CONFIRMATION NO. 1367

OC000000021442268

Steve Z Szczepanski-Kelley Drye & Warren LLP
Suite 2600
333 West Wacker Drive
Chicago, IL 60606

Date Mailed: 12/01/2006

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/13/2006.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

SHARON KUANG
PTOSS (703) 305-3006

OFFICE COPY

PTO/AIA/80 (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
U.S. Patent and Trademark Office; U.S DEPARTMENT OF COMMERCE

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint:

■ Practitioners associated with Customer Number: 93219

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

As attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignments documents attached to this form in accordance with 37 CFR 3.73(c).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to:

■ The address associated with Customer Number: 93219

OR

☐	Firm or Individual Name			
	Address			
	City		State	Zip
	Country			
	Telephone		Email	

Assignee Name and Address: Parus Holdings, Inc.
3000 Lakeside Drive, Suite 300N
Bannockburn, IL 60015

A copy of this form, together with a statement under 37 CFR 3.73(c) (Form PTO/AIA/96 or equivalent) is required to be Filed in each application in which this form is used. The statement under 37 CFR 3.73(c) may be completed by one of The practitioners appointed in this form, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record
The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	Robert C. McConnell	Date	5/21/2013
Name	Robert C. McConnell	Telephone	888-387-3481
Title	Chief Financial Officer, Senior Vice President and General Counsel of Parus Holdings, Inc.		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	20821581
Application Number:	10821690
International Application Number:	
Confirmation Number:	1367
Title of Invention:	ROBUST VOICE BROWSER SYSTEM AND VOICE ACTIVATED DEVICE CONTROLLER
First Named Inventor/Applicant Name:	Alexander Kurganov
Customer Number:	27433
Filer:	Reena Kuyper
Filer Authorized By:	
Attorney Docket Number:	078616-1026
Receipt Date:	01-DEC-2014
Filing Date:	09-APR-2004
Time Stamp:	02:44:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73.	04517US_Stmnt373.pdf	120064 b618d229f4045fae6075c8c4320113cd32ccf6c4	no	3

Warnings:	
Information:	

2	Power of Attorney	Signed_Parus_POA.pdf	58299 db136580173a245b145ea45cb364f8db8e4ae578	no	1

Warnings:	
Information:	
Total Files Size (in bytes):	178363

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office;U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of1995, no persons arerequired to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Alexander Kurganov, Valery Zhukoff

Application No./Patent No.: 10/821,690 Filed/Issue Date: April 9, 2004

Titled: Robust Voice Browser System and Voice Activated Device Controller

Parus Holdings, Inc., a corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

   ☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

   ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

   1. From: Alexander Kurganov, Valery Zhukoff To: Webley Systems, Inc.

      The document was recorded in the United States Patent and Trademark Office at
      Reel 033922, Frame 0418, or for which a copy thereof is attached.

   2. From: Webley Systems, Inc. To: Parus Holdings, Inc.

      The document was recorded in the United States Patent and Trademark Office at
      Reel 033922, Frame 0431, or for which a copy thereof is attached.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Reena Kuyper/	December 1, 2014
Signature	Date
Reena Kuyper	33,830
Printed or Typed Name	Title or Registration Number

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that yoube given certain informationin connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, pleasebe advised that: (1) the general authority forthe collection of thisinformation is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and(3) the principal purpose forwhich the information isused by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent applicationor patent. If you do not furnish the requested information,the U.S. Patent and Trademark Office may not be able to process and/or examineyour submission,which may result in termination of proceedings or abandonment of the applicationor expiration of the patent.

The informationprovided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the informationin order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an InternationalApplication filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, arecord may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from thissystem of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/821,690	04/09/2004	Alexander Kurganov	078616-1026

CONFIRMATION NO. 1367

27433
FOLEY & LARDNER LLP
3000 K STREET N.W.
SUITE 600
WASHINGTON, DC 20007-5109

POWER OF ATTORNEY NOTICE

OC000000072135011

Date Mailed: 12/03/2014

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/01/2014.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/rmturner myles/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/821,690	04/09/2004	Alexander Kurganov	

CONFIRMATION NO. 1367

93219
Patent Law Works, LLP
201 South Main Street, Suite 250
Salt Lake City, UT 84111

POA ACCEPTANCE LETTER

OC000000072135062

Date Mailed: 12/03/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 12/01/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/rmturner myles/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas - Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:19-cv-00433	7/22/2019	Western District of Texas - Waco Division

PLAINTIFF	DEFENDANT
PARUS HOLDINGS INC.	GOOGLE, LLC

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 SEE ATTACHED		
2 7076431		
3 9451084		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
Jeannette J. Clack	amichael	7/22/2019

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas - Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:19-cv-00432	7/22/2019	Western District of Texas - Waco Division

PLAINTIFF	DEFENDANT
Parus Holdings Inc.	Apple, Inc.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	See attached		
2	7076431		
3	9451084		
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
Jeannette J. Clack	Brianna Waite	7/22/2019

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas - Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:19-cv-00437	7/23/2019	Western District of Texas - Waco Division

PLAINTIFF	DEFENDANT
PARUS HOLDINGS INC.	LG Electronics, Inc., et al.

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 (see attached)		
2 7076431		
3 9451084		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
Jeannette J. Clack	Melissa Copp	7/23/2019

Copy 1—Upon initiation of action, mail this copy to Director **Copy 3—Upon termination of action, mail this copy to Director**
Copy 2—Upon filing document adding patent(s), mail this copy to Director **Copy 4—Case file copy**

AO 120 (Rev. 08/10)

TO:	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Western District of Texas - Waco Division on the following

☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:19-cv-00438	7/22/2019	Western District of Texas - Waco Division

PLAINTIFF	DEFENDANT
PARUS HOLDINGS INC.	GOOGLE, LLC

PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 (see attached)		
2 7076431		
3 9451084		
4		
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
Jeannette J. Clack	Melissa Copp	7/23/2019

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AO 120 (Rev. 08/10)

TO:	Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK

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☐ Trademarks or ☑ Patents. (☐ the patent action involves 35 U.S.C. § 292.):

DOCKET NO.	DATE FILED	U.S. DISTRICT COURT
6:19-cv-00454	8/6/2019	Western District of Texas - Waco Division

PLAINTIFF	DEFENDANT
PARUS HOLDINGS INC.	AMAZON.COM, INC.

	PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1	~~SEE ATTACHED~~		
2	7,076,431		
3	9,451,084		
4			
5			

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY ☐ Amendment ☐ Answer ☐ Cross Bill ☐ Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
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4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
Jeannette J. Clack	L Diaz	8/7/2019

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