

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
9 December 2004 (09.12.2004)

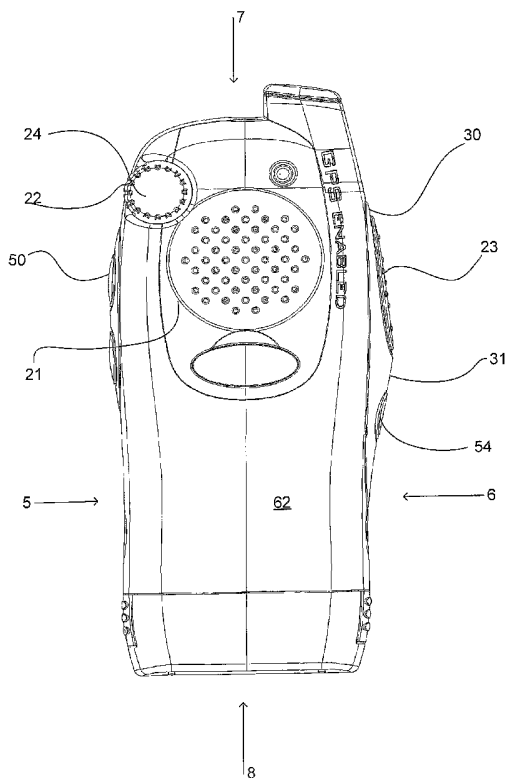
PCT

(10) International Publication Number
WO 2004/107787 A2

- (51) International Patent Classification⁷: **H04Q 7/32**, (72) Inventor; and
H04M 1/02 (75) Inventor/Applicant (*for US only*): **BATAILLARD, Chrisophe, Jean** [FR/GB]; 141 Gloucester Road, London SW7 4TH (GB).
- (21) International Application Number: PCT/GB2004/002296 (74) Agents: **MURRAY, Elisabeth, Anne** et al.; Mathys & Squire, 100 Gray's Inn Road, London WC1X 8AL (GB).
- (22) International Filing Date: 28 May 2004 (28.05.2004) (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
0312435.1 30 May 2003 (30.05.2003) GB
0317885.2 30 July 2003 (30.07.2003) GB
- (71) Applicant (*for all designated States except US*): **IN-QUAM (UK) LIMITED** [GB/GB]; Parnell House, 25 Wilton Road, London SW1V 1LW (GB). (84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH,

[Continued on next page]

(54) Title: COMMUNICATION HANDSET



(57) Abstract: A push-to-talk communication device handset (1) having front and rear faces (60, 62), and side surfaces (5, 6) located between the front and rear faces (60, 62) is described. A keypad (13) is located on the front face (60), a push-to-talk switch (23) is located on or adjacent one of the side surfaces (6), and a group selector means (22) is located on or adjacent another of the side surfaces (5), such that the push-to-talk switch (23) and the group selector means (22) are operable using a respective: digit of a hand holding the handset (1). This can allow a user to operate the handset (1) with only one hand.



GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

COMMUNICATION HANDSET

The present invention relates to a push-to-talk communication device handset, and to a
5 method of operating a push-to-talk communication device.

Push-to-talk (PTT) communications systems are commonly used by the emergency services (such as the police and ambulance service) and taxi companies to facilitate communication between users ("communicatees") who are dispersed across a large
10 geographical area. The term "push-to-talk" is particularly appropriate because a user of such a communications system typically (but not always) transmits a message to the communicatees by pushing a switch or button, typically on a handset of a communication device, before speaking their message into a microphone. The user signals the end of the message by releasing this so-called push-to-talk switch. The
15 message is transmitted to the communicatees via a communications network and is audibly reproduced by loudspeakers on the communicatees' communication devices. The communicatees may then respond to the message by pushing the push-to-talk switches on their own communication devices in a similar fashion.

20 A wide variety of communication modes are possible with PTT systems, for example: one-to-one communication between two communicatees; communication between a number of communicatees, in which a transmitted message is received by all communicatees; and communication between a number of communicatees and a dispatcher in a control centre, in which each communicatee may communicate with the
25 dispatcher but not with other communicatees. Many PTT communications systems allow "groups" of communicatees to be defined such that a user of the system may choose to send a PTT communication to a particular group of people; the PTT communication will only be received by other communicatees who are members of that group, but will not be received by communicatees who are not members of the group. Similarly, the user can
30 receive PTT communications from other communicatees who are members of a group of which the user is also a member. The functionality for enabling groups of

communicatees to be defined may be provided by the communications network and/or by PTT-enabled communication devices. Some PTT communications systems allow a plurality of groups to be defined, and communication device handsets for use with these PTT systems typically provide a group selector means to allow a user to choose to which
5 of these groups a particular PTT communication is to be sent, such that the PTT communication will be received by members of that group.

It is becoming increasingly common for cellular telephone networks to provide PTT communications facilities. With such networks, it is convenient to use a single handset
10 that combines standard mobile telephone functionality with PTT functionality.

A conventional push-to-talk communication device is shown in EP-A2-1168777. The handset has front and rear faces, and left and right sides. The front face and left side carry functional elements for a digital radio telephone. The rear face and right side carry
15 push-to-talk (PTT) functional elements. Specifically, the right side carries a push-to-talk switch, and the rear face carries centrally a group selector switch together with a push-to-talk microphone and a push-to-talk speaker.

A first problem with the user interface of EP-A2-1168777 is that it is not suited for
20 operation while the handset is carried in the hand. As a result, the device is carried in a cradle attached to a shoulder strap, particularly when operated in push-to-talk mode.

A second problem with the user interface of EP-A2-1168777 is that it is not convenient to operate the group selector switch with the hand which is carrying the handset.

25

A third problem with the user interface of EP-A2-1168777 is that it is not convenient to operate the group selector switch while the handset is being held adjacent to the head.

A fourth problem with the user interface of EP-A2-1168777 is that each of the two
30 modes of operation of the communication device, namely digital radio telephone

operation and PTT operation, is operated using a set of functional elements that is distinct and separate from the set of functional elements that is used to operate the other mode of operation.

- 5 It is a preferred aim of this invention to at least partially alleviate some of these problems.

A broad aspect of the invention provides a push-to-talk communication device handset having front and rear faces, a display and/or keypad located on one of said faces, and
10 side surfaces between the front and rear faces, a push-to-talk switch being located on or adjacent one of the side surfaces, and group selector means being located on or adjacent another of the side surfaces, each of said switch and said selector means being operable using a respective digit of a hand holding the handset.

- 15 In accordance with a first aspect of the invention, there is provided a push-to-talk communication device handset having front and rear faces, a keypad being located on the front face, and side surfaces between the front and rear faces, a push-to-talk switch being located on or adjacent one of the side surfaces, and group selector means being located on or adjacent another of the side surfaces, each of said switch and said selector means
20 being operable using a respective digit of a hand holding the handset.

Thus, the push-to-talk switch and group selector means may be easily operated by the hand which is holding the handset, as, for example, the thumb of the user will rest against the group selector means and at least one finger of the hand will rest against the
25 PTT switch. Furthermore, the location of the keypad on the front surface of the handset can allow a user to conveniently operate the push-to-talk switch and/or group selector means with the hand holding the handset, whilst also entering information into the handset via the keypad, for example with his other hand. Preferably, this arrangement allows a user to operate the keypad whilst simultaneously operating the push-to-talk
30 switch and/or the group selector means. The speed, ease and/or efficiency with which the

user can interact with the handset (for example when entering information into the handset) may be improved by allowing a user to operate the controls of the telephone with both hands simultaneously. The speed, ease and/or efficiency with which the user may interact with the handset may also be improved by allowing each of a user's hands
5 (or a different digit of each or both hands) to operate a different type of control, particularly when the different types of control are adapted to perform different functions.

In some examples, the keypad, push-to-talk switch and/or the group selector means may
10 all be operated by digits of the hand holding the handset. This can allow one-handed operation of the handset, which may be convenient in some situations.

The term 'communication device' preferably refers to any device used for the purpose of voice or data communication, or other kinds of communication. The term preferably
15 refers to devices that provide communication functions for communicating over a communications network. The term 'handset' preferably refers to an assembly of components (forming at least part of a communication device) that can be manipulated by a user; for example, a user may be able to hold the handset in a hand in order to send and receive communications, to view displayed information and/or to operate user-
20 operable controls (such as buttons, dial and/or switches). In preferred examples, the communication device is fully-contained within the handset, such that, for example, the handset comprises a user interface (including, for example, a speaker, a microphone and a display), with components for enabling communication with a communications network (including, for example, a modulator, demodulator and an antenna), control
25 circuitry and/or software, and a power source; in such examples, the communication device is preferably portable.

Examples of such communication devices include mobile or handheld devices, such as wireless or mobile telephones, wireless modems, personal digital assistants (PDAs) or

other devices, for example, devices comprising a combination of features of a mobile telephone and a PDA.

