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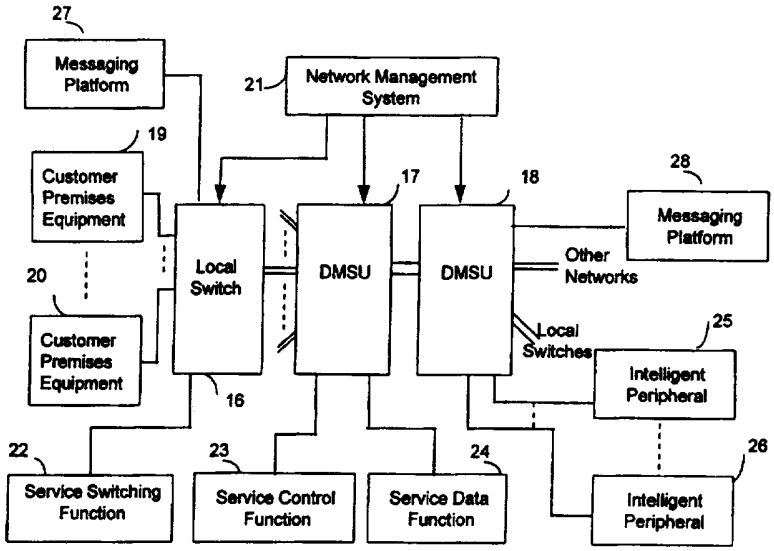

(57) Abstract

So that any messaging platform (27, 28) can be used for storing messages by any customer and common messaging protocols may be used, the present system is controlled by service switching function (22) and service control function (23) which may be located in differing parts of the network. On detection of a messaging service request the SSF (22) alerts the SCF (23) through signalling paths of the network via digital local exchange (16) and DMSU (17). The SCF takes control of the customer call and using data held in a service data store (24) provides appropriate prompts, access control and storage. Messages are stored in a distributed manner with sequential messages for the same customer not necessarily being held in the same messaging platform, only the location of each message being held in the SDF 24. FAX, Voice, Data and E-Mail messages may all be stored in the same manner.

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MESSAGING SYSTEMS

The present invention relates to messaging systems and more particularly to such systems accessible through a switched telecommunications network.

Messaging systems are no longer restricted to voice communication. Telecommunications customers expect access to store and forward systems for fax, data, video communication, electronic mail messages and for sending advertising materials through such systems. As telecommunications users become more sophisticated in their demand communications suppliers the number of platforms on which the services are provided may multiply.

A customer who requires a messaging service across more than one network may be required to contact several different telephone numbers in order to check for the presence of any communications waiting.

As each new development in messaging systems occurs customers requiring the additional functionality may be required to change their messaging systems causing confusion to people wishing to leave messages.

Further, where a customer has access to a multiplicity of messaging service providers, the access functionality for each provider may be different. It is also possible that where multiple/switched telephony network providers operate, each having its own messaging service, interworking between network message services will be required.

It will be appreciated that interworking between service providers is required so that at the very least a customer on one messaging system may send a message to a customer on another messaging system. This has already been achieved in many areas of electronic mail (e-mail) messaging and as multimedia messaging replaces current single media messaging systems (e.g. voice, fax, e-mail) complex interaction between systems may be expected.

According to the present invention there is provided a messaging system accessible by way of a switched telecommunications network, comprising storage means for storing messages, control means for directing the storage and retrieval of messages and conversion means for converting received messages into a form suitable for storage characterised in that the storage means comprises a plurality of data stores each connected to a communications switch for access by way of

the telecommunications network, the control means on a receipt of a message being arranged to cause storage of the message in one of the data stores by effecting switching through the network, the control means holding, in respect of each messaging customer, a record of the location of the or each message for such customer whereby messages for any one customer may be stored in any of the accessible data stores.

Preferably the control means has access through the switched network to a plurality of service modules each comprising data processing means to provide a respective part of the storage and for retrieval function, the control means causing a calling customer to be sequentially connected to appropriate service modules and interacting with the respective modules to complete the storage or retrieval of a message.

The messaging system may have a plurality of operating modes in a deposit mode of which a caller may leave a message for a messaging system customer, the control means connecting in turn a first service module to provide a system greeting, a second service module to collect a customer response if required and a further service module to prompt deposit of a message.

In a retrieval mode the control means may connect the first service module and the second service module as above followed by a different service module which collects a further customer response to validate the customer access to retrieval service.

If a valid response is received in the retrieval mode the customer may be connected through the switched network to a retrieval management service module which uses data retrieved by the control means to identify to the customer what (if any) messages are stored and to collect from the customer an indication of which stored message is to be retrieved such that the control means may cause the connection of the customer of the appropriate accessible data store for retrieval of the selected message. After retrieval of the selected message the control means causes reconnection of the customer to the retrieval management service module which may be arranged to offer a plurality of options to a customer in respect of the message retrieved.

A plurality of service modules in each type may be available and may be located in different parts of the network, the control means selecting and

connecting an appropriate free service module at each stage of the deposit or retrieval mode.

In a call answering mode if a network management system or control processor of a communications switch detects that an incoming call to a telephony customers is not being answered it may cause the calling customer to be connected to the messaging system and the control means may cause connection of a service module arrangement to provide to the calling customer a dedicated user greeting in respect of the called customer. The dedicated user greeting may be held in a data store which holds customer profile data in respect of each of a multiplicity of messaging system customers.

The network management system or control processor may also be arranged to cause connection of calling customer to the messaging system if the called customer line is not available or if the called customer has requested connection of all incoming calls to the messaging system.

A messaging system in accordance with the invention will now be described by way of example only with reference to the accompanying drawings of which:

Figures 1a, 1b and 1c are block schematic diagrams showing various methods of providing messaging services to multiple switched networks;

Figure 2 is a block schematic diagram showing an interpretation of the messaging service in accordance with the invention;

Figure 3 is a block schematic diagram of the public switched telephone network including the messaging system of the invention;

Figure 4 shows schematically interaction between some of the functions of the messaging system shown in Figure 3;

Figure 5 shows communication paths of the messaging system of Figure 4; and

Figures 6, 7, 8 and 9 are flow charts showing the sequence of operation of the messaging system of the invention.

Referring to Figure 1, where multiple networks 1, 2, 3 and 4 are provided, messages service providers 5, 6 and 7 need to be connected to each of the networks in order to provide a complete service to all customers. This is shown in

Figure 1a and would enable customers of any network to use any of the message services. Thus each service provider would provide a particular service, for example, message service provider 5 may provide a voice service while message service provider 6 is for fax and message service provider 7 is for e-mail.

Turning now to Figure 1b, a typical problem which may arise occurs if some message platforms 8, 9 and 10 are not connected to all of the networks 1, 2, 3 and 4. Thus a customer on one of the networks 2, 3 and 4 linked to a multimedia message service platform 9 or 10 as a subscriber could use a single mailbox for all of their messaging requirements. Thus, if network 3, for example, were a mobile network and network 4 a PSTN network, then access to the customer's mailbox would be of a common type. However, full interworking between message platforms is not practical. The platform 8 is not connected to all of the networks, such that customers of networks 3 and 4 may not have direct communication with messaging service customer of that platform.

Turning now to Figure 1c, if a single message platform providing all available messaging types is provided as shown, then the possibility of all customers having the same message functionality enables e-mail or pre-created voice messages to be exchanged between subscribers. It is also possible to upgrade service to all customer by upgrading the single service platform 11.

One of the problems of this solution is that a technology upgrade in the future, in order to provide specific future functionality (or new services) to messaging customers could be prohibitively expensive since all of the technology would require to be changed.

