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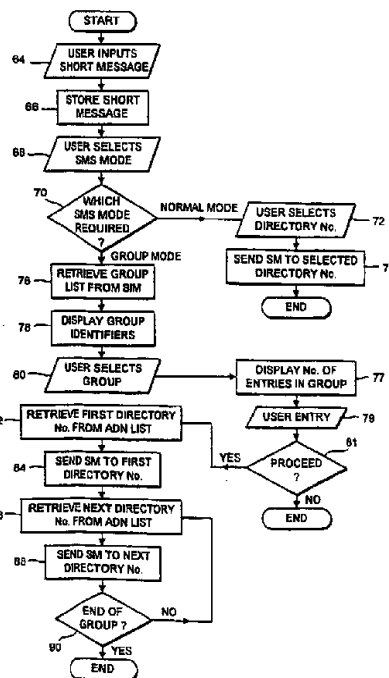
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<p>(21) International Application Number: PCT/GB97/00298 (22) International Filing Date: 31 January 1997 (31.01.97) (30) Priority Data: 9618539.2 5 September 1996 (05.09.96) GB (71) Applicant (for all designated States except US): ORANGE PERSONAL COMMUNICATIONS SERVICES LTD. [GB/GB]; St. James Court, Great Park Road, Almondsbury Park, Bradley Stoke, Bristol BS12 4QJ (GB). (72) Inventor; and (75) Inventor/Applicant (for US only): GREEN, Mark [GB/GB]; 20 Manor Farm Crescent, Hutton, Weston-Super-Mare, North Somerset BS24 9XB (GB). (74) Agents: MUSKER, David, C. et al.; R.G.C. Jenkins & Co., 26 Caxton Street, London SW1H 0RJ (GB).</p>	<p>(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments. (88) Date of publication of the international search report: 23 April 1998 (23.04.98)</p>	

(54) Title: MOBILE ORIGINATED GROUP SHORT MESSAGE SERVICE AND APPARATUS THEREFOR

(57) Abstract

A mobile station (8) for a mobile communication system, which stores groups of directory numbers in a memory (38). A short message signal is composed by the user of the mobile station (64), and one of the groups of directory numbers is selected by the user (80). The mobile station in response sends the short message to each of the directory numbers appearing in the selected group (84, 88). Each of the groups is provided with an identifier which is programmable by a user of the mobile station.

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MOBILE ORIGINATED GROUP SHORT MESSAGE SERVICE AND APPARATUS THEREFOR

This invention relates to mobile communications, in particular but not exclusively to cellular radio communications, such as in a GSM (Global System for Mobile communications) digital cellular radio network.

A known conventional GSM network, referred to as a public land mobile network (PLMN), is schematically illustrated in Figure 1. A mobile switching centre (MSC) 2 is connected via communication links to a number of base station controller (BSCs) 4. The BSCs 4 are dispersed geographically across areas served by the mobile switching centre 2. Each BSC controls one or more base transceiver stations (BTSs) 6 located remote from, and connected by further communication links to, the BSC. Each BTS 6 transmits radio signals to, and receives radio signals from, mobile stations 8 which are in an area served by that BTS. That area is referred to as a "cell". A GSM network is provided with a large number of such cells, which are ideally contiguous to provide continuous coverage over the whole network territory.

A mobile switching centre 2 is also connected via communications links to other mobile switching centres in the remainder of the mobile communications network 10, and to a public service telephone network (PSTN),

which is not illustrated. The mobile switching centre 2 is provided with a home location register (HLR) 12 which is a database storing subscriber authentication data including the international mobile subscriber identity (IMSI) which is unique to each mobile station 5 8. The IMSI is also stored in the mobile station in a subscriber identity module (SIM) along with other subscriber-specific information.

The mobile switching centre is also provided with 10 a visitor location register (VLR) 14 which is a database temporarily storing subscriber authentication data for mobile stations which are active in the area served by the mobile switching centre 2.

The GSM system, in common with other mobile 15 communication systems, supports a variety of teleservices. One such teleservice is a speech teleservice, for supporting voice calls on a speech traffic channel. Other teleservices include a short message service (SMS) which is used for transmitting 20 alphanumeric messages in the system on a low rate data traffic channel. A user of the mobile station 8 may generate a message by input to a user interface device, and transmit the message, along with the directory number of the terminating station for the 25 short message, to the service BTS 6. The message is forwarded to the MSC 2, which forwards the message

transmitted from the mobile station 8 to a short message service centre (SC) 15, which stores the message for onward transmission to the terminating station corresponding to the directory number specified by the user of the mobile station 8.

International Patent Application No. WO94/09599 describes a method for transmitting short messages in a GSM network. In order to reduce the effort and signalling load required in order to transmit a large number of short messages to a large number of terminating subscribers, a gateway MSC copies a message received via a short message service centre from the message generating mobile station to produce a large number of messages, which are then forwarded to the intended recipients.