Preferably, the group selector means allows a user to select a group of communicatees from a range of candidate groups with whom the user may communicate via PTT communication. Preferably, the range of candidate groups comprises zero or more groups. More preferably, the range of candidate groups comprises two or more groups. Preferably, a group comprises zero or more communicatees. More preferably, a group comprises two or more communicatees. In an example of one-to-one PTT communication, each group can be considered to comprise one communicatee such that the group selector means is used to select one particular communicatee with whom the user may communicate with via PTT communication.

Preferably the keypad comprises a plurality of keys. In some examples, the keypad comprises a touch-activated control, such as a touch screen or a touch pad.

Preferably the keypad includes a numeric keypad. Preferably the term "numeric keypad" is to be understood to refer to a plurality of keys for enabling the entry of numeric data (such as a telephone number, for example) into a communication device. For example, the numeric keypad may comprise a respective key for each of the numbers from 0 to 9. In another example, the numeric keypad may also comprise keys for entering "*" and "#" characters. In another example, the numeric keypad may comprise fewer than ten keys, with particular numbers being entered into the keypad by pressing an appropriate key a plurality of times, or by pressing an appropriate plurality of keys simultaneously or sequentially. The keypad may or may not additionally include other keys. The presence of a numeric keypad on the front surface of the communication device can allow a user to enter conveniently numeric information (such as a telephone number, or a number relating to PTT communications such as the number of a group) into the handset.

Preferably the keypad is an alphanumeric keypad. Preferably the term “alphanumeric keypad” is to be understood to refer to a plurality of keys for enabling the entry of alphanumeric data (such as a telephone number and a corresponding name, for example) into a communication device. For example, the alphanumeric keypad may comprise a
5 respective key for each of the numbers from 0 to 9, such that operation of a particular key causes the respective number to be entered into the communication device. In this example, non-numeric characters (such as the letters of the alphabet and punctuation) may be entered into the keypad by pressing an appropriate key a plurality of times or by pressing an appropriate plurality of keys simultaneously or sequentially. In another
10 example, the alphanumeric keypad comprises a respective key for each of the letters of the alphabet. In a further example, the alphanumeric keypad comprises a respective key for each of the letters of the alphabet and for each of the numbers from 0 to 9. The presence of an alphanumeric numeric keypad on the front surface of the handset can allow a user to enter conveniently alphanumeric information (such as the name of a
15 communicatee, or one or more alphanumeric characters relating to PTT communications such as the name of a group) into the handset.

Preferably the keypad comprises further keys, for example to enable communications functions to be performed. Such further keys may include one or more of a “send key”
20 for initiating a cellular telephone call, an “end key” for terminating a cellular telephone call and a “soft key” which can effect a user-selectable or software-selectable function.

Preferably the front face further comprises a display screen.

25 Preferably the term “display screen” is to be understood to refer to a display including a plurality of display elements. In preferred examples, a display screen comprises a planar array of liquid crystal display or light emitting diode elements.

Thus, the location of the display screen on the front surface of the handset can allow a
30 user to hold the handset in a convenient and ergonomic operating position in which the

display screen can be viewed whilst the push-to-talk switch and/or group selector means are operated with the hand holding the handset, and/or whilst information is entered into the handset via the keypad with the user's other hand. This can allow a user to view the results of the operation of the push-to-talk switch, group selector means and keypad upon
5 the display without requiring the communication device to be moved from this operating position.

Preferably the display screen is adapted to display information. Preferably the display screen is adapted to display alphanumeric characters. For example, the display screen
10 may display information such as the names of one more communicatees, the telephone number of a communicatee, the names and/or numbers one or more groups of communicatees, a list of communicatees who are members of a particular group, the status of the communication device (for example, battery power, the strength or quality of a communications signal, and/or whether a communication is currently in progress),
15 the currently selected mode of communication (for example, whether a PTT or a cellular telephone mode of operation is currently in use), a time and/or date, the name of a communications service provider, the duration of a communication, an indication that a communication has been sent or received, and/or a text-based message (such as a Short Message Service (SMS) message) that has been received or has been (or is to be) sent.

20

Preferably, the group selector means is mounted on the rear face adjacent to the side surface opposite said one of the side surfaces.

Preferably, the group selector means protrudes at least partially beyond said another of
25 said side surfaces.

Preferably, the handset comprises an opening on the rear face of the handset, wherein the group selector means is mounted in the opening. This provides a more slimline design than the design of EP-A2-168777.

30

Preferably, the opening is a seat having a first opening on the rear face of the handset, and a second opening on said another of said side surfaces.

Preferably, the group selector means is a rotary switch. In this case the rotary switch
5 may be operable to positively select a particular group when rotated. In an alternative embodiment, the group selector means may be a rotary dial, in which case a particular group may only be positively selected by activating the PTT button or another function key. In an alternative embodiment, the group selector means may be a push button switch.

10

Preferably, the push-to-talk switch is located on said one of the side surfaces.

Preferably, the push-to-talk switch is located on a side surface opposite to the side surface on which, or adjacent to which, the group selector means is located.

15

Preferably, the handset includes ergonomically profiled side surfaces.

Preferably, the push-to-talk switch follows the profile of said one of said side surfaces.

20 Preferably the handset comprises a further user-operable control located on a side surface. Preferably the further user-operable control is located near to the push-to-talk switch or the group selector means. For example, the handset may comprise a group select button, in the form of a push switch for selecting a group, located near to (and on the same surface as) the push-to-talk switch. In another example, the handset may
25 comprise one or more push switches for allowing a user to adjust the volume of a speaker or loudspeaker (including, for example, turning the loudspeaker on or off), located near to (and on or adjacent the same surface as) the group selector means. By locating the further user-operable control near to the push-to-talk switch or the group selector means in this manner, a user can easily locate and activate the further user
30 operable control by moving the position of the digit that normally operates the push-to-

talk switch or group selector means, or by using another digit of the hand holding the handset.

In accordance with a further aspect of the invention, there is provided a push-to-talk communication device handset comprising first and second sides, the first side being
5 broader than the second side; a push-to-talk switch; and group selector means mounted on or adjacent to the relatively narrow second side of the handset.

Thus, the group selector means may be operated while the first side of the handset is
10 being held adjacent to the head of the user, to be close to the speaker and/or microphone.

Preferably, the first and second sides may be opposite sides (for instance, front and rear faces of the handset), but preferably are adjacent sides (such as a rear and left side of the handset).

15

The handset may not include a speaker and/or microphone. In this case, the speaker and/or microphone can be provided as a separate headset.

In accordance with another aspect of the invention, there is provided a push-to-talk communication device handset comprising front and rear faces, a microphone, a push-to-talk speaker located on the front face of the handset, and group selector means located on
20 or adjacent to the rear face of the handset.

Thus, the group selector switch may be operated easily while the broad side of the
25 handset is being held in the palm of the hand.

Preferably the handset is further adapted to effect a second type of communication.

This feature is of particular importance and is provided independently.

A further aspect of the invention provides a communication device handset adapted to effect push-to-talk communications and a second type of communication, the handset having front and rear faces, a display and/or keypad located on one of said faces, and side surfaces between the front and rear faces, a push-to-talk switch being located on or adjacent one of the side surfaces, and group selector means being located on or adjacent another of the side surfaces, each of said switch and said selector means being operable using a respective digit of a hand holding the handset.

The provision of two types of communication within a single handset may be more convenient for a user than having a separate handset for each of the types of communication that the user may wish to use. For example, it may be more convenient for a user to carry a single handset, it may be less expensive for a user to purchase a single handset, a user may only have to learn how to operate a single handset and/or a user may only need to maintain a single "contacts list" (listing, for example, the telephone numbers of other parties with whom the user communicates) on a single handset.

The second type of communication may include, for example, telephony, cellular telephony, video telephony, voice mail, video conferencing, Short Message Service (SMS), Enhanced Message Service (EMS), Multimedia Messaging Service (MMS), electronic mail, facsimile and/or instant messaging. It will be appreciated that other appropriate communication types are also possible. In some examples, the communication device may be enabled to effect more than two different communications types.

Preferably the second type of communication is voice-based.

A voice-based type of communication is preferably understood to be a type of communication that involves the transmission of information representing an audible signal (such as speech or music, for example) from one party to another party. Examples

of voice-based types of communication include radio telephony and cellular telephony; other examples of voice-based communication, such as video telephony and video-conferencing, additionally involve the transmission of information representing an image (or a sequence of images).

5

Preferably, the similarities between PTT communications and other voice-based types of communications can allow functional elements (such as the loudspeaker, speaker and microphone, for example) of the handset to be used for both PTT communications and the other voice-based type of communication supported by the handset.

10

In some examples, the second type of communication may be a visual type of communication. A visual type of communication is preferably understood to be a type of communication which involves the transmission of information representing alphanumeric characters and/or an image from one party to another. Examples of visual

15 types of communication include SMS, EMS, MMS, email and facsimile.