Turning now to Figure 2, if access to a number of message service platforms 12, 13, 14 from the networks 1, 2, 3, 4, is controlled through an integrated message service provider 15 then as message service functionality on new platforms develops subscribers can switch platforms regardless of the network on which the subscribing customer has a residence. Thus new messaging platforms can be fitted behind the message service provider 15 without modifying customer access. The present invention seeks to provide a messaging service of the kind shown in Figure 2 in which message service provision is from a number of different message service platforms and is consistently provided to customers regardless of the network 1, 2, 3, 4, on which the customer is present.

Turning then to Figure 3, one of the networks is represented by digital main switching units (DMSUs) 17, 18 which may be two switches of the public switched telephone network (PSTN) connected to a local switch 16 which provides service to customer premise equipment 19, 20. It will be appreciated that if the local switch 16 was in fact a mobile telephone network interlinking to the PSTN at the DMSUs 17, 18 then the customer premises equipment would be suitable mobile telephony equipment.

Typically, the operation of the network is overseen by a network management system 21 in known manner. In the present invention, additional functionality is provided in the PSTN or in the associated networks. Typically, a service switching function (SSF) 22 is provided and this has access via the digital network to service control function (SCF) 23, service data function (SDF)24 and intelligent peripherals (IP) 25 and 26, the purpose of which will become apparent by reference to the subsequent description.

It is here noted that an intelligent peripheral (IP) as referred to herein is a service module connected to the network and accessible through the network. An IP includes processing means (for example a microprocessor) for providing dedicated functionality in response to control data transmitted across the network by the SCF. IP's connectable to calling customers by way of the network may include voice synthesis capability to provide instruction information or acknowledgement to customers and for may included response collection capability for detecting and for analysing tones, voice response or other signalling IP's are sometimes referred to in the art as "Service Engines".

Also accessible by way of the digital network, either attached directly to a DMSU or by way of another network, are messaging platforms represented by messaging platform 27 attached to DMSU 18 and messaging platform 28 shown connected to another network 29. Although the messaging platforms are shown specifically connected it will again be appreciated that the platforms may be anywhere in the network.

Referring to Figure 4, much of the interaction between the various parts of the messaging system is either by signalling on virtual paths or in signalling channels of the digital switching network of Figure 3. Thus, data related to particular customers would be held in service data function (SDF) 24 and where

required the service control function 23 will forward signals to the SDF 24 requesting specific profile data relating to a customer as indicated by the signalling communication path 30.

Similarly, communication with intelligent peripherals 25, 26 which provide specialised services for the customer, is by means of a signalling path 31 from the SCF 23. Note however that the service switching function 22 will provide a communication path where necessary between the intelligent peripherals 25, 26 and the customers by way of switched network (16, 17, 18 of Figure 3) as indicated by the path 37.

In the messaging platforms 28, for example, the control function or message resource function 33 has signalling access to and from the SCF through virtual paths or signalling channels of the network shown at 34 and physical connections 35 to and from customers switched in as required.

Within the messaging platform message data is held in a message data function store 36.

Referring also to Figure 5, it should be noted that the service switching function 22 has switchable access via the network to a number of different platforms some of which may have specific functionality for (e.g.) voice, fax or electronic mail services and the service control function will normally seek to cause access via an appropriate message resource function for each such service. It will however be appreciated the once converted to an appropriate medium for storage voice, fax or e-mail are storable in any MDF 36 and provided that an appropriate MRF 33 for the recovery medium is used, the stored message will be recovered appropriately.

Effectively the MRFs 331 to 333 must translate data appropriately.

It should be noted that the messaging platform 28 may not necessarily be operated by the network operator provided it is accessible through the network and is capable of providing signalling to the SCF 23.

Further understanding of the invention may be had by considering the operation of the system in three principles modes of operation for direct deposit of messages for subsequent recovery by a "mailbox" owner, use of a mailbox in a call answering system and thirdly recovery of messages from a customer's mailbox. It will be noted, however, that although the customer has a "mailbox" address it is a

virtual address indicative only of a customer for whom messages may be left. The storage capacity of the MDF 36 of several messaging platforms will be used in a non-sequential manner dynamically and only a reference to the location of messages is directly associated on a permanent basis with the customer's identity.

Referring again to Figure 3 and also to Figure 7, we will first consider the deposit of a message collection by a customer from another customer of the messaging system. Thus, when the calling customer initiates a call as indicated at step 705, the local switch 16 routes the call to the SSF 22 which initiates a mailbox access request as indicated at step 710. This is a physical connection between the customer premises or customer telephone from which the call originated to the SSF 22. At step 715 the SSF using signalling paths through the network forwards the mailbox access request to the SCF 23 at the DMSU 17. The SCF responds to the signalling by returning signalling requesting the calling line identity of the originating customer and an indication of the message medium (i.e. voice, fax, e-mail).

Once the SCF 23 receives the CLI information it recovers from the SDF 24, again via a signalling path, the profile of the originating user.

The profile from the originating user will include information such as the level of service access permitted, any password associated with message retrieval and data defining the users greeting for depositing customer, for example.

Having received the profile from the SDF at step 725 by way of the virtual signalling channel, the control function causes the physical connection through the network of the caller to an intelligent peripheral, say 25, and forwards signals to the peripheral 25 to cause the peripheral to transmit an appropriate welcome message. Either the same peripheral or another one of the peripherals 25, 26 is then linked through the network to the caller to request an indication from the customer of the service required. This peripheral will await an indication from the customer and will then use the signalling path to return to the SCF 23 the customer's indication as to whether he wishes to deposit a message for another mailbox customer or to retrieve messages previously left.

Assuming that, at step 745, the customer indicates that this call is for the purposes of depositing a message then referring to Figure 8 at step 805 the SCF 23 causes a path to be set up through the network to a peripheral which forwards

an appropriate prompting message to enable the destination customer to be identified and to inform the customer when to commence depositing of the message.

Now at step 810 the network connection is to one of the messaging platforms 27, 28 to an appropriate message resource 331, 332, 333 of Figure 5. The MRF will receive the message directly from the customer by way of the switched network and will convert the message appropriately at step 815 for storage by one of the MDFs within the messaging platform. This is indicated at step 820 and at step 825 the message is stored and a message number indicative of the location within the specific MDF is passed back to the MRF which then uses the signalling path at step 835 to return the message number and identity of the MDF to the SCF 23. The SCF 23 now causes the call to be cleared at step 840 possibly by reconnecting the caller to step 740 to permit a further message to be deposited or to another peripheral to enable replay and/or editing of the deposited message for example.

The message location is stored against the receiving customer's identity in an appropriate SDF 24. This also cause the SCF data to be set updating the customer status of the receiving customer to indicate the number of messages waiting.

It should be noted that there are a number of peripherals 25, 26 which are sequentially connected at different stages of a call. A single peripheral 25 having appropriate voice, fax or e-mail interactively may be signal controlled by the SCF to provide appropriate prompts to a calling customer. It will also be noted that the customer is only connected through the network i.e. having a communications channel which may be a TDM channel rather than a physical channel through the network to the various parts of the messaging service on an as needed basis.

As will also be noted, there is no requirement for messages for a particular customer to be to be stored in particular messaging platform 28 since the SCF 23 causes the MDF and message number identities to be stored in respect of a particular customer. It will also be appreciated that a single message may be left for multiple customers and the MDF and message number identity stored against the customer for whom a message is held.