When the gateway MSC receives a short message, it analyses the part of the message signal containing the address of the recipient to determine whether it contains the address of a single subscriber or a predefined identifier for a group of recipients. This identifier, if present, is used to access a list of directory numbers stored in the gateway MSC, which is used to determine the intended recipients of the message. The message is copied to each of those intended recipients.

In accordance with an aspect of the invention



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there is provided a mobile station for use in a mobile communications system, said mobile station comprising radio transmit means for transmitting short message service signals for recipients identified by addresses selected by a user and a memory for storing a plurality of recipient addresses, characterised in that said mobile station further comprises: a group edit menu facility for allowing a user to create groups of recipient addresses; means for storing group data relating to said groups, said group data including, for each said group, an identifier which is specified by the user; and a group transmit menu facility for presenting said identifiers to the user in order to allow selection of one of said groups and for initiating the transmission of short message service signals for said selected group.

Thus, the invention in this aspect provides a mobile station having menu facilities allowing groups to be created and to be selected.

The group edit menu facility may allow a user to create a group by selecting recipient address from a stored list. The group data preferably comprises pointers to each recipient address in the group, in said list. This can reduce duplication of data where the user station is provided with such a list of recipient addresses. The group data need not include



the recipient addresses in full, by referring to the addresses in the stored list.

If a recipient address is deleted from the list, the data relating to the addresses in each group will no longer be valid insofar as one of the addresses identified in the group data, if it is the deleted address, will no longer be available. The user station preferably further comprises means for searching and revising the group data relating to the deleted recipient address in response to the deletion.

In accordance with a further aspect of the present invention there is provided a mobile station for use in a mobile communications system, said mobile station comprising a memory for storing a plurality of recipient addresses and means for sending a short message to a selected recipient, characterised in that said mobile station further comprises a group select menu facility for selecting a group of recipient addresses from said plurality of recipient addresses, and a group transmit menu facility for sending a series of short messages, one for each member of said selected group of directory numbers, automatically in a consecutive order.

Thus, a number of short messages can be sent for each of a desired group of recipient addresses without requiring the user of the mobile station to separately



select and cause the mobile station to send a message for each of the recipient addresses individually.

The group of recipient addresses may be selected from a plurality of stored predetermined groups of recipient addresses. This provides further convenience to a user, insofar as the members of the group do not need to be selected separately each time short messages are to be sent for the selected group.

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

Figure 1 is a block diagram of a mobile communications network;

Figure 2 is a block diagram of a mobile station;

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next page is page 9



Figure 3 illustrates the structure of a linear fixed data file;

Figure 4 illustrates the structure of an ADN data record;

5 Figure 5 illustrates the contents of a group list file containing directory number group records in accordance with the present invention;

10 Figure 6 is a flow diagram showing steps taken when sending a short message in accordance with the present invention;

Figure 7 is a flow diagram showing steps taken when editing a directory number group list in accordance with the present invention; and

15 Figure 8 is a flow diagram illustrating steps taken by the mobile station when an ADN record is deleted.

20 A GSM network, referred to as a public land mobile network (PLMN), is schematically illustrated in Figure 1. This is in itself known and will not be described in detail. A mobile switching centre (MSC) 2 is connected via communication links to a number of base station controller (BSCs) 4. The BSCs 4 are dispersed geographically across areas served by the mobile switching centre 2. Each BSC 4 controls one or
25 more base transceiver stations (BTSs) 6 located remote from, and connected by further communication links to,

the BSC. Each BTS 6 transmits radio signals to, and receives radio signals from, mobile stations 8 which are in an area served by that BTS. That area is referred to as a "cell". A GSM network is provided with a large number of such cells, which are ideally contiguous to provide continuous coverage over the whole network territory.

A mobile switching centre 2 is also connected via communications links to other mobile switching centres in the remainder of the mobile communications network 10, and to a public service telephone network (PSTN), which is not illustrated. The mobile switching centre 2 is provided with a home location register (HLR) 12 which is a database storing subscriber authentication data including the international mobile subscriber identity (IMSI) which is unique to each mobile station 8. The IMSI is also stored in the mobile station in a subscriber identity module (SIM) along with other subscriber-specific information.

The mobile switching centre is also provided with a visitor location register (VLR) 14 which is a database temporarily storing subscriber authentication data for mobile stations active in its area.

Referring to Figure 2, a mobile station 8 comprises a transmit/receive aerial 16, a radio frequency transceiver 18, a speech coder/decoder 20

connected to a loudspeaker 22 and a microphone 24, a processor circuit 26 and its associated memory 28, an LCD display 30 and a manual input port (keypad) 32. The mobile station is connected to a removable SIM 34 via electrical contacts 35.

The SIM 34 connected to the mobile station has a SIM processor 36, for example a Hitachi H8 microprocessor, and SIM memory 38, which includes for example 16 kilobytes of mask-programmed ROM containing the SIM operating system, 8 kilobytes of read/write EEPROM for the non-volatile storage of data items and 256 bytes of scratchpad RAM for use by the SIM processor during operations.