20

The second type of communication is preferably enabled by a communications network infrastructure that includes at least part of the communications network infrastructure that enables PTT communications. This can allow functional elements (such as the

modulator, demodulator and antenna, for example) of the handset to be used for both PTT communications and the second type of communications, and can also allow a communications service provider to offer additional services to users with existing network infrastructure equipment. In preferred examples, PTT functionality is provided by a cellular telephone network.

25

Preferably the second type of communication is telephony.

Preferably, the telephony is radio telephony or cellular telephony. Preferably, telephony is enabled by means of a CDMA2000 telephony system, the CDMA2000 telephony

30 system comprising appropriate cooperating functional elements in the handset and in a

communications network. Other types of cellular telephony, for example, Code Division Multiple Access (CDMA), Universal Mobile Telecommunications System (UMTS) or Global System for Mobile Telecommunications (GSM) are possible. Other forms of telephony, including those enabled by a satellite-based telephone network (such as Iridium™) or Voice over Internet Protocol (VoIP) are also possible.

Preferably the handset comprises a cellular telephone.

In accordance with a broad further aspect of the invention, there is provided a method of operating a push-to-talk communication device handset having front and rear faces, a display and/or keypad located on one of said faces, and side surfaces between the front and rear faces, a push-to-talk switch being located on or adjacent one of the side surfaces, and group selector means being located on or adjacent another of the side surfaces, the method comprising holding the handset in one hand; and operating each of said switch and said selector means using a respective digit of the hand which is holding the handset.

In accordance with a further aspect of the invention there is provided a method of operating a push-to-talk communication device handset having front and rear faces, a keypad located on the front face, and side surfaces between the front and rear faces, a push-to-talk switch being located on or adjacent one of the side surfaces, and group selector means being located on or adjacent another of the side surfaces, the method comprising holding the handset in one hand; and operating each of said switch and said selector means using a respective digit of the hand which is holding the handset.

Preferably the keypad is operated by the hand that is not holding the handset.

Preferably, the keypad is operated by a digit of the hand that is not holding the handset.

Preferably a display screen on the front face of the device is viewed while the push-to-talk switch, group selector means and/or keypad is operated.

Preferably, the group selector means is operated while the handset is being held in the
5 palm of the hand.

Preferably, the group selector means is operated by one of a finger and a thumb of the hand which is carrying the handset.

10 Preferably, the group selector means comprises a switch, wherein the group selector means is operated by a scrolling action of said one of a finger and a thumb against the switch.

In an example in which the group selector means comprises a rotary switch, the scrolling
15 action by which the group selector means is operated comprises rotating the switch in a clockwise and/or anti-clockwise direction with a user's finger or thumb. In an example in which the group selector means comprises a sliding switch, the scrolling action by which group selector means is operated comprises sliding the switch along one or more of its permissible sliding directions with a user's finger or thumb.

20 Preferably, the push-to-talk switch is operated while the handset is being held in the palm of the hand.

Preferably, the push-to-talk switch is operated with the other one of a finger and a thumb
25 of the hand which is carrying the handset.

Preferably, the push-to-talk switch is operated with a thumb or an index finger of the hand which is carrying the handset.

In accordance with yet a further aspect of the invention, there is provided a method of operating a push-to-talk communication device having front and rear faces, a microphone, a push-to-talk speaker located on the front face of the handset, and group selector means located on or adjacent to the rear face of the handset, the method
5 comprising operating the group selector means while the handset is being held adjacent to the head.

In accordance with a broad further aspect of the invention there is provided a communication device handset enabled to effect first and second types of
10 communication, the handset comprising a set of functional elements operable as at least part of a user interface for the first type of communication, wherein the set of functional elements is also operable as a full user interface for the second type of communication.

In accordance with a further aspect of the invention there is provided a communication
15 device handset enabled to effect cellular telephone communications and PTT communications, the handset comprising a set of functional elements operable as at least part of a user interface for cellular telephone communications, wherein the set of functional elements is also operable as a full user interface for PTT communications.

20 The term "functional element" preferably includes, for example, user-operable controls (for example, push buttons, rotary switches, sliding switches and joysticks), audio transducers (for example, microphones, loudspeakers and earphones) and visual transducers (for example, display screens, light emitting diodes, and cameras).

25 Preferably, the term "set of functional elements" is to be understood to mean one or more functional elements as hereinbefore described.

Preferably, the term "user interface" describes any means, including functional elements as described above, by which a user can interact with the handset or a particular type of
30 communication that is enabled by the handset. The term "full user interface" preferably

describes a set of functional elements through which the user can interact with all of the user-interactable functionality of the handset or a particular type of communication that is enabled by the handset.

- 5 The total number of components required by the handset may thus be reduced by sharing a set of functional elements between two communication types, such as cellular telephony and PTT, that are supported by the handset. Reducing the number of components in the handset may reduce the cost, weight and size of the handset, and may also improve the reliability of the handset.

10

Sharing functional elements may also improve the ease of use of the handset. For example, by reducing the number of user-operable controls present on the handset, the risk of confusing or intimidating a user who is unfamiliar with the method of operation of the handset may be reduced. Furthermore, reducing the number of functional elements
15 that are present on the surface of the handset may improve ease of use by allowing the size of these functional elements to be increased, whilst allowing the handset to maintain a compact overall size. For example, increasing the size of user-operable controls may facilitate their manipulation by a user.

- 20 Preferably, PTT communications are enabled by a cellular telephone network adapted to provide PTT services. For example, a Qualcomm Qchat™ system may be used to provide PTT functionality in a CDMA2000 telecommunications network. In another example, a Winphoria Networks Global Instant Rendezvous (GIR™) system may be used to provide PTT functionality in an existing cellular telecommunications network. PTT
25 communication may alternatively be enabled by a dedicated PTT telecommunications infrastructure that is separate from the communications network used for cellular telephony.

Preferably, the user interface for cellular telephone communications comprises a
30 functional element located on a first surface of the handset, and the user interface for

PTT communications comprises a functional element located on or adjacent a second surface of the handset.

Preferably, if the handset comprises more than two surfaces, the user interface for
5 cellular telephone communications and/or PTT communications may also include a functional element located on or adjacent a surface other than the first or second surfaces.

Preferably, the user interface for PTT communications comprises a functional element
10 located on a third surface of the handset.

Preferably, the second surface is disposed between the first and third surfaces.

Preferably, the second surface is orthogonal to both the first and third surfaces.

15

Preferably, the width of the second surface in the direction generally perpendicular to both the first and third surfaces is less than the width of the first and third surfaces in the direction generally perpendicular to the second surface. Thus, in an example in which the functional elements for use with both cellular telephone and PTT communications
20 comprise a user-operable control located on or adjacent the second surface, the handset can be held such that the user-operable control is operable using a digit of a user's hand when either the first or third surface is facing the palm of the user's hand. This may allow the user to interact with the handset in a comfortable and convenient manner, and may also facilitate operation of the handset using a single hand.

25

Locating those functional elements of the handset user interface that are particularly associated with cellular telephony (such as the numeric keypad, for example) on a surface opposite to that on which those functional elements of the handset user interface that are particularly associated with PTT (such as the loudspeaker, for example) are
30 located may improve the ease of use of the handset, by creating a clear distinction

between operation in cellular and PTT modes. In an example, the handset may be used for cellular telephone communications by holding the handset such that the third surface faces the user's palm; to effect PTT communications, the orientation of the handset is optionally reversed, such that the first surface faces the user's palm. Thus, the user can easily select between the cellular and PTT modes of operation according to the way in which the handset is oriented during use. Furthermore, certain functional elements that are common to both cellular telephone communications and PTT communications may be conveniently accessible on or adjacent the side of the handset (for operation with a digit of the hand that is holding the handset) in both of the previously mentioned handset orientations. However, it should be emphasised that reversing the orientation of the handset to effect PTT communications is optional in this example, since the PTT communications are possible even when the handset is held in the preferred orientation for cellular communications. In an example, a PTT button and/or a group select wheel are located on or adjacent the second surface.

15

In another example, the first, second and third surfaces are mutually orthogonal. This arrangement may also improve ease of use by creating a clear distinction between the cellular and PTT modes of operation of the handset.

Preferably, the first and second surfaces define opposite sides of the handset. For example, the first surface may be the nominal "front" of the handset and the second surface may be the nominal "rear" of the handset. Alternatively, the first surface may be the nominal "left side" of the handset and the second surface may be the nominal "right side" of the handset, or the first surface may be the nominal "top" of the handset when the second surface is the nominal "bottom" of the handset. This arrangement of functional elements may also improve the ease of use of the handset, by reinforcing the functional distinction between the cellular and PTT operating modes. In examples in which the handset comprises more than two surfaces, the user interfaces for either cellular telephone communications and/or PTT communications may also comprise

25

functional elements located on or adjacent surfaces other than the first and second surfaces.