Having considered message deposit with reference to Figures 7 and 8, referring again to figures 3 and 7, if at step 745 the indicator collected by the system indicates the customer wishes to retrieve messages left, then referring to Figure 9, at step 905, the SCF 23 causes a password access peripheral to connect through the network to the customer and the customer is prompted to enter a personal identification number (PIN). This is validated against the data previously collected from the SDF 24 at step 910 and, assuming the password is valid causes the customer to be connected to one of the peripherals 25, 26 through the network for management of the retrieval process. The SCF 23 uses its signalling path to forward SDF data to the management peripheral which will make an appropriate announcement to the customer concerning the number of messages, times and dates of receipt, sources etc. which information was previously stored in the SDF. The management peripheral will then prompt the customer to determine which, if any, of the messages the customer wishes to retrieve. The management peripheral will forward the customer's response to the SCF which will collect the identity of the message to be retrieved at step 920 and causes a connection to appropriate MRF of messaging platform 27, 28 at step 930 passing the message number as previously stored to the MRF which is now physically connected back through the network to the customer. The MRF effectively connects the customer to his message in the MDF and plays the message appropriately.

At step 950, once the MDF has played as indicated at step at step 945, the MRF forwards a signalling message to the SCF 23 indicating that the message has been played and the SCF 23 releases the connection to the MRF and reconnects the caller to the management peripheral at step 945 to enable the caller to request that the message be repeated or to request further calls, to make replies or any other function normally associated with a messaging service.

In call answering mode, referring now to Figure 6, if a call is indicated to a customer's home or mobile telephone number, the network will route the call in known manner through the digital switching unit 17, 18 to the local switch 16 or to the mobile 'phone associated with the dialled number. This is indicated at steps 600 and 605.

The local switch 16, for example, will determine the current status at step 610 and will examine the customer's class of service to determine whether call

answering is currently selected by the customer. If not, then, assuming the customer's line is not currently engaged at step 620, then normal incoming telephony signals will be applied to the customer's premises or mobile communications system at step 625, if at step 630 the call is answered in the normal manner then a normal telephony connection through the network is completed.

If, however, at step 615, the class of service associated with the called number indicates that call answer has been selected or if at step 620 the called number is already engaged (and assuming the customer has requested call answering when busy) or if following a predetermined period, at step 630, the call is not answered, then the local switch causes the call to be connected to the SSF 22 at step 640.

In similar manner to that previously described at step 645 the SSF 22 forwards the request to the SCF 23 which obtains the appropriate called line indication and message medium to be determined and obtains the profile of the receiving customer at step 655 from the SDF 24.

The called customer will now be connected to a user greeting peripheral 25, 26 where a greeting recovered from the called user's profile may be played and the customer prompted to leave any message. The subsequent interaction between the SCF, SSF, MRF and MDF is as previously described for message depositing with reference to Figure 8.

It will however be noted that on completion of the deposit the customer may not necessarily receive the opportunity to deposit further messages.

CLAIMS

1. A messaging system as accessible by way of a switched telecommunications network, comprising storage means for storing messages, control means for directing the storage and retrieval of messages and conversion means for converting received messages into a form suitable for storage characterised in that the storage means comprises a plurality of data stores each connected to a communications switch for access by way of the telecommunications network, the control means on a receipt of a message being arranged to cause storage of the message in one of the data stores by effecting switching through the network, the control means holding, in respect of each messaging customer, a record of the location of the or each message for such customer whereby messages for any one customer may be stored in any of the accessible data stores.

2. A messaging system as claimed in claim 1 further characterised in that the control means has access through the switched network to a plurality of service modules each comprising data processing means to provide a respective part of the storage and for retrieval function, the control means causing a calling customer to be sequentially connected to appropriate service modules and interacting with the respective modules to complete the storage or retrieval of a message.

3. A messaging system as claimed in claim 1 or claim 2 further characterised in that the system has a plurality of modes in a deposit mode of which a caller may leave a message for a messaging system customer, the control means connecting in turn a first service module to provide a system greeting, a second service module to collect a customer response and a further service module to prompt deposit of a message.

4. A messaging system as claimed in claim 3 further characterised in that in a retrieval mode the control means connects the first service module and the second service module as above followed by a different service module which

collects a further customer response to validate the customer access to retrieval service.

5. A messaging system as claimed in claim 4 further characterised in that in the retrieval mode the customer is connected through the switched network to a retrieval management service module which uses data retrieved by the control means to identify to the customer what (if any) messages are stored and to collect from the customer an indication of which stored message is to be retrieved such that the control means may cause the connection of the customer of the appropriate accessible data store for retrieval of the selected message.

6. A messaging system as claimed in claim 5 further characterised in that following retrieval of a selected message the control means causes reconnection of the customer to the retrieval management service module such that the customer is offered a plurality of options in respect of the message retrieved.

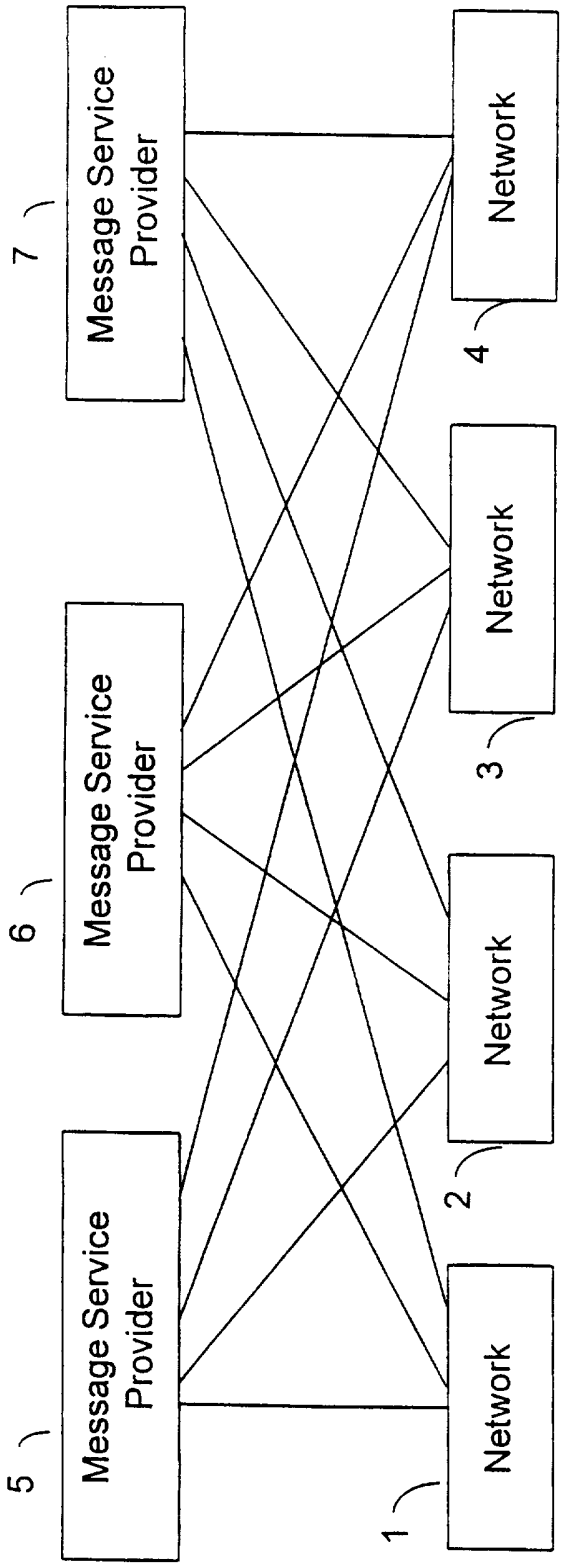
7. A messaging system as claimed in any one of claims 1 to 6 further characterised in that a plurality of service modules of each types are provided and the control means selects and connects an appropriate available service mode at each stage of the call.

8. A messaging system as claimed in claim 7 further characterised in that service modules are distributed through the network such that a service module of a particular type is available through more than one switchable route.