Both the mobile station 8 and the SIM 34 are well known and therefore need not be described in detail herein. A commercially-available SIM is the GemXplore (registered trade mark) SIM card produced by Gemplus, BP 100-13881, Gemenos Cedex-France.

As described above, the SIM 34 is used for the storage and retrieval of data items by the processor 26 of the mobile station 8. The command set, data file structure and data coding format for data communicated via the interface between the mobile station processor 26 and the SIM processor 36 are all specified, in the GSM system, in GSM technical specification 11.11 (ETS 300 536), incorporated herein

by reference.

A standard GSM file structure for the storage of data on a SIM, referred to as a linear fixed file structure, is illustrated in Fig. 3. It consists of a header 40 and record space 42. The record space is divided into N fixed length records.

One data record provided in the SIM memory 38 in a conventional SIM 34 is an abbreviated dialling number (ADN) record 44, which forms part of an ADN list file having a linear fixed file structure. Each ADN record 44 has data stored in a fixed length coding format. The record 44 is divided into fixed-length data blocks, each consisting of one or more bytes. A first data block 46, consisting of n bytes, is reserved for directory number identifier data. A second block 48, consisting of one byte, is reserved for data indicating the length of the directory number. A third block 50, consisting of one byte, is reserved for data indicating the type of directory number stored in the record. A fourth block 52, consisting of 8 bytes of memory, is reserved for the directory number data itself. A fifth block 54, consisting of one byte, is reserved for a "capability configuration pointer", indicating the teleservices (e.g. voice call, SMS, fax, etc.) which can be supported by the telephone equipment corresponding to

the directory number stored. A final data block 56, consisting of one byte, is an extension record pointer, which indicates the address of an extension record to be accessed in a different data file to give
5 the remainder of a directory number.

In this embodiment of the invention, the mobile station 8 is capable of sending SMS teleservice short messages as defined in GSM Technical Specification 03.40 (ETS 300 608), which is incorporated herein by
10 reference. In the known short message service, a user of the mobile station 8 composes a short message, consisting of alphanumeric characters, and specifies a recipient directory number, by input via the keypad 32. When instructed to by the user, the mobile
15 station then sends a short message signal on a data traffic channel of the radio interface to the fixed portions of the mobile communications network. The short message signal contains data defining the identity of the originating mobile station, data
20 indicating the directory number of the intended recipient, and data within which the short message is coded. When the signal is received by the MSC 2, it forwards it to the SMS service centre 15 for storage and forwarding to the intended recipient.

25 Figure 5 illustrates the contents of a new data record file, referred to herein as a group list file,

stored in the SIM memory 38 and used in connection with the SMS teleservice in accordance with the present invention. The group list file contains a number of records 1 to n, each record storing data relating to (i) an entry list 58 containing pointers to records in the ADN list stored in the SIM, namely the record numbers of particular ADN records, and (ii) the number of entries 60 in the entry list 58, and an alphanumeric group identifier 62, such as "Family", "Project Team", etc. as shown. The entry list 58 for each record is selected by the mobile user from entries on the ADN list in the SIM, and the group identifier 62 is defined by the user of the mobile station by keypad input. The group list is stored in the SIM 34 of the mobile station at a predefined address, and records of the group list can be read by the mobile station processor 26 by means of a read command specifying the group list address and the address (record number) of the record in the group list.

Figure 6 illustrates a procedure for sending SMS signals in this embodiment of the invention, which utilises the group list described above. It allows the user of the mobile station 8 to select either a normal mode, in which a short message is sent to a single selected directory number, or group mode in

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which a short message is sent to a selected group of directory numbers.

The user first selects the short message service and composes the short message, step 64, which is
5 stored by the mobile station in step 66. Next, the user is prompted to select an SMS mode, which selection is performed by user input in step 68. If the user requires only normal mode, step 70, the user selects the intended recipient's directory number in
10 step 72, and instructs the mobile station to proceed. The mobile station 8 then proceeds to send the short message radio signal, step 74, containing the short message.

If the user requires group mode, step 70, the
15 mobile station retrieves the group list from the SIM 34, by addressing each record in turn, step 76, and displays the group identifier 62 to the user, step 78, on LCD display 30. The user then selects an intended group of recipient directory numbers by keypad input
20 in step 80, to which the mobile station responds by displaying the number of directory number entries in the selected record, step 77. The mobile station may also display the alphanumeric identifiers of each ADN record in the selected group, if required. If the
25 user is satisfied with the selection, by user entry, step 79, the mobile station is instructed to proceed,

step 81.

The mobile station now has stored in its memory
28 the short message to be sent and the group record
of the selected group. In step 82, the mobile station
5 processor 26 proceeds to read the first entry in the
entry list 58 indicating the ADN record number of the
first intended recipient directory number. The mobile
station processor then reads the corresponding record
stored in the ADN list of the mobile station, and
10 retrieves the stored directory number.

The mobile station then proceeds directly to
transmit the short message radio signal, containing
the short message, in step 84, to the serving BTS 6
for the first directory number, which is indicated in
15 the short message signal.