In accordance with a further aspect of the invention there is provided a communication
5 device handset enabled to effect cellular telephone communications and PTT
communications, the handset having a first surface at the front of the handset and a
second surface at the rear of the handset, the handset comprising a set of functional
elements operable as at least part of a user interface for cellular telephone
communications, the set of functional elements also being operable as a full user
10 interface for PTT communications, wherein the set of functional elements comprises a
functional element for PTT communications located on the second surface.

This may improve the ease of use of the handset, for example by allowing a user to
distinguish between cellular and PTT modes of operation by optionally reversing the
15 orientation of the handset according to which of these operating modes is in use.

Preferably the set of functional elements comprises a functional element for cellular
telephone communications located on the first surface at the front of the handset.
Preferably the set of functional elements located on the first surface at the front of the
20 handset includes a display and/or a keypad for cellular telephone communications.
Preferably the set of functional elements comprises a functional element for both cellular
telephone communications and PTT communications located on the first surface at the
front of the handset. Preferably the functional element for PTT communications located
on the second surface at the rear of the handset is a loudspeaker or a group select wheel.

25 Preferably the handset further comprises a third surface located between the first and
second surfaces, wherein the set of functional elements further comprises a functional
element for PTT communications located on or adjacent the third surface.

Preferably, the set of functional elements comprises a speaker, a loudspeaker and a microphone comprising an aperture in communication with a transducer, wherein the relative positions of the speaker, loudspeaker and microphone aperture are such that the speaker and loudspeaker are located nearer to each other on the handset than to the
5 microphone aperture

Preferably the loudspeaker is adapted to produce an audible signal of greater amplitude, power and/or volume than the speaker.

10 Preferably, the set of functional elements comprises a speaker located near a first end of the handset, and a microphone comprising an aperture in communication with a transducer, the aperture located near a second end of the handset, wherein the set of functional elements further comprises a loudspeaker located near the first end of the handset.

15

Preferably, the speaker is an earphone.

Preferably, the transducer converts sound to an electrical signal.

20 Preferably, the aperture conveys sound waves generated outside the handset to the transducer.

Thus, in normal use the handset may be oriented such that both the speaker and loudspeaker are proximal to the user's ear when the aperture of the microphone is
25 proximal to the user's mouth. This arrangement enables the use of a single microphone for both the first and second types of communication.

Furthermore, locating the loudspeaker (and, to a lesser extent, the speaker) remote from the aperture and/or transducer may reduce or eliminate the undesirable feedback of an
30 audible signal from the loudspeaker (and speaker) to the microphone. Feedback may be

further reduced by locating the aperture and/or the transducer on a different surface of the handset to the loudspeaker and/or speaker.

Preferably, the set of functional elements comprises a speaker and a loudspeaker,
5 wherein the speaker is located on the first surface of the device and the loudspeaker is located on the second surface of the device.

Locating the speaker, which is primarily associated with cellular telephone communications, on a different surface from the loudspeaker, which is primarily
10 associated with PTT communications, may improve ease of use of the handset by creating a clear distinction between the two types of communication enabled by the handset.

Furthermore, locating the loudspeaker on a different surface of the handset from the
15 speaker may reduce the risk of damage to a user's hearing that may be caused by a signal (such as an incoming PTT communication) being reproduced at a high volume by the loudspeaker when the handset is held in an operating position in which the speaker is near to the user's ear.

20 Preferably, the first and second surfaces define opposite sides of the handset.

Thus, a user can optionally reverse the orientation of the handset to choose between cellular and PTT modes of communication.

25 Preferably the set of functional elements comprises a microphone, the microphone comprising an aperture in communication with a transducer, wherein the aperture is located between the first and second surfaces.

Preferably, the aperture is located substantially equidistant from the first and second
30 surfaces.

Locating the aperture substantially equidistant from these two surfaces may allow a single aperture to be used when the handset is held in different orientations to effect cellular and PTT communications. In an alternative example, an aperture is provided on
5 each of the first and second surfaces.

Preferably, the set of functional elements comprises a speaker located on the first surface of the handset, a loudspeaker located on the second surface of the handset, and a microphone, wherein the microphone comprises a transducer located substantially
10 equidistant from the first and second surfaces.

Locating the transducer distal from the surfaces of the handset may help to maximise the surface area of the handset that is available for other purposes. Thus, a greater number of user-operable controls may be placed on the surface of the handset; alternatively, an
15 uncluttered appearance of the handset may be achieved.

Preferably at least part of the user interface for PTT communications is located in a tactilely distinctive position.

20 This can assist a user to operate the handset in a PTT mode of communications without having to look at the handset. For example, the push-to-talk button and/or group select wheel may be located on, or adjacent to, a side of the handset where it can be easily located by a digit of a hand that is holding the handset. In some examples, a user-operable control that forms part of the user interface for PTT communications may have
25 a distinctive shape for enabling a user to locate that control by touch alone. In further examples, a surface of a user-operable control that forms part of the user interface for PTT communications comprises one or more tactile features (such as a raised area and/or a depression) for enabling a user to locate that control by touch alone and/or to assist the user to manipulate the control.

Preferably at least part of the user interface for cellular telephone communications is located in a tactilely distinctive position.

According to a further aspect of the invention, there is provided a communication device
5 handset enabled to effect first and second types of voice-based communication, the first and second types of communication being enabled by different network infrastructures, and the handset comprising a set of functional elements operable as at least part of a user interface for the first type of communication, wherein the set of functional elements is also operable as a full user interface for the second type of communication.

10

In a first example, one type of communication is cellular telephony enabled by a cellular telecommunications network infrastructure, while the other type of communication is PTT enabled by a cellular telecommunications network comprising a PTT system (such as a QChat™ or GIR™ system, as previously described).

15

In other examples, the first or second types of communication may be enabled by a dedicated PTT network infrastructure, a satellite telephony network infrastructure, a packet-switched wireless network infrastructure (such as an IEEE 802.11 network infrastructure), or a network infrastructure adapted to enable video conferencing.

20

In yet further examples, the different network infrastructures comprise a number of elements. Particular elements, such as base station transceivers or public switched telecommunications networks for example, may be shared between the different network infrastructures. However, either the first or second type of communication is enabled by
25 at least one element of a network infrastructure that is not required to enable the other type of communication.

Preferably, the user interface for the first type of communication comprises a functional element located on a first surface of the handset, and the user interface for the second

type of communication comprises a functional element located on or adjacent a second surface of the handset.

Preferably, the user interface for the second type of communication comprises a
5 functional element located on a third surface of the handset.

Preferably, the second surface is disposed between the first and third surfaces.

Preferably, the second surface is substantially orthogonal to both the first and third
10 surfaces.

Preferably, the first and second surfaces define opposite sides of the handset.

Preferably, the set of functional elements comprises a speaker located near a first end of
15 the handset, and a microphone comprising an aperture in communication with a transducer, the aperture located near a second end of the handset, and the set of functional elements further comprises a loudspeaker located near the first end of the handset.

20 Preferably, the speaker is located on a first surface of the device and the loudspeaker is located on a second surface of the device.

Preferably, the first and second surfaces define opposite sides of the handset.

25 Preferably, the aperture is located between the first and second surfaces.

Preferably, the aperture is located substantially equidistant from the first and second surfaces.

In accordance with a further aspect of the invention there is provided a communication device handset enabled to effect first and second types of voice-based communication, the handset comprising a speaker located near a first end of the handset, and a microphone for use with both first and second types of communication, the microphone
5 comprising an aperture in communication with a transducer, the aperture located near a second end of the handset, wherein the handset further comprises a loudspeaker located near the first end of the handset.

Preferably, the speaker is located on a first surface of the device and the loudspeaker is
10 located on a second surface of the device.

Preferably, the first and second surfaces define opposite sides of the handset.

Preferably, the aperture is located between the first and second surfaces.
15

Preferably, the aperture is located substantially equidistant from the first and second surfaces.

Preferably, the transducer is located substantially equidistant from the first and second
20 surfaces.

According to yet a further aspect of the invention, there is provided a communication device handset, the handset comprising a microphone, a speaker located on a first surface of the handset, and a loudspeaker located on a second surface of the handset, wherein the
25 microphone comprises a transducer located substantially equidistant from the first and second surfaces.

Preferably, the first and second surfaces define opposite sides of the handset.

Preferably, the speaker and loudspeaker are located near a first end of the handset, and the microphone comprises an aperture in communication with the transducer, and the aperture is located near the second end of the handset.

- 5 Preferably, the handset is enabled to effect first and second types of voice-based communication, and the microphone is operable for use with both first and second types of communication.

Preferably, one of the first or second types of communication is cellular telephony.

10

Preferably, one of the first or second types of communication is PTT.

A further aspect of the invention provides a user interface manager for enabling a first and/or second user interface of a handset as herein described.

15

A further aspect of the invention provides a user interface manager for a communication device handset enabled to effect first and second types of communication, the handset having first and second user interfaces associated with the first and second types of communication respectively, wherein the user interface manager is adapted to enable the
20 first user interface in accordance with the value of a status variable.