9. A messaging system as claimed in anyone of claim 3 to 6 or as claimed in claim 7 or claim 8 when dependent on anyone of claims 3 to 6 further characterised in that in a call answering mode when a management system of the network or a control processor of a switch of the network on detection of an unanswered incoming call to a telephony call connects the calling customer to the messaging system, the control means causes connection of the calling customer to a service module which provides to the calling customer a dedicated user greeting in respect of the called customer.

10. A messaging system as claimed in claim 9 further characterised in that calling customers are connected to the messaging system if the called customer line is unavailable.

11. A messaging system as claimed in claim 9 or claim 10 further characterised in that on request of a messaging system customer all telephony calls directed to the respective customers connections are connected to the messaging system.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Message Service Provider
Message Service Provider
Network
Network
Network
Network
5
6
7
1
2
3
4

Fig 1A

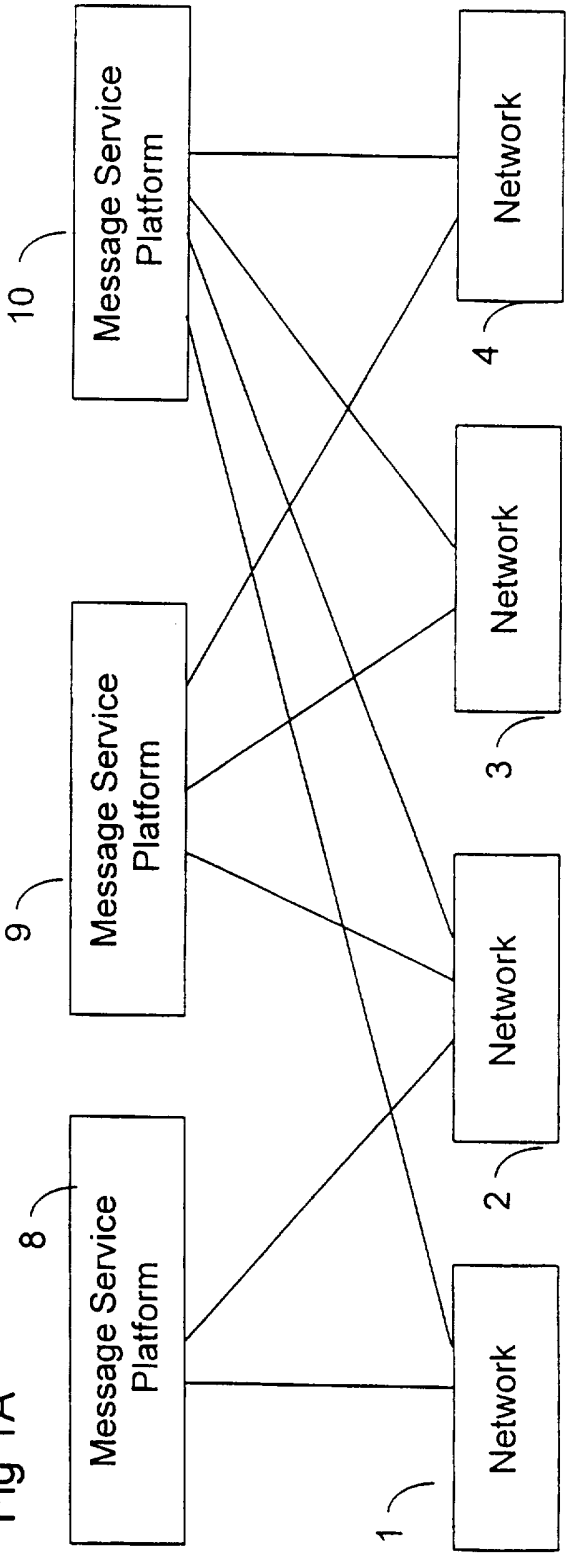

Message Service Platform
Message Service Platform
Message Service Platform
Network
Network
Network
Network
8
9
10
1
2
3
4