Once the short message signal has been
transmitted in its entirety, the mobile station
proceeds to retrieve the directory number from the ADN
record having a record number which appears next on
20 the entry list 58 of the group list, in step 86. A
short message signal, containing the same short
message, is then sent for this next directory number,
step 88. This directory number retrieval and short
message signal transmission process is repeated until
25 the end of the entry list 58 is reached, in step 90.

Thus, a short message is sent to each of the

directory numbers corresponding to the entries in the group record entry list 58 automatically, i.e. without user intervention, in automatically consecutive order, i.e. without requiring the user to select an intended recipient directory number after a short message has been sent to a different intended recipient directory number.

Referring now to Figure 7, the group list can be edited in accordance with a menu facility provided in this embodiment of the invention. When the user enters the group list edit function, the mobile station proceeds to display different options on the LCD display 30, step 92, which the user selects between, step 94, by keypad input.

If the user chooses to add a group record, step 96, to the group list, the mobile station checks, step 98, if a record is available. If not, the edit facility ends. If a group record is available, the mobile station proceeds to display options for editing the selected empty group record, step 100.

If the user selects in step 94 to edit a group record, step 102, the mobile station displays all of the group identifiers for the current group records in the group list, step 104. The user then selects one of the group records by means of the group identifier, step 106, and the mobile station then proceeds to

display further options, step 100, which the user selects between by keypad input in step 108.

If the user wishes to add a directory number to the entry list for the selected group record, step 5 110, the mobile station proceeds to display all of the ADN identifiers appearing in the ADN list stored in the mobile station SIM 34, step 112. From these ADN identifiers, the user selects the chosen ADN to be added to the group record, step 114. The mobile 10 station then proceeds to add the ADN record number of the selected ADN record to the group entry list 58, in step 116. Next, the value of the number of entries 60 for the group is incremented to reflect the added record number entry, step 118. The procedure then 15 moves back to step 100, in which the options for editing the selected group are again displayed.

If the user selects in step 108 to delete a directory number from the entry list of the selected group, step 120, the mobile station proceeds to 20 display each of the ADN identifiers for the ADN record indicated in the group entry list 58, step 122. The user then selects which of the group's directory numbers is to be deleted, step 124, by means of the ADN identifiers. The mobile station then proceeds to 25 delete the selected ADN record number from the group entry list 58, step 126, shifting the remaining

entries if required to defragment the entry list.
Next, the mobile station decrements the number of
entries datum 60 to reflect the reduced number of
entries in the entry list 58, step 128. The procedure
5 then moves back to step 100, in which the group edits
options are displayed again.

If in step 108 the user selects the option to
update the group identifier 62, the user is prompted
to input the new group identifier, step 132. The
10 mobile station then updates the group identifier data
for the record, step 134, and returns to step 100.

If in step 94 the user selects the option to
delete a group from the group list, step 136, the
mobile station proceeds to display each of the group
15 identifiers occurring in the group list, 138. From
these, the user selects a group record to be deleted,
140, which the mobile station proceeds to delete in
step 142. That group record then becomes available
for the storage of a further group list.

20 Referring now to Figure 8, there is also provided
in this embodiment a procedure whereby, if an ADN
record is deleted from the ADN record list, the group
list stored on the SIM is updated. When an ADN record
is deleted by input from the user or otherwise, step
25 144, the mobile station performs a search through the
entry lists 58 of each group record in the group list,

for the record number of the deleted ADN record, step 146.

5 If the ADN record number is found in a group, step 148, it is deleted from the entry list of the group in which that ADN record is found, step 150, and the remaining entries in the entry list 58 are shifted, to reduce any fragmentation of the entry list caused by the deletion of an entry.

10 Next, the mobile station proceeds to update the number of entries datum 60 by decrementing the value stored to reflect the deletion of an entry from the entry list 58. The search procedure is re-initiated, returning to step 146, until no further instance is found of the deleted ADN record number occurring in
15 the group list.

Other Embodiments

In the above embodiment, the mobile station automatically sends each SMS signal without requiring
20 intervening user input after the mobile station is instructed to proceed to send the SMS signals.

In some cases it may however be preferred to allow the user to enter an instruction to continue in the time after one SMS signal has been sent and before the following SMS signal is sent. The mobile station
25 would signal, for example audibly, to the user when the first SMS signal has been sent successfully, to

prompt the user for a continue command, which may be input for example via the keypad of the mobile station. A continue command could be required after each SMS signal is sent, or intermittently after a set
5 number of signals has been sent.

In the above embodiment, the mobile station is a GSM-compatible mobile station, having a SIM. However, the invention could be implemented in relation to a mobile station used in other mobile communications
10 systems, such as CDMA, PDH and third generation systems. References to GSM include other standards for which at least some features are set by the GSM technical specifications such as the PCN standard and the DCS 1800 standard.

15 The group list data need not be stored on a removable data store, such as a SIM, but could be stored in another memory element provided in the mobile station.