Preferably the user interface manager comprises software being executed by a microprocessor or microcontroller. In other examples, the user interface may comprise a programmable logic device or other logic circuit.

25

Preferably, the user interface manager is adapted to disable the second user interface in accordance with the value of the status variable and/or when the first user interface is enabled.

The status variable is preferably a communications mode status variable. The communications mode status variable preferably indicates whether the first or second type of communication is currently active. In other examples, the status variable may be a user preference status variable, which indicates a user's preference as to which of the first or second user interfaces is to be enabled. In some examples, the user interface manager may enable the first user interface in accordance with the values of a plurality of status variables (including, for example, one or more communications mode status variables, and/or one or more user preference status variables), or in accordance with a logic operation (and/or arithmetic operation) performed on one or more status variables.

10

The value of a status variable preferably may be changed by, for example, the activation by a user of a user-operable control, the selection of an item from a menu or the transmission or receipt of a communication. For example, the value of a communications mode status variable may be changed to indicate whether the first or second type of communication is active as a result of, and in accordance with, a received communication of the first or second type.

15

Preferably, the user interface manager is adapted to receive a signal from a user-operable control and to enable the performance of a communications function, wherein the communications function relates to the first communication type when the first user interface is enabled and relates to the second communication type when the second user interface is enabled.

20

Thus, the functionality of a user-operable control can be changed according to whether the first or second user interface is enabled. The communications function may include one or more of the following examples: initiating a communication; transmitting a communication; receiving a communication; displaying a received communication (such as a message or an image); editing a communication (such as a message); selecting an item from a menu; selecting an entry from a list of contacts; diverting a communication to another communication device or an answering service; adjusting the volume level of,

25

30

or muting, a speaker or a loudspeaker; adjusting the sensitivity of, or muting, a microphone.

The communications function may be performed by the user interface manager, or the
5 communications function may be performed by another component of the handset.

Preferably the user interface manager is adapted to enable the transmission of a signal to an output transducer, wherein the signal relates to the first communication type when the first user interface is enabled and relates to the second communication type when the
10 second user interface is enabled.

The output transducer may be an audio transducer or a visual transducer. In an example in which the output transducer is an audio transducer, such as a microphone, the signal may represent an audible signal, such as a voice: when the first user interface is enabled,
15 the audible signal that will be reproduced by the output transducer will relate to the first communication type (such as, for example, a received PTT message); when the second user interface is enabled, the audible signal will relate to the second communication type (such as, for example, a cellular telephone call).

20 Preferably the user interface manager is adapted to enable the acceptance of a signal from an input transducer, wherein the signal relates to the first communication type when the first user interface is enabled and relates to the second communication type when the second user interface is enabled.

25 The input transducer may be an audio transducer or a visual transducer. In an example in which the input transducer is an audio transducer, such as a microphone, the signal may represent an audible signal, such as a voice: when the first user interface is enabled, the audible signal that will be accepted by the transducer will relate to the first communication type (such as, for example, an outgoing PTT message); when the second

user interface is enabled, the audible signal will relate to the second communication type (such as, for example, a cellular telephone call).

A further aspect of the invention provides a method of controlling a user interface of a communication device handset enabled to effect first and second types of communication, the handset having first and second user interfaces associated with the first and second types of communication respectively, the method comprising the step of enabling the first user interface in accordance with the value of a status variable.

10 Preferably the method further comprises the step of disabling the second user interface.

Preferably the second user interface is disabled in accordance with the value of the status variable and/or when the first user interface is enabled.

15 Preferably the method further comprises the steps of receiving a signal from a user-operable control and enabling the performance of a communications function, wherein the communications function relates to the first communication type when the first user interface is enabled and relates to the second communication type when the second user interface is enabled.

20

Preferably the method further comprises the step of transmitting a signal to an output transducer.

25 Preferably the signal transmitted to the output transducer relates to the first communication type when the first user interface is enabled and relates to the second communication type when the second user interface is enabled.

Preferably the method further comprises the step of receiving a signal from an input transducer.

30

Preferably the signal received from the input transducer relates to the first communication type when the first user interface is enabled and relates to the second communication type when the second user interface is enabled.

- 5 A further aspect of the invention provides a computer program product adapted to perform a method as herein described.

A further aspect of the invention provides a computer program product (for example a computer program) for controlling a user interface of a communication device handset
10 enabled to effect first and second types of communication, the handset having first and second user interfaces associated with the first and second types of communication respectively, wherein the computer program product comprises means (such as code) for enabling the first user interface in accordance with the value of a status variable.

- 15 The invention also provides a computer program and a computer program product for carrying out any of the methods described herein and/or for embodying any of the apparatus features described herein, and a computer readable medium having stored thereon a program for carrying out any of the methods described herein and/or for embodying any of the apparatus features described herein.

20

The invention also provides a signal embodying a computer program for carrying out any of the methods described herein and/or for embodying any of the apparatus features described herein, a method of transmitting such a signal, and a computer product having an operating system which supports a computer program for carrying out any of the
25 methods described herein and/or for embodying any of the apparatus features described herein.

The invention extends to methods and/or apparatus substantially as herein described with reference to the accompanying drawings.

30

A further aspect of the invention provides a communication device handset substantially as herein described and illustrated with reference to the accompanying drawings.

5 A further aspect of the invention provides push-to-talk communication device handset substantially as herein described and illustrated with reference to the accompanying drawings.

10 A further aspect of the invention provides a method of operating a push-to-talk communication device handset substantially as herein described and illustrated with reference to the accompanying drawings.

A further aspect of the invention provides a user interface manager substantially as herein described and illustrated with reference to the accompanying drawings.

15 A further aspect of the invention provides any feature or component being substantially as herein described with reference to and/or as illustrated in any of the accompanying drawings.

20 Any feature in one aspect of the invention may be applied to other aspects of the invention, in any appropriate combination. In particular, method aspects may be applied to apparatus aspects, and vice versa.

25 Furthermore, features implemented in hardware may generally be implemented in software, and vice versa. Any reference to software and hardware features herein should be construed accordingly.

An embodiment of the present invention will now be described by way of example with reference to the accompanying drawings in which:-

30 Figure 1 is a schematic front view of a radio telephone;

Figure 2 is a schematic rear view of the radio telephone of Figure 1;

Figure 3 is a schematic perspective view of the radio telephone of Figure 1 from the rear
5 and left side;

Figure 4A is a schematic front view of a handset;

Figure 4B is a schematic rear view of the handset of Figure 4A;

10

Figure 5 is a schematic diagram of a radio telephone microphone arrangement; and

Figure 6 is a schematic diagram of a user interface manager for a handset.

15 As shown in the drawings, a radio telephone handset 1 has a front side shown in Figure 1, a rear side shown in Figure 2; opposed left and right sides 5, 6; and opposed top and bottom sides 7, 8.

The handset shown in Figure 1 carries functional elements associated with a
20 conventional digital or cellular radio telephone. These include a display 10, speaker 12, and keypad 13. The handset also includes a dummy microphone 11. The actual input to the microphone is via an opening in the bottom side 8 of the handset 1.

The handset also provides access to functional elements associated with a Push-To-Talk
25 telephone, including a second speaker in the form of a loudspeaker 21, group selector means in the form of a group select wheel 22 and push-to-talk button 23. The speaker output grill is on the rear side of the handset 1, the group select wheel 22 is on the left side 5, and the push-to-talk button 23 is on the right side 6.

The body of the handset is formed by a housing made of various parts which form a closed shell, for example, front part 9 and rear part 13. The rear part 13 is formed with a seat with a front wall 40, upper wall 41, lower wall 42, right wall 43, and open left and rear sides. The group select wheel 22 is partially recessed into the seat, with the left side
5 of the group select wheel 22 protruding slightly from the open left side of the seat. The rear face 24 of the group select wheel is fully recessed below the level of the rear face of the housing, but can be accessed through the open rear side of the seat. Thus the group select wheel 22 is easily accessible from the left side of the handset 1 and the rear face of the handset 1 which enables the group select wheel 22 to be operated as a rotary switch.

10 From Figure 2, it can be seen that the group select wheel 22 has been located in a readily accessible position on the side of the handset. In an alternative embodiment (not shown), the group select wheel 22 may be located more centrally, as long as the wheel remains at least adjacent to one side of the rear face of the handset 1.

15 The right side 6 of the handset has a projection formed by an upper ramp portion 30 and a lower ramp portion 31. The upper ramp portion 30 has a recess (not labelled) through which the PTT button 23 protrudes slightly. The ramp portions 30,31 follow the profiled shape of the sides of the handset 1 and provide a profile which sits comfortably against
20 the fingers of a right handed user, or the thumb of a left handed user, when the handset 1 is held face up.

The handset 1 is also provided with a group select button 54, provided below the PTT button 23, and a speaker on/off switch 50 which selectively switches audio output from
25 the speaker 12 to the loudspeaker 21.