Fig 1B

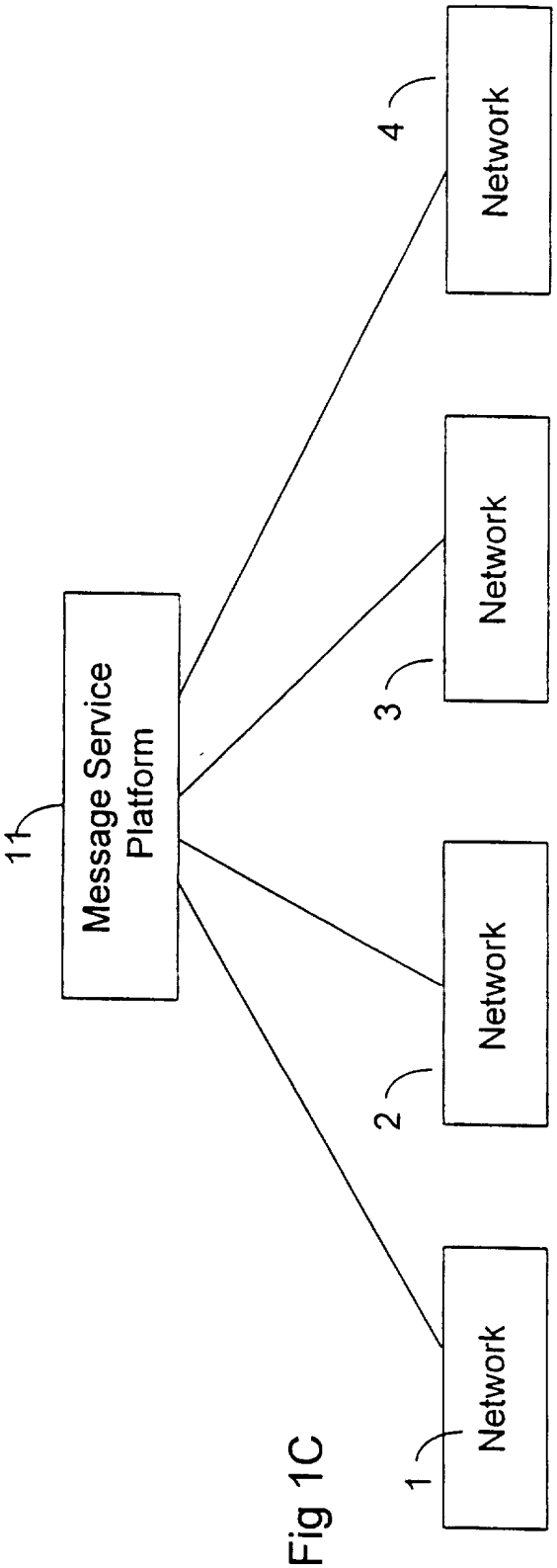

Message Service Platform
11
Network
1
Network
2
Network
3
Network
4

Fig 1C

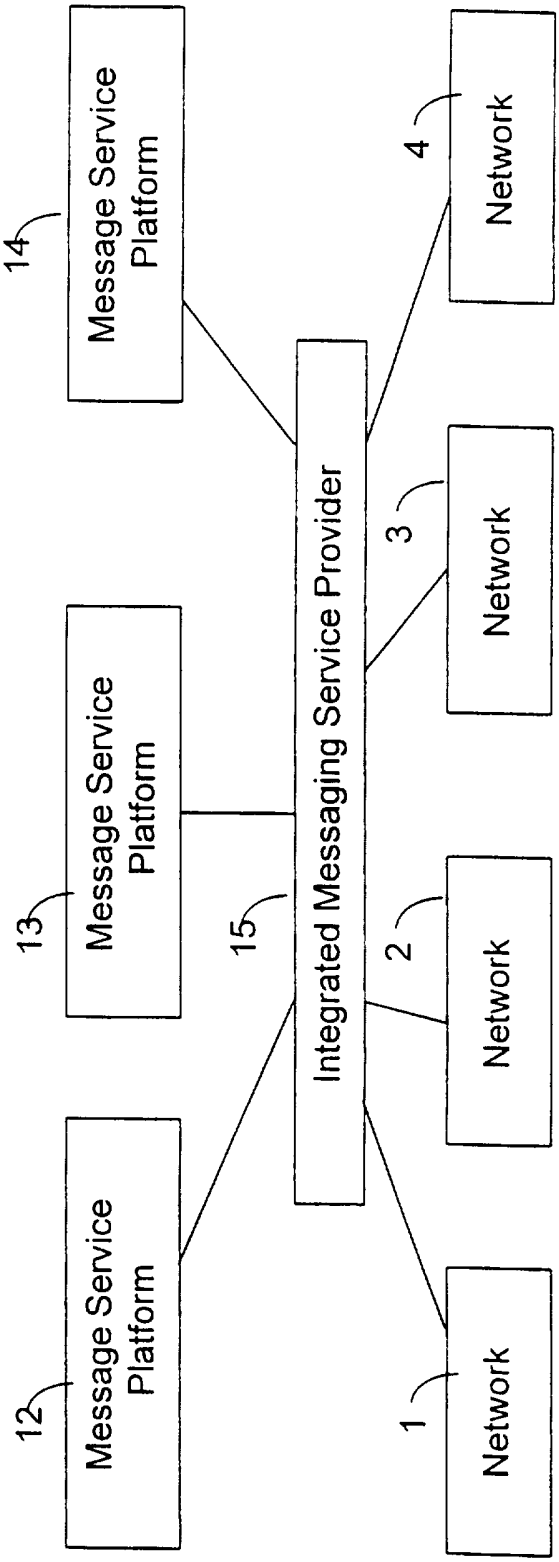

Integrated Messaging Service Provider
15
Message Service Platform
12
Message Service Platform
13
Message Service Platform
14
Network
1
Network
2
Network
3
Network
4

Fig 2

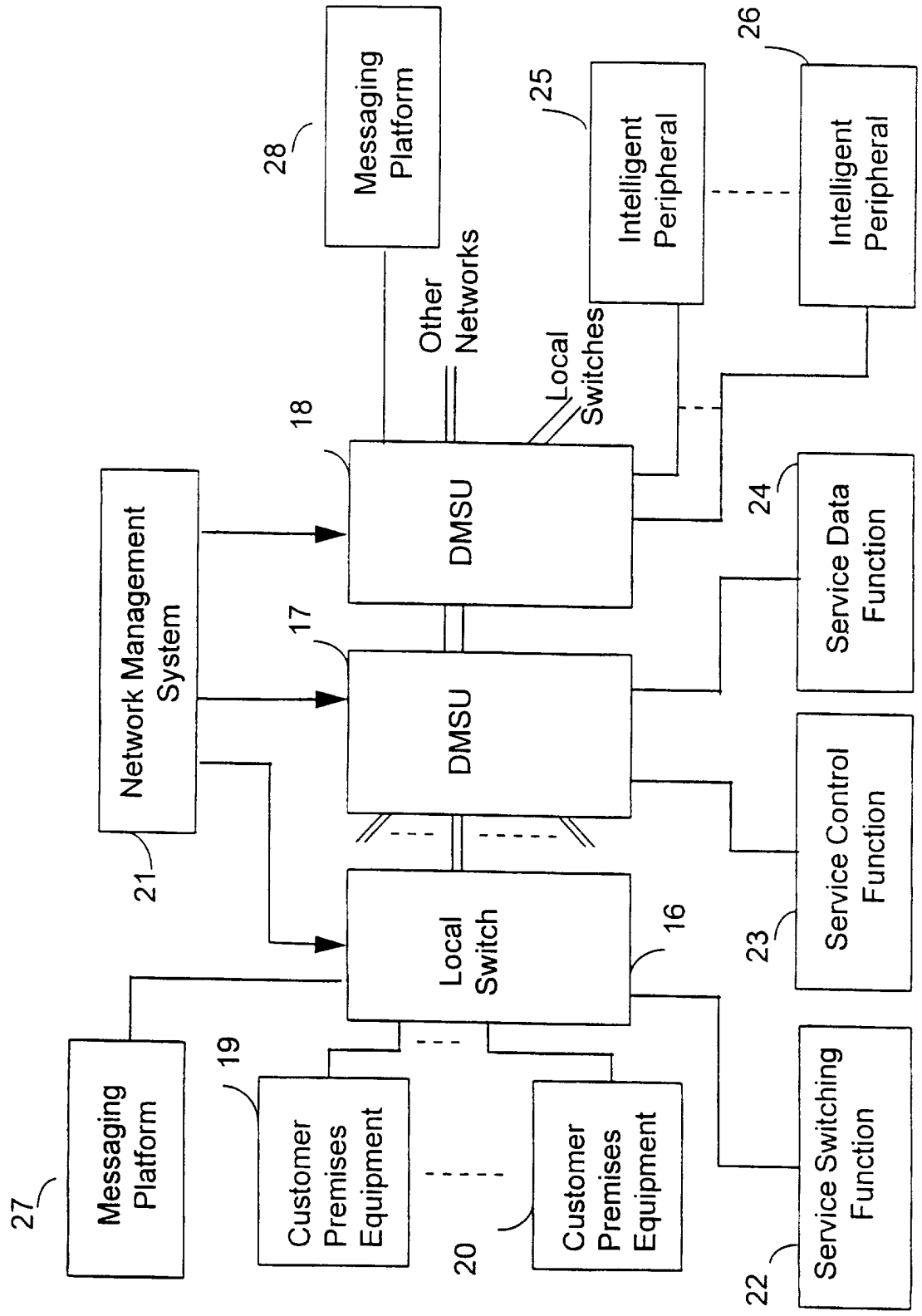
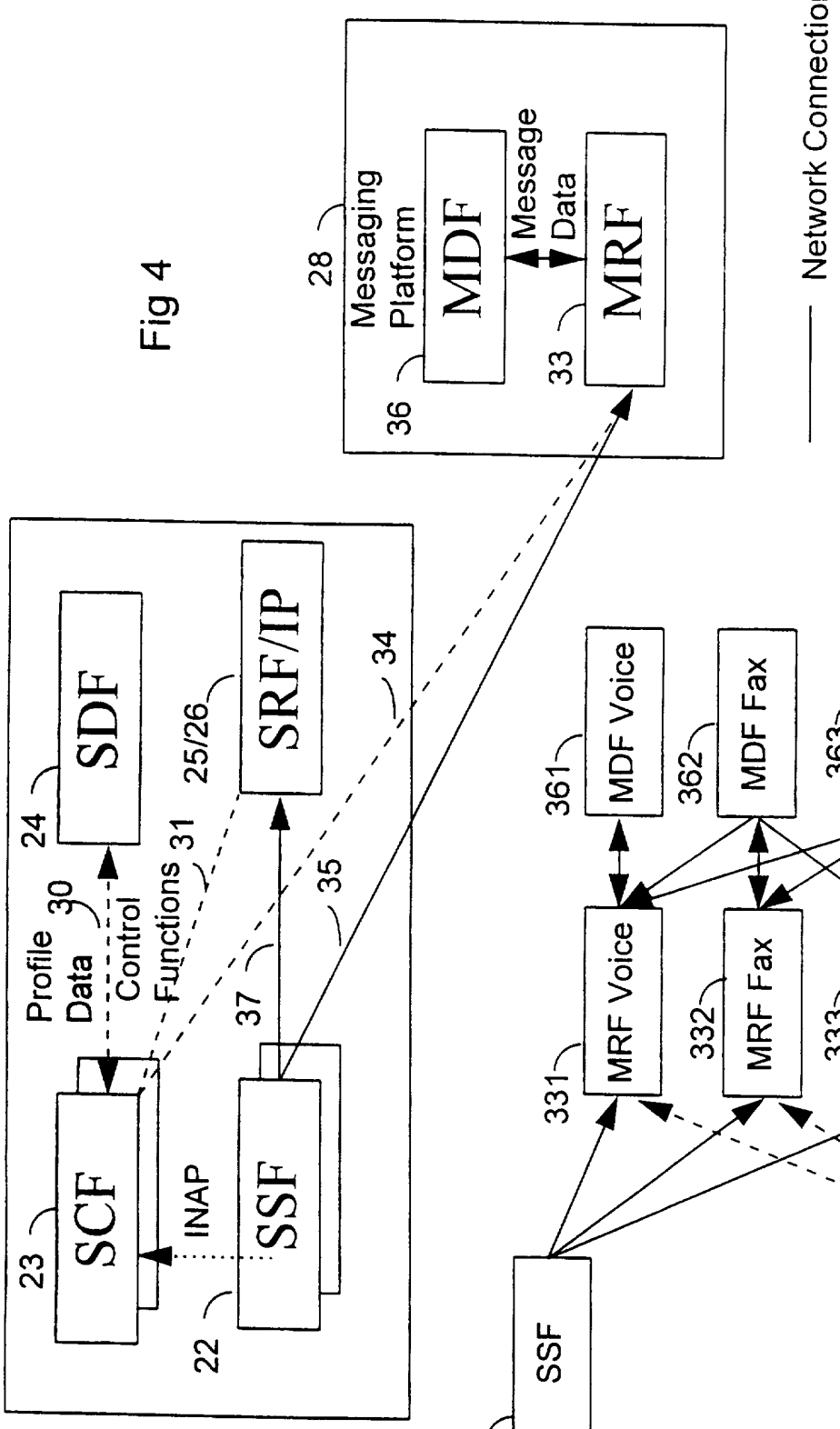