In the first described embodiment, the group list
20 records contain the record numbers of the ADN records containing the recipient directory numbers for the group. In an alternative embodiment, each group list record contains the recipient directory numbers for the group in full. An ADN list can then be assembled
25 from the superset of entries in each of the group list and/or a supplemental ADN list.

Furthermore, the mode of selection of the directory numbers in a group is not limited to the selection of a pre-stored group of directory numbers. In a further embodiment, after the user has composed the short message, the user would be presented with the ADN list record identifiers, from which the user could select each ADN record to be included in the selected group by keypad input. The mobile station would, in response to a command from the user, then send an SMS signal for each member of the selected group in an automatically consecutive order.

It should be noted that the invention is not limited to the sending of short message signals. The invention could be implemented in relation to any teleservice which a mobile station supports, such as a multiple-recipient facsimile teleservice. Also envisaged is a method for establishing multiparty voice calls which is essentially similar to the methods described for sending SMS signals to a group of recipients. In the case of the establishment of multiparty calls, a voice call establishment procedure would be initiated for each of the group list members in turn, in accordance with the selected group list record.

In the first described embodiment, the group messaging procedure is directed by the mobile station

processor, the SIM playing a passive role. In an alternative embodiment, the procedure could be implemented entirely by commands sent by the SIM processor to the mobile station processor. Thus, the
5 SIM processor would instruct the mobile station processor to offer a group messaging menu facility, the menu facility prompts being sent from the SIM to the mobile station. Once a group SMS signalling procedure is confirmed by the user, the SIM processor
10 would instruct the mobile station processor to send an SMS signal to each of the recipient directory numbers in turn. An advantage of this alternative embodiment is that a group messaging feature can be provided without the need for modification of the mobile
15 station. All that is required is a mobile station which accepts the appropriate control signals sent by the SIM processor.

It is also envisaged that various modifications and variations to the above described embodiments
20 could be made, without falling outside the scope of the present invention which is defined in the appended claims.

CLAIMS:

1. A user station for use in a mobile communications system, said station comprising:

5 means for storing data relating to a plurality of groups of recipient addresses, each said group having an identifier which is programmable by a user of the station; and

10 means for presenting said identifiers to a user of the station in order to allow user selection of one of said groups.

2. A user station according to claim 1, wherein said identifier is an alphanumeric character string.

3. A user station according to claim 2, wherein said storage means comprises a plurality of group memory portions, each said memory portion storing data relating to a group of recipient addresses and data relating to said identifier.

4. A user station according to any of claims 1 to 3, further comprising means for presenting to a user of the mobile station a further information item relating to recipient addresses in a group.

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5. A user station according to claim 4, wherein said information item relates to the number of recipients addresses in a group.

5 6. A user station according to any of claims 1 to 5, wherein said storage means comprises means for storing a list of recipient addresses, and said data relating to each group of recipient addresses identifies each of the recipient addresses in the group, in said list.

10 7. A user station according to claim 6, having a menu facility allowing a user to create one of said groups by selecting recipient addresses from said list.

15 8. A user station according to claim 6 or 7, wherein recipient addresses are deletable from said list, further comprising means for automatically revising said data relating to a deleted recipient address.

20 9. A user station according to any of claims 1 to 8, further comprising means for sending a radio signal containing an alphanumeric message for each member of a group when selected.

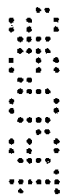
10. A removable data store in accordance with the removable data store of claim 9.

11. A mobile station for use in a mobile communications system, said mobile station comprising a memory for storing a plurality of recipient addresses and means for sending a short message to a selected recipient,

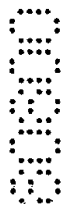
characterised in that said mobile station further comprises a group select menu facility for selecting a group of recipient addresses from said plurality of recipient addresses, and a group transmit menu facility for sending a series of short messages, one for each member of said selected group of recipient addresses, automatically in a consecutive order.

12. A mobile station according to claim 11 wherein each of said short messages is automatically sent without requiring intervening user input after the first of said short messages is sent.

13. A mobile station according to claim 11 or 12, wherein said memory is for storing a plurality of predetermined groups of recipient addresses.



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14. A mobile station according to claim 11, 12 or 13, wherein said memory stores data for presenting a group identifier in the form of an alphanumeric character string previously specified by said user, whereby to perform said selection.

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15. A mobile station according to any of claims 11 to 14, wherein said memory is a removable data store, such as a SIM.

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16. A mobile station for use in a mobile communications system, said user station comprising a memory for storing a plurality of recipient addresses and an alphanumeric text message to be sent from the mobile station,

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characterised in that said mobile station comprises a menu facility for selecting a group of recipient addresses from said plurality of recipient addresses, and a menu facility for sending separate short messages for each member of said selected group, said short messages each containing the same message stored in said memory.