In use, when the handset 1 is carried in the right hand of a user with the rear side engaging the palm, the index finger of the right hand rests over the PTT button 23 and the thumb of the right hand rests over the group select wheel 22. Thus the PTT button 23
30 and group select wheel 22 can be actuated by the index finger and thumb respectively of

the same hand that is carrying the phone. Also, the PTT button 23 and group select wheel 22 are easily accessible from the left and right sides of the phone respectively. This enables the PTT button 23 and group select wheel 22 to be operated easily whilst the handset 1 is held with speaker 12 near the ear of the user.

5

Similarly, when the handset 1 is carried in the left hand of a user with the rear side engaging the palm, the thumb of the left hand rests over the PTT button 23 and the index finger of the left hand rests over the group select wheel 22. Thus the PTT button 23 and group select wheel 22 can be actuated by the thumb and index fingers respectively of the same hand that is carrying the phone. Also, the PTT button 23 and group select wheel 22 can be operated easily whilst the handset 1 is held with speaker 12 near to the ear of the user.

10

The group select wheel 22 is used to select a group of devices that the user wishes to talk to. The user can switch between groups by rotating the wheel. Thus for example the user can talk/listen to a first group of devices with the wheel in a first rotary position, and to a second group of devices with the wheel in a second rotary position.

15

Pushing the PTT button 23 establishes a voice connection with other devices in the currently selected group.

20

In another example, the group select wheel 22 does not actually positively switch between different groups, and the PTT button 23 is used to positively switch to a particular group presently indicated by the group select wheel 22. In this case, the available groups may be indicated on the display 10 as the user scrolls the group select wheel 22.

25

In another example, a particular group may be positively selected using the group select button 54, which is conveniently located below the PTT button 23. Thus, a user can scroll between different groups using the group select wheel 22 and then select a group

30

using the group select button 54, by pressing the group select button 54. A PTT connection is then established using the PTT button 23.

The user may receive PTT voice messages through the speaker 12, with the handset positioned adjacent the user's ear. Alternatively, the user can switch to the loudspeaker 21 using the speaker on/off switch 50. Thus, the handset 1 can be used while away from the ear of the user.

In another example, any or all of the functional elements associated with PTT communications that are located on or adjacent the left and right sides 5,6 of the handset 1 can be operable when the handset is operating as a conventional digital radio telephone. The functionality of these functional elements is typically selected such that it is appropriate to the current mode of operation of the handset 1. For example, when the handset is operating as a conventional digital radio telephone, the group select wheel 22 may be rotated to increase or decrease the volume of the speaker 12. In another example when the handset operates as a conventional digital radio telephone, the push-to-talk button 23 may be used to mute audio input to the microphone.

Similarly, functional elements associated with PTT communications that are located on the rear surface 62 of the handset 1 can be operable when the handset is operating as a conventional digital radio telephone. For example, the loudspeaker 21 may be used to effect "hands free" operation of the handset 1, such that the user can conduct a conventional digital radio telephone call without holding the handset.

Further aspects of an example of a user interface for a communication device handset enabled to effect two types of communication will now be described with reference to Figures 4A and 4B, which respectively show front and rear views of a handset. In the example shown in Figures 4A and 4B, the telephone handset 100 is enabled to effect both conventional digital cellular telephone communications and Push to Talk (PTT) communications. The handset 100 has a front surface 102, a rear surface 104, a bottom

surface 107, a left surface 108 and a right surface 106. The handset 100 comprises functional elements including a display 110, a keypad 111, a speaker 112, a microphone 113, a push-to-talk/mute button 114, a group select/volume wheel 115, and a loudspeaker 116. In this example, the speaker 112 is an earpiece, and the microphone 113 includes an
5 aperture in the bottom surface 107 of the handset 100, which is in communication with an internal transducer. Furthermore, the push-to-talk/mute button 114 is located prominently on the left side surface 108 of the handset 100 and the group select/volume wheel 115 is located prominently adjacent the opposite side surface 106.

10 As shown in Figure 6 a user interface manager 200, which is implemented in software running on the handset 100 monitors a communication mode 202 status variable and determines, based on the status of the communications mode 202 status variable, whether the PTT communications user interface 204 should be enabled or the conventional cellular communications user interface 206 should be enabled. Thus, based on certain
15 predetermined events or operating conditions, the user interface manager 200 will either enable a conventional cellular telephone user interface 206 or a PTT communications user interface 204.

The user interface manager 200 provides the appropriate user interface by altering the
20 functionality of particular functional elements of the handset 100.

Thus, when the user interface manager 200 enables the handset 100 to provide conventional cellular communications a conventional cellular user interface 206 is provided which comprises the functional elements illustrated by the reference numerals
25 110 to 116. In this case, the push-to-talk/mute button 114, functions as a mute button and the group select/volume wheel 115 functions as a volume control.

Similarly, when the user interface manager 200 enables the handset 100 to provide PTT communications a PTT communications user interface 204 is provided which comprises
30 the functional elements illustrated by the reference numerals 113 to 116. In this case, the

push-to-talk/mute button 114, functions as PTT button and the group select/volume wheel 115 functions as a group selector switch.

Thus, the set of functional elements that is required by the user interface for cellular
5 telephone communications also comprises all of the functional elements that are required to provide a fully-functional user interface for PTT communications. The user interface for PTT communications does not require any dedicated functional elements, and all functional elements used to provide the PTT user interface also provide functionality associated with the cellular user interface.

10

Furthermore, some of the functional elements, such as the push-to-talk/mute button 114, and the group select/volume wheel 115, which are used to provide both PTT and cellular functionality are located on the handset 100 such that they may be easily manipulated by the user, for example, single handed and/or without having to look at the handset 100.

15

Thus, a user can readily operate the handset in a PTT mode of communications by navigating the tactile push-to-talk button 114, and the group select wheel 115, which are located on the handset 100 in tactilely distinctive positions. The user can also readily increase or decrease the volume using volume control 115, and mute the audio input to the microphone using the mute button 114 when operating in conventional cellular
20 communications mode. In a particular example, the group select/volume wheel 115 can also be used to scroll through and highlight items of a menu and a switch on the handset (such as the those illustrated by the reference numerals 54 or 23 in Figure 1) can be used to select the highlighted menu item.

25

In the example of a handset shown in Figures 4A and 4B, the set of functional elements 110-113 that is most commonly used for cellular telephone communications is located on the front and bottom surfaces 102, 107 of the handset 100, and the set of functional elements 113-116 that constitute the user interface for PTT communications is located on the side, rear and bottom surfaces 106, 108, 104, 107 of the handset 100. Thus, in use, a
30 user may hold the handset such that the front surface 102 faces towards him during

cellular telephone communications, and can optionally reverse the handset such that the rear surface 104 faces towards him during PTT communications.

The user interface manager 200 enables either the conventional cellular telephone user interface or the PTT user interface depending on particular operating circumstances, reflected by the communications mode status 202. For example, the user may manually enable either cellular or PTT communications, in which case the user interface manager 200 enables the appropriate user interface. Alternatively, certain events might automatically change the communications mode 202 status and thereby cause the user interface manager 200 to automatically enable an appropriate user interface. For example, when an element of the keypad 111 is depressed the communications mode 202 status may change from PTT to cellular and the user interface manager 200 will then enable the cellular communications user interface. Likewise, when the PTT button 114 or group select wheel 115 is actuated after a predetermined period of inactivity the communications mode 202 status may change and the user interface manager 200 will then enable the PTT user interface. The communications mode 202 status may also be altered in response to an incoming cellular or PTT call, in which case the user interface manager 200 selects the user interface required to answer and handle the incoming call or message.

20

As shown in Figure 5, in one example, the handset 1 includes a microphone assembly 76 comprising an aperture 72 in the bottom surface 8 of the handset and a transducer 70. The location of the dummy microphone 11 is also indicated. The transducer 70 converts sound waves to an electrical signal and comprises, for example, a moving coil, a capacitive element or a piezoelectric element. The transducer 70 is typically located inside the closed shell formed by the front part 9 and rear part 13 of the handset 1. Sound waves generated outside the handset are conveyed from the aperture 72 to the transducer 70 via a tube 72. In another example (not shown), sound waves are conveyed from the aperture 72 to the transducer 70 via a hollow cavity.

30

The transducer 70 is located towards the bottom side of the phone in a position that is substantially equidistant from the front surface 60 and rear surface 62 of the handset. This location of the aperture is suited to use of the handset 1 in both conventional radio telephone mode (when the front surface 60 of the handset is more proximal to the user's face than the rear surface 62) and push-to-talk mode (when the user may optionally hold the handset in a reverse orientation, such that rear surface 62 of the handset is more proximal to the user's face than the front surface 60).

Alternatively, an aperture may be provided in the front surface 60 of the handset 1 (such as the dummy microphone 11) and/or in the rear surface 62 of the handset. In an example, an aperture is provided in each of the front and rear surfaces 60, 62 of the handset 1 in order to facilitate the conveyance of sound to the transducer when the phone is operated in either of these two operating modes.