Messaging Platform
28
Other Networks
Intelligent Peripheral
25
Intelligent Peripheral
26
Local Switches
18
DMSU
Network Management System
21
17
DMSU
Service Data Function
24
Service Control Function
23
Local Switch
16
27
Messaging Platform
19
Customer Premises Equipment
20
Customer Premises Equipment
Service Switching Function
22

Fig 3

Fig 4


28
Messaging Platform
MDF
Message Data
MRF
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Network Connection
Signalling Path
SDF
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SRF/IP
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Control Functions
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37
SCF
23
INAP
SSF
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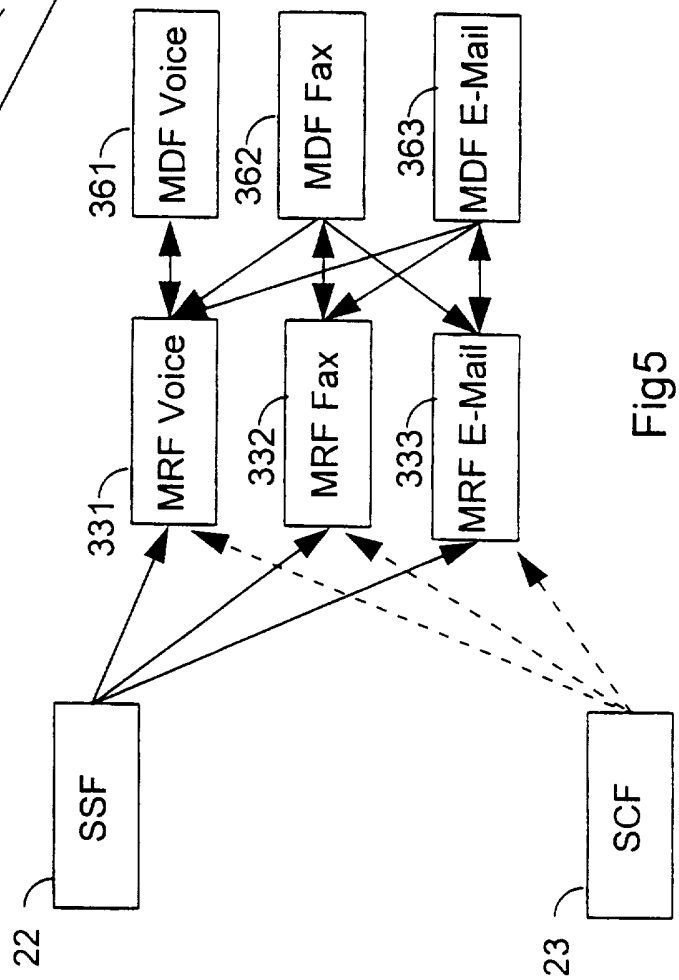
MDF Voice
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SCF
23

Fig5

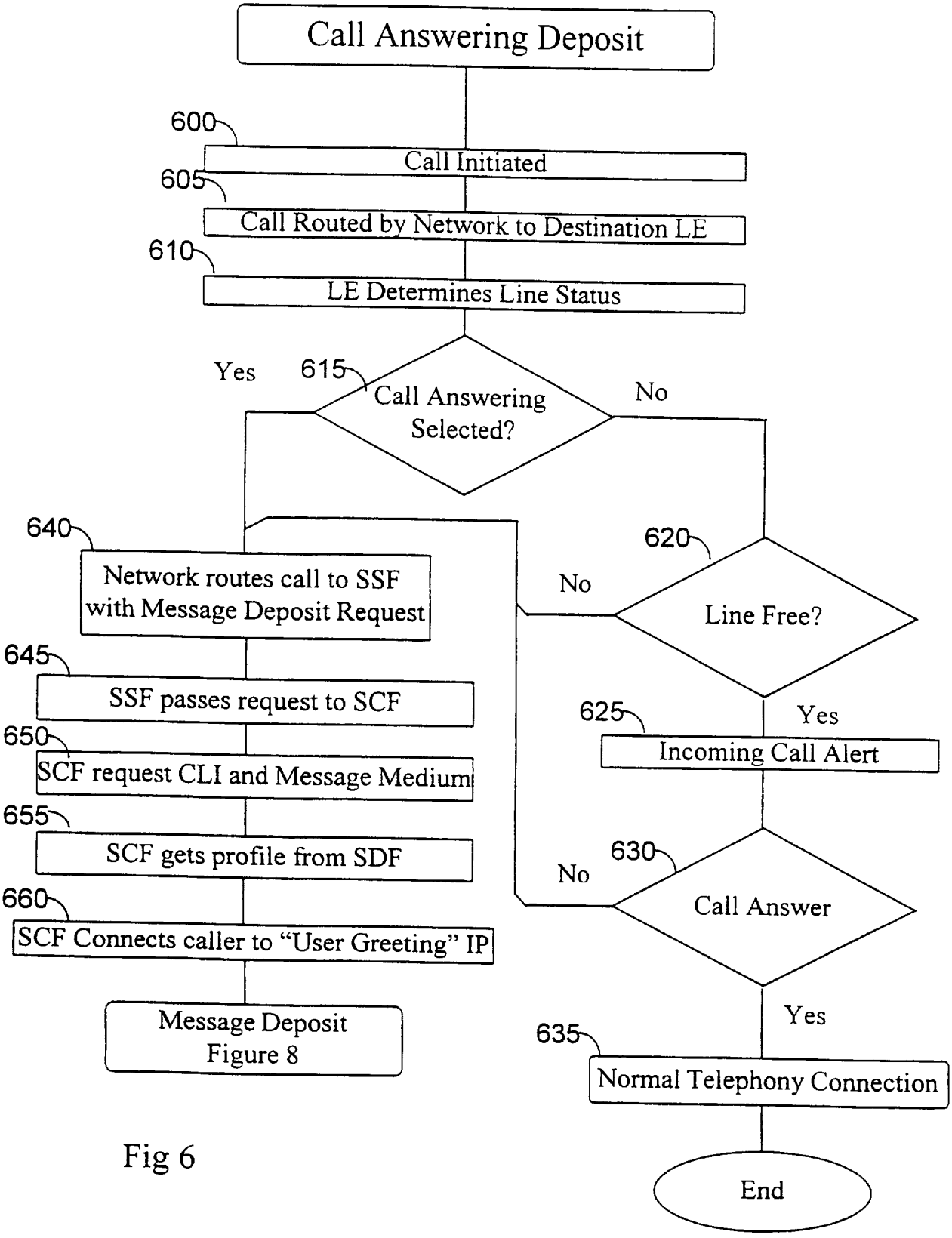
Call Answering Deposit
600
Call Initiated
605
Call Routed by Network to Destination LE
610
LE Determines Line Status
615
Call Answering Selected?
Yes
No
640
Network routes call to SSF with Message Deposit Request
645
SSF passes request to SCF
650
SCF request CLI and Message Medium
655
SCF gets profile from SDF
660
SCF Connects caller to "User Greeting" IP
Message Deposit Figure 8
620
Line Free?
No
Yes
625
Incoming Call Alert
630
Call Answer
No
Yes
635
Normal Telephony Connection
End