17. A mobile station substantially as hereinbefore described with reference to the accompanying drawings.

DATED: 5 August 2000

Freehills Carter Smith Beadle

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ORANGE PERSONAL COMMUNICATIONS SERVICES LIMITED



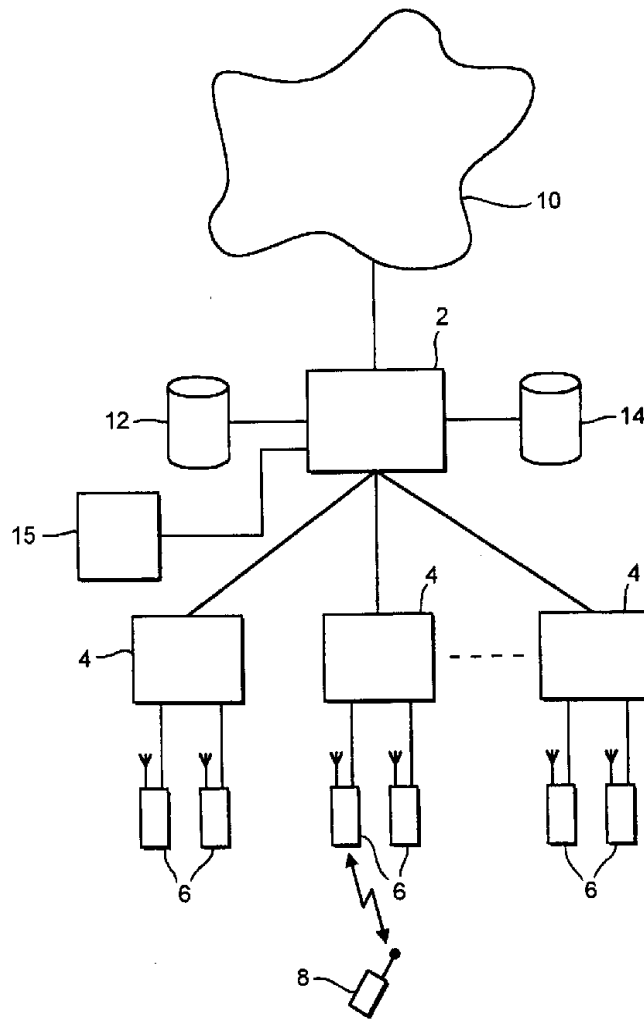


FIG. 1

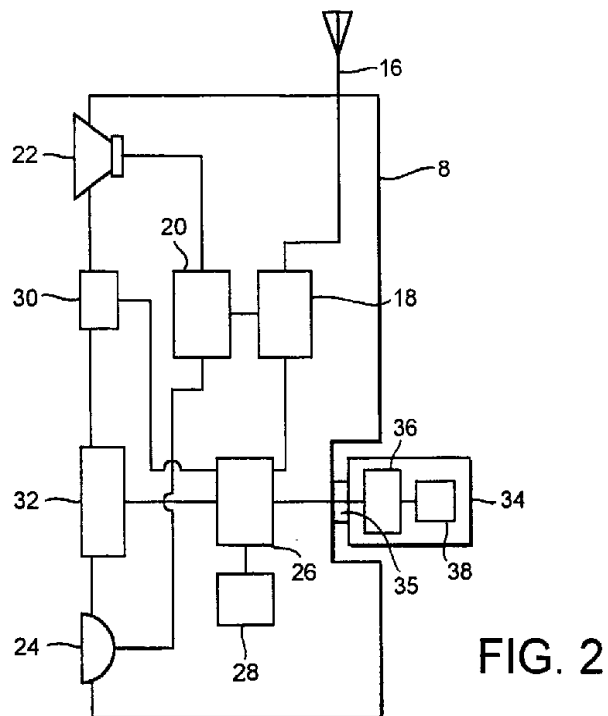


FIG. 2

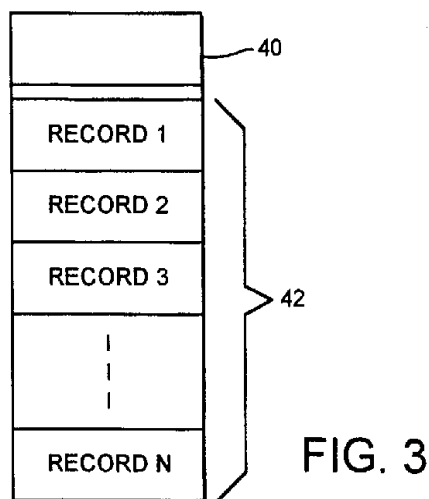


FIG. 3

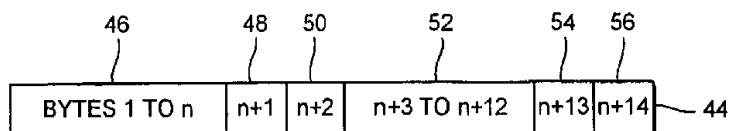


FIG. 4

RECORD NUMBER	ALPHA IDENTIFIER	NUMBER OF ENTRIES	ENTRY LIST
1	FAMILY	04	02 07 14 3F 11
2	PROJECT TEAM	04	31 2C 65 91 48 01 61
..
n	EXEC OFFICE	03	01 34 8D