It will be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.

Each feature disclosed in the description, and (where appropriate) the claims and drawings may be provided independently or in any appropriate combination.

Reference numerals appearing in the claims are by way of illustration only and shall have no limiting effect on the scope of the claims.

CLAIMS

1. A push-to-talk communication device handset having front and rear faces, a keypad being located on the front face, and side surfaces between the front and rear
5 faces, a push-to-talk switch being located on or adjacent one of the side surfaces, and group selector means being located on or adjacent another of the side surfaces, each of said switch and said selector means being operable using a respective digit of a hand holding the handset.
- 10 2. A handset according to claim 1, wherein the keypad includes a numeric keypad.
3. A handset according to claim 1 or claim 2, wherein the front face further comprises a display screen.
- 15 4. A handset according to any of the preceding claims, wherein the group selector means is mounted on the rear face adjacent to the side surface opposite said one of the side surfaces.
5. A handset according to any of the preceding claims, wherein the group selector
20 means protrudes at least partially beyond said another of said side surfaces.
6. A handset according to any of the preceding claims, comprising an opening on the rear face of the handset, wherein the group selector means is mounted in the opening.
- 25 7. A handset according to claim 6, wherein the opening is a seat having a first opening on the rear face of the handset, and a second opening on said another of said side surfaces.
8. A handset according to any of the preceding claims, wherein the group selector
30 means is a rotary switch.

9. A handset according to any of the preceding claims, wherein the push-to-talk switch is located on said one of the side surfaces.
- 5 10. A handset according to any of the preceding claims, wherein the push-to-talk switch is located on a side surface opposite to the side surface on which, or adjacent to which, the group selector means is located.
11. A handset according to any of the preceding claims, wherein the handset includes
10 ergonomically profiled side surfaces.
12. A handset according to any of the preceding claims, wherein the push-to-talk switch follows the profile of said one of said side surfaces.
- 15 13. A push-to-talk communication device handset comprising first and second sides, the first side being broader than the second side; a push-to-talk switch; and group selector means mounted on or adjacent to the relatively narrow second side of the handset.
- 20 14. A handset according to claim 13, wherein the first and second sides are adjacent sides.
15. A push-to-talk communication device handset comprising front and rear faces, a microphone, a push-to-talk speaker located on the front face of the handset, and a group
25 selector means located on or adjacent to the rear face of the handset.
16. A handset according to any of the preceding claims wherein the handset is further adapted to effect a second type of communication.

17. A communication device handset adapted to effect push-to-talk communications and a second type of communication, the handset having front and rear faces, a display and/or keypad located on one of said faces, and side surfaces between the front and rear faces, a push-to-talk switch being located on or adjacent one of the side surfaces, and
5 group selector means being located on or adjacent another of the side surfaces, each of said switch and said selector means being operable using a respective digit of a hand holding the handset.

18. A handset according to claim 16 or claim 17, wherein the second type of
10 communication is voice-based.

19. A handset according to any of claims 16 to 18, wherein the second type of communication is telephony.

15 20. A handset according to any of the preceding claims, wherein the handset comprises a cellular telephone.

21. A method of operating a push-to-talk communication device handset having front and rear faces, a keypad located on the front face, and side surfaces between the front
20 and rear faces, a push-to-talk switch being located on or adjacent one of the side surfaces, and group selector means being located on or adjacent another of the side surfaces, the method comprising holding the handset in one hand; and operating each of said switch and said selector means using a respective digit of the hand which is holding the handset.

25

22. A method according to claim 21, wherein the keypad is operated by the hand that is not holding the handset.

23. A method according to claim 21 or claim 22, wherein a display screen on the front face of the device is viewed while the push-to-talk switch, group selector means and/or keypad is operated.

5 24. A method according to any of claims 21 to 23, wherein the group selector means is operated while the handset is being held in the palm of the hand.

25. A method according to any of claims 21 to 24, wherein the group selector means is operated by one of a finger and a thumb of the hand which is carrying the handset.

10

26. A method according to claim 25, the group selector means comprising a switch, wherein the group selector means is operated by a scrolling action of said one of a finger and a thumb against the switch.

15 27. A method according to any of claims 21 to 26, wherein the push-to-talk switch is operated while the handset is being held in the palm of the hand.

28. A method according to any of claims 25 to 27, wherein the push-to-talk switch is operated with the other one of a finger and a thumb of the hand which is carrying the
20 handset.

29. A method according to any of claims 21 to 28, wherein the push-to-talk switch is operated with a thumb or an index finger of the hand which is carrying the handset.

25 30. A method of operating a push-to-talk communication device having front and rear faces, a microphone, a push-to-talk speaker located on the front face of the handset, and group selector means located on or adjacent to the rear face of the handset, the method comprising operating the group selector means while the handset is being held adjacent to the head.

30

31. A communication device handset enabled to effect cellular telephone communications and PTT communications, the handset comprising a set of functional elements operable as at least part of a user interface for cellular telephone communications, wherein the set of functional elements is also operable as a full user
5 interface for PTT communications.

32. A handset according to claim 31, wherein the user interface for cellular telephone communications comprises a functional element located on a first surface of the handset, and the user interface for PTT communications comprises a functional element located
10 on or adjacent a second surface of the handset.

33. A handset according to claim 32, wherein the user interface for PTT communications comprises a functional element located on a third surface of the handset.

15 34. A handset according to claim 33, wherein the second surface is disposed between the first and third surfaces.

35. A handset according to claim 32 or 33, wherein the first and second surfaces define opposite sides of the handset.

20

36. A communication device handset enabled to effect cellular telephone communications and PTT communications, the handset having a first surface at the front of the handset and a second surface at the rear of the handset, the handset comprising a set of functional elements operable as at least part of a user interface for cellular
25 telephone communications, the set of functional elements also being operable as a full user interface for PTT communications, wherein the set of functional elements comprises a functional element for PTT communications located on the second surface.

37. A handset according to claim 36, the handset further comprising a third surface
30 located between the first and second surfaces, wherein the set of functional elements

further comprises a functional element for PTT communications located on or adjacent the third surface.

38. A handset according to any of claims 31 to 37, the set of functional elements comprising a speaker, a loudspeaker and a microphone comprising an aperture in communication with a transducer, wherein the relative positions of the speaker, loudspeaker and microphone aperture are such that the speaker and loudspeaker are located nearer to each other on the handset than to the microphone aperture.

39. A handset according to any of claims 31 to 38, the set of functional elements comprising a speaker located near a first end of the handset, and a microphone comprising an aperture in communication with a transducer, the aperture located near a second end of the handset, wherein the set of functional elements further comprises a loudspeaker located near the first end of the handset.

40. A handset according to any of claims 32 to 39, the set of functional elements comprising a speaker and a loudspeaker, wherein the speaker is located on the first surface of the device and the loudspeaker is located on the second surface of the device.

41. A handset according to any of claims 32 to 40, the set of functional elements comprising a microphone, the microphone comprising an aperture in communication with a transducer, wherein the aperture is located between the first and second surfaces.

42. A handset according to any of claims 32 to 41, the set of functional elements comprising a speaker located on the first surface of the handset, a loudspeaker located on the second surface of the handset, and a microphone, wherein the microphone comprises a transducer located substantially equidistant from the first and second surfaces.

43. A handset according to any of claims 31 to 42, wherein at least part of the user interface for PTT communications is located in a tactilely distinctive position.

44. A communication device handset enabled to effect first and second types of voice-based communication, the first and second types of communication being enabled by different network infrastructures, and the handset comprising a set of functional elements operable as at least part of a user interface for the first type of communication, wherein the set of functional elements is also operable as a full user interface for the second type of communication.

45. A handset according to claim 44, wherein the user interface for the first type of communication comprises a functional element located on a first surface of the handset, and the user interface for second type of communication comprises a functional element located on or adjacent a second surface of the handset.

46. A handset according to claim 45, wherein the user interface for the second type of communication comprises a functional element located on a third surface of the handset.

47. A handset according to claim 46, wherein the second surface is disposed between the first and third surfaces.

48. A handset according to claim 45 or claim 46, wherein the first and second surfaces define opposite sides of the handset.

49. A handset according to any of claims 44 to 48, the set of functional elements comprising a speaker, a loudspeaker and a microphone comprising an aperture in communication with a transducer, wherein the relative positions of the speaker, loudspeaker and microphone aperture are such that the speaker and loudspeaker are located nearer to each other on the handset than to the microphone aperture.

50. A handset according to any of claims 44 to 49, the set of functional elements comprising a speaker located near a first end of the handset, and a microphone

comprising an aperture in communication with a transducer, the aperture located near a second end of the handset, wherein the set of functional elements further comprises a loudspeaker located near the first end of the handset.