Fig 6

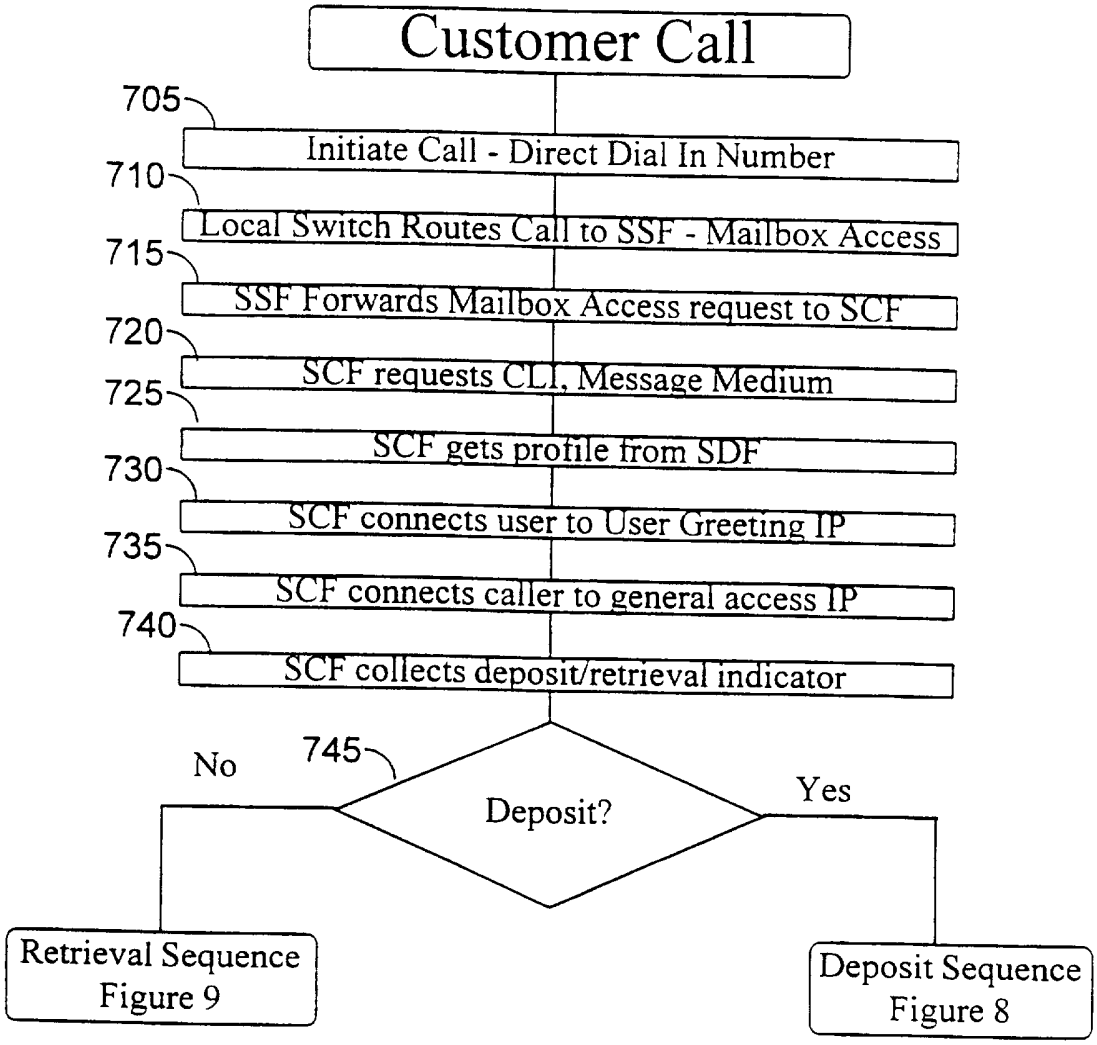
Customer Call
705
Initiate Call - Direct Dial In Number
710
Local Switch Routes Call to SSF - Mailbox Access
715
SSF Forwards Mailbox Access request to SCF
720
SCF requests CLI, Message Medium
725
SCF gets profile from SDF
730
SCF connects user to User Greeting IP
735
SCF connects caller to general access IP
740
SCF collects deposit/retrieval indicator
745
Deposit?
No
Yes
Retrieval Sequence Figure 9
Deposit Sequence Figure 8

Fig 7

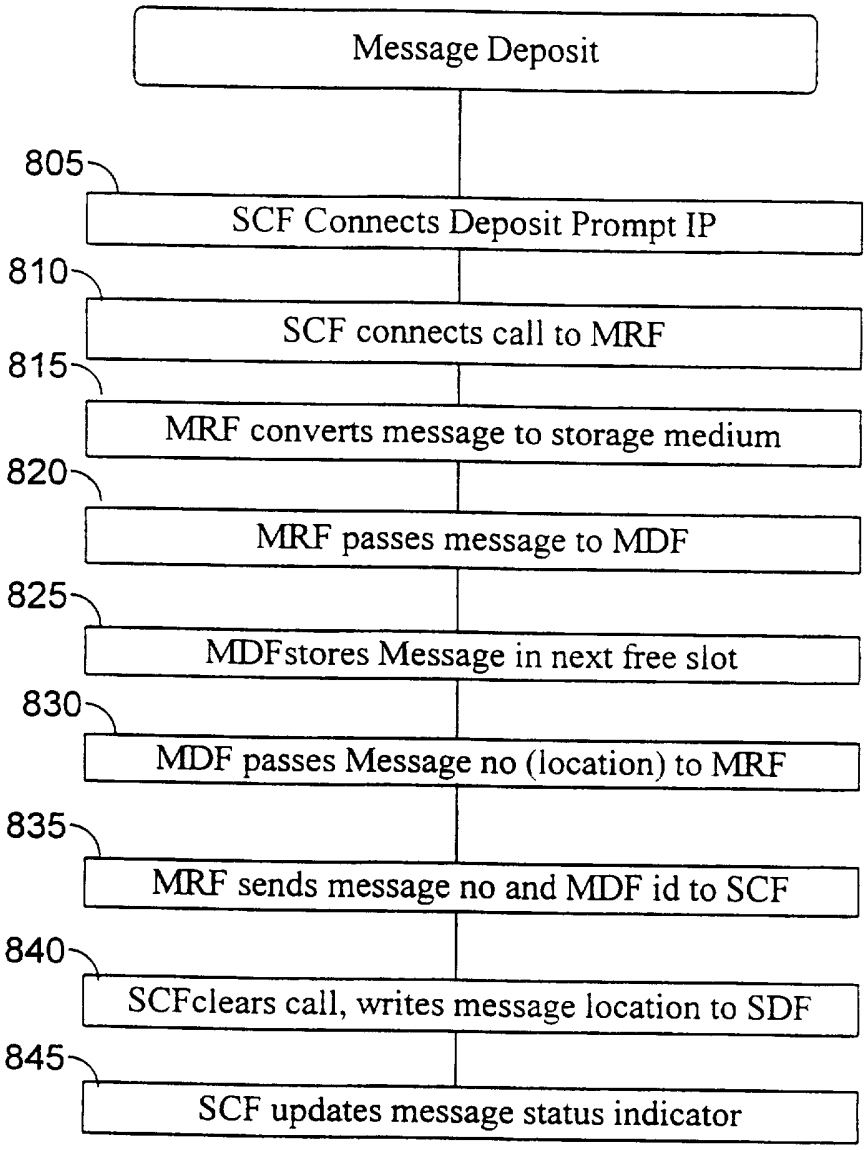
Message Deposit
805
SCF Connects Deposit Prompt IP
810
SCF connects call to MRF
815
MRF converts message to storage medium
820
MRF passes message to MDF
825
MDFstores Message in next free slot
830
MDF passes Message no (location) to MRF
835
MRF sends message no and MDF id to SCF
840
SCFclears call, writes message location to SDF
845
SCF updates message status indicator