FIG. 5

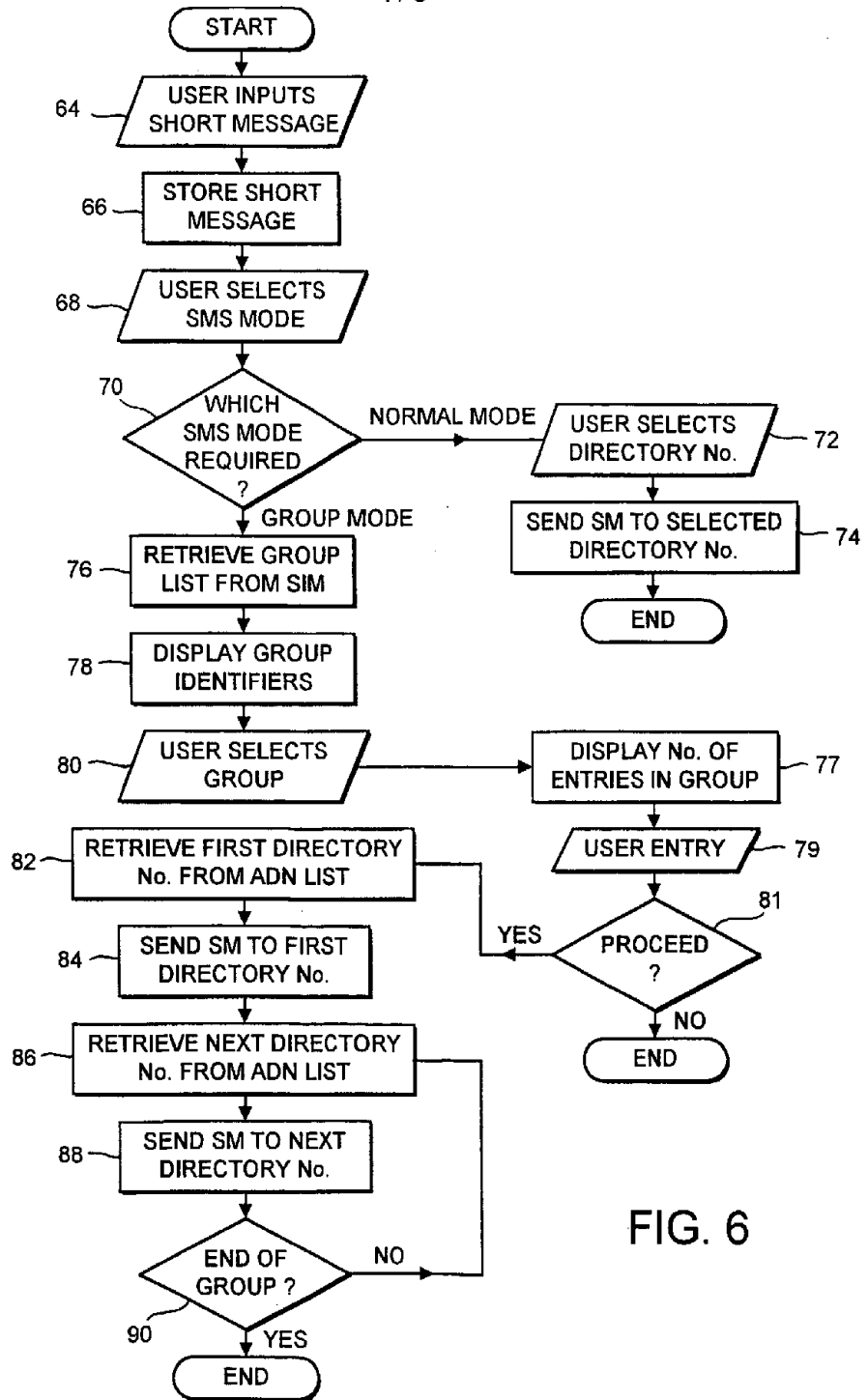
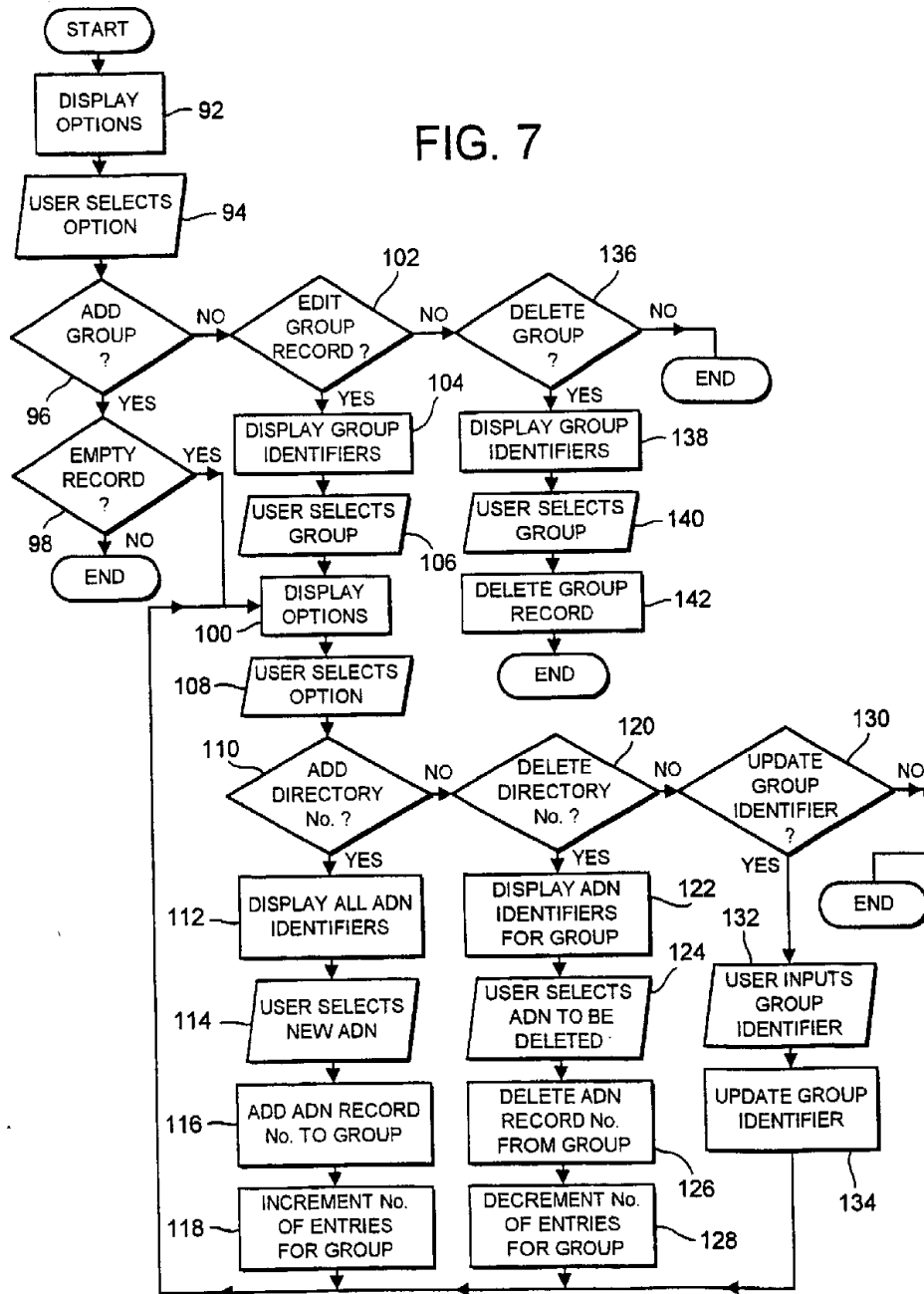