5 51. A handset according to claim 49 or claim 50, wherein the speaker is located on a first surface of the device and the loudspeaker is located on a second surface of the device.

52. A handset according to claim 51, wherein the first and second surfaces define
10 opposite sides of the handset.

53. A handset according to claim 51 or claim 52, wherein the aperture is located between the first and second surfaces.

15 54. A communication device handset enabled to effect first and second types of voice-based communication, the handset comprising a speaker, a loudspeaker and a microphone, for use with both first and second types of communication, the microphone comprising an aperture in communication with a transducer, wherein the relative positions of the speaker, loudspeaker and microphone aperture are such that the speaker
20 and loudspeaker are located nearer to each other on the handset than to the microphone aperture.

55. A communication device handset enabled to effect first and second types of voice-based communication, the handset comprising a speaker located near a first end of
25 the handset, and a microphone for use with both first and second types of communication, the microphone comprising an aperture in communication with a transducer, the aperture located near a second end of the handset, wherein the handset further comprises a loudspeaker located near the first end of the handset.

56. A handset according to claim 54 or claim 55, wherein the speaker is located on a first surface of the device and the loudspeaker is located on a second surface of the device.

5 57. A handset according to claim 56, wherein the first and second surfaces define opposite sides of the handset.

58. A handset according to any of claims 54 to 57, wherein the aperture is located between the first and second surfaces.

10

59. A handset according to any of claims 54 to 58, wherein the transducer is located substantially equidistant from the first and second surfaces.

60. A communication device handset, the handset comprising a microphone, a
15 speaker located on a first surface of the handset, and a loudspeaker located on a second surface of the handset, wherein the microphone comprises a transducer located substantially equidistant from the first and second surfaces.

61. A handset according to claim 60, wherein the first and second surfaces define
20 opposite sides of the handset.

62. A handset according to claim 60 or 61, the speaker and loudspeaker being located near a first end of the handset, and the microphone comprising an aperture in communication with the transducer, wherein the aperture is located near the second end
25 of the handset.

63. A handset according to any of claims 60 to 62, the handset being enabled to effect first and second types of voice-based communication, wherein the microphone is operable for use with both first and second types of communication.

30

64. A handset according to any of claims 44 to 59 or claim 63, wherein one of the first or second types of communication is cellular telephony.

65. A handset according to any of claims 44 to 59, claim 63 or claim 64, wherein one
5 of the first or second types of communication is PTT.

66. A user interface manager for enabling a first and/or second user interface of a handset according to any of claims 31 to 65.

10 67. A user interface manager for a communication device handset enabled to effect first and second types of communication, the handset having first and second user interfaces associated with the first and second types of communication respectively, wherein the user interface manager is adapted to enable the first user interface in accordance with the value of a status variable.

15

68. A user interface manager according to claim 66 or 67, the user interface manager being adapted to receive a signal from a user-operable control and to enable the performance of a communications function, wherein the communications function relates to the first communication type when the first user interface is enabled and relates to the
20 second communication type when the second user interface is enabled.

69. A user interface manager according to any of claims 66 to 68, the user interface manager being adapted to enable the transmission of a signal to an output transducer, wherein the signal relates to the first communication type when the first user interface is
25 enabled and relates to the second communication type when the second user interface is enabled.

70. A user interface manager according to any of claims 66 to 69, the user interface manager being adapted to enable the acceptance of a signal from an input transducer,
30 wherein the signal relates to the first communication type when the first user interface is

enabled and relates to the second communication type when the second user interface is enabled.

71. A method of controlling a user interface of a communication device handset enabled to effect first and second types of communication, the handset having first and second user interfaces associated with the first and second types of communication respectively, the method comprising the step of enabling the first user interface in accordance with the value of a status variable.

72. A method according to claim 71, the method further comprising the step of disabling the second user interface.

73. A method according to claim 71 or claim 72, the method further comprising the steps of receiving a signal from a user-operable control and enabling the performance of a communications function, wherein the communications function relates to the first communication type when the first user interface is enabled and relates to the second communication type when the second user interface is enabled.

74. A method according to any of claims 71 to 73, the method further comprising the step of transmitting a signal to an output transducer.

75. A method according to any of claims 71 to 74, the method further comprising the step of receiving a signal from an input transducer.

76. A computer program product adapted to perform a method according to any of claims 71 to 75.

77. A computer program product for controlling a user interface of a communication device handset enabled to effect first and second types of communication, the handset having first and second user interfaces associated with the first and second types of

communication respectively, wherein the computer program product comprises means for enabling the first user interface in accordance with the value of a status variable.

78. A computer readable medium having stored thereon a computer program product
5 according to claim 76 or claim 77.

79. A signal tangibly embodying a computer program product according to claim 76 or claim 77.

10 80. A method of transmitting a signal according to claim 79.

81. A communication device handset substantially as herein described and illustrated with reference to the accompanying drawings.

15 82. A push-to-talk communication device handset substantially as herein described and illustrated with reference to the accompanying drawings.

83. A method of operating a push-to-talk communication device handset substantially as herein described and illustrated with reference to the accompanying drawings.

20

84. A user interface manager substantially as herein described and illustrated with reference to the accompanying drawings.

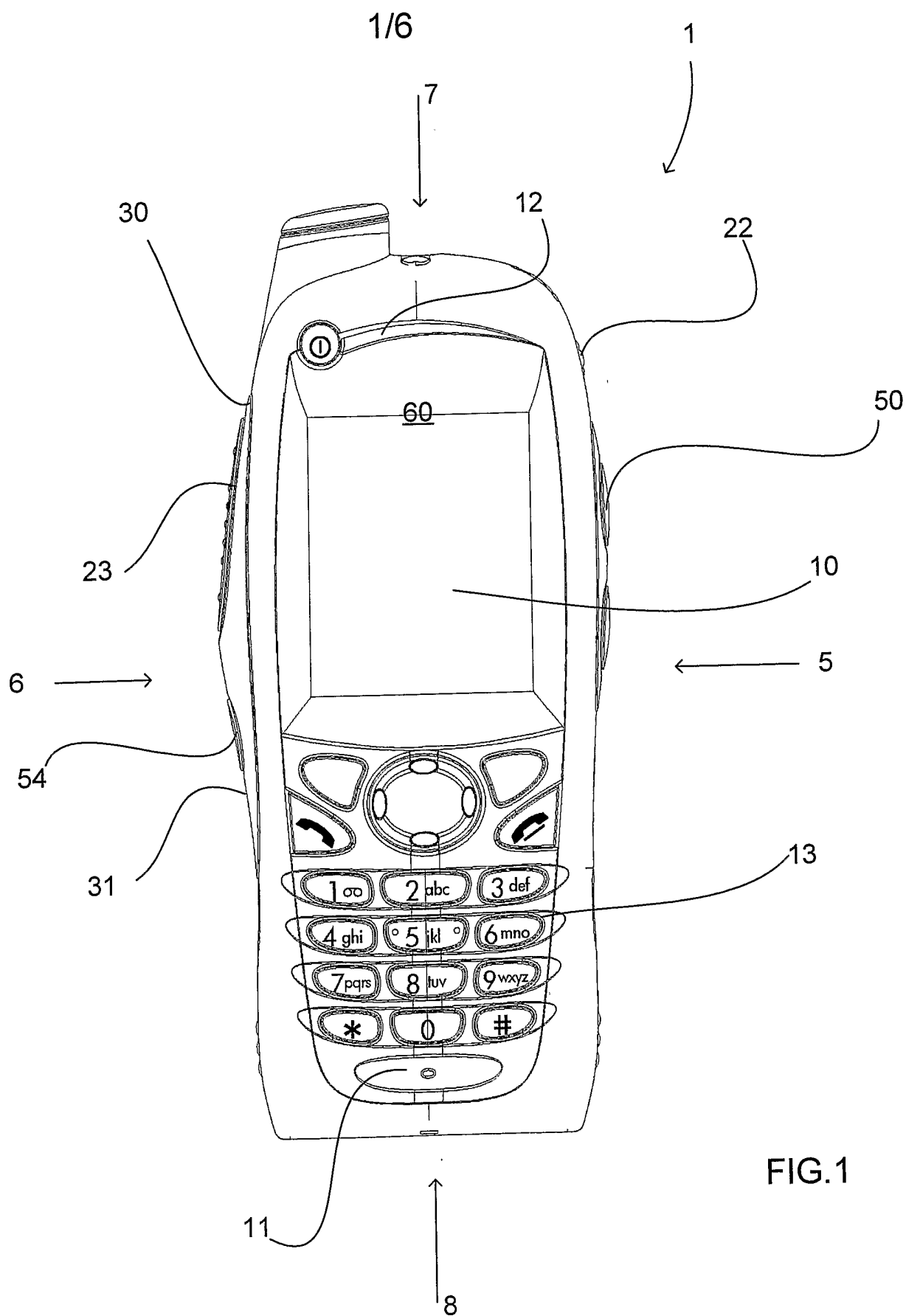