Fig 8

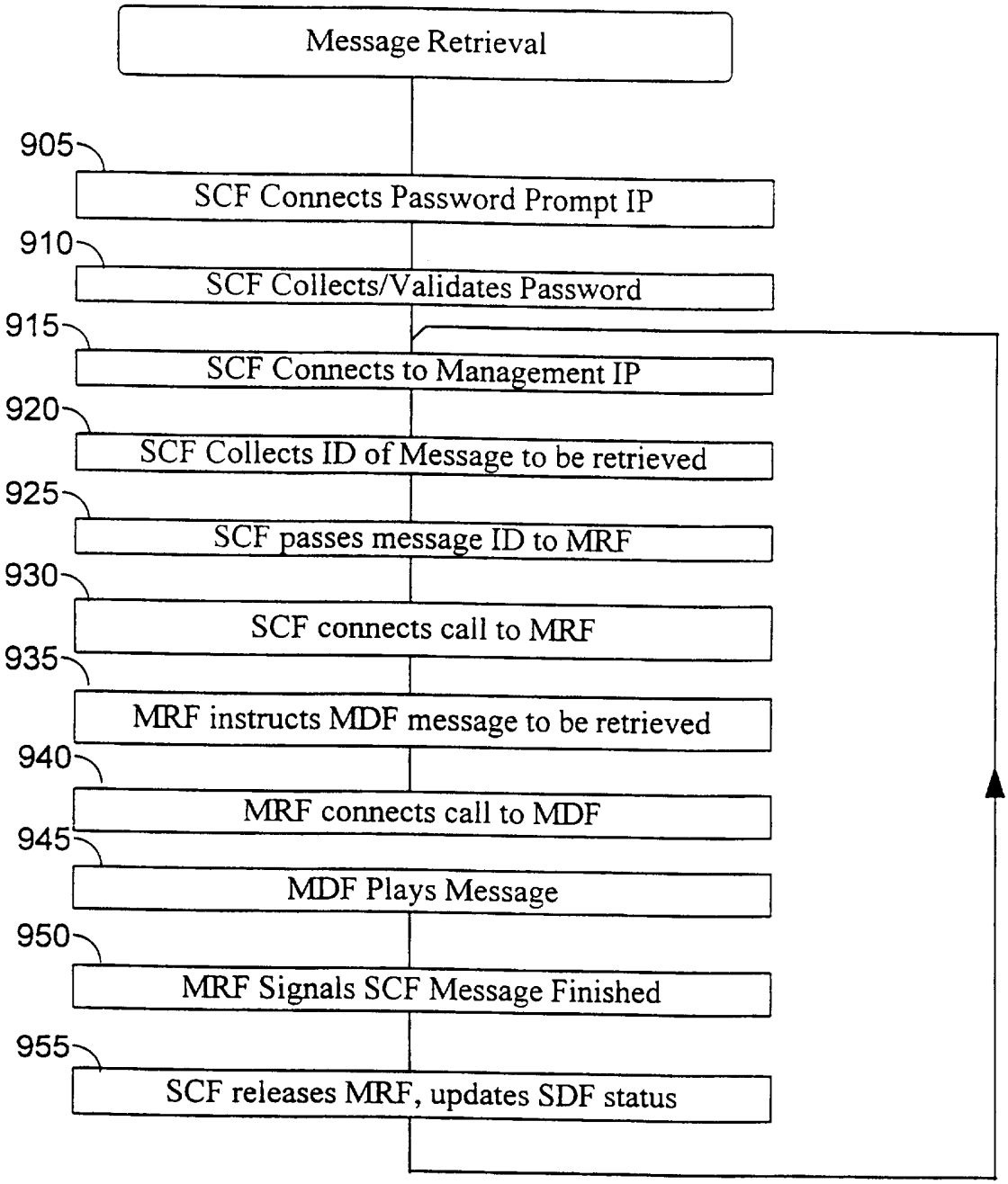
Message Retrieval
905
SCF Connects Password Prompt IP
910
SCF Collects/Validates Password
915
SCF Connects to Management IP
920
SCF Collects ID of Message to be retrieved
925
SCF passes message ID to MRF
930
SCF connects call to MRF
935
MRF instructs MDF message to be retrieved
940
MRF connects call to MDF
945
MDF Plays Message
950
MRF Signals SCF Message Finished
955
SCF releases MRF, updates SDF status

Fig 9

INTERNATIONAL SEARCH REPORT

Int. ional Application No
PCT/GB 97/00545

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04L12/58

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04L

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.
X	US 4 837 798 A (R.S.COHEN ET AL) 6 June 1989 see column 2, line 23 - column 3, line 45 see column 4, line 28 - column 5, line 3 see column 5, line 49 - column 6, line 30 see column 8, line 51 - column 9, line 4 see figures 1,5	1
Y	---	2-11
X	EP 0 565 850 A (IBM) 20 October 1993 see page 4, line 7 - line 28 see page 5, line 1 - page 7, line 51 see page 12, line 1 - line 10 see abstract	1

	-/--	

[X] Further documents are listed in the continuation of box C.

[X] 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

"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 when the document is taken alone

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"&" document member of the same patent family

1

Date of the actual completion of the international search	Date of mailing of the international search report
17 June 1997	30.06.97

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	Canosa Areste, C

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INTERNATIONAL SEARCH REPORT

Inte. ional Application No
PCT/GB 97/00545

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 95 23483 A (BRITISH TELECOMMUNICATIONS, PLC.) 31 August 1995 see page 2, line 1 - page 4, line 17 see page 6, line 5 - line 34 see page 14, line 28 - page 15, line 7 see page 30, line 20 - page 33, line 2 see page 61, line 17 - page 62, line 31 see figure 1 -----	2-11

1

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Int tional Application No
PCT/GB 97/00545

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		CA 1270584 B	19-06-90
		CN 1014666 B	06-11-91
		EP 0270604 A	15-06-88
		JP 2568602 B	08-01-97
		JP 63503502 T	15-12-88
		WO 8707801 A	17-12-87
EP 565850 A	20-10-93	US 5333266 A	26-07-94
		JP 6044157 A	18-02-94
		JP 8027766 B	21-03-96
WO 9523483 A	31-08-95	AU 1817395 A	11-09-95
		CA 2183981 A	31-08-95
		EP 0748569 A	18-12-96