FIG. 6

FIG. 7



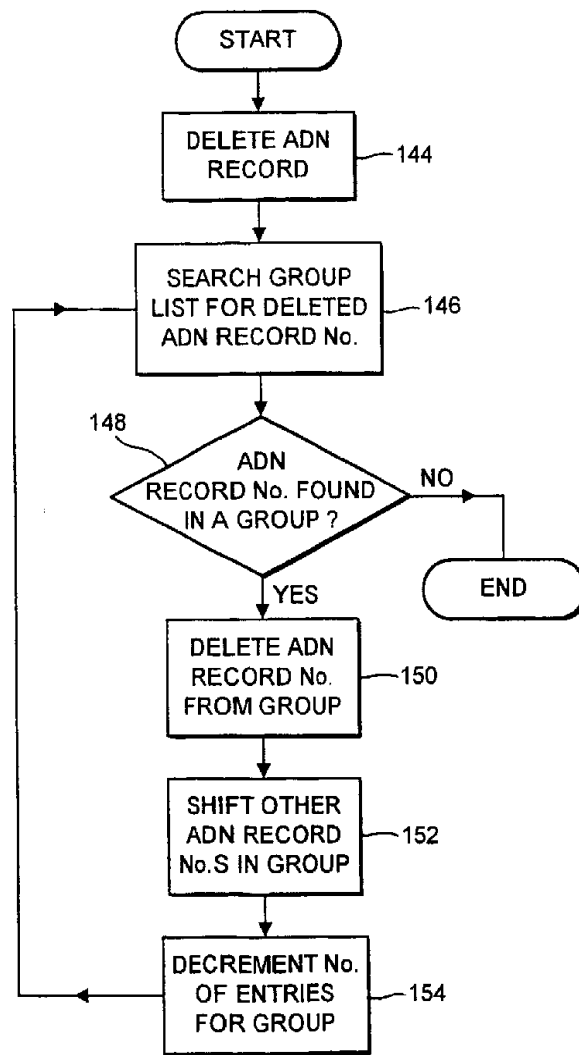


FIG.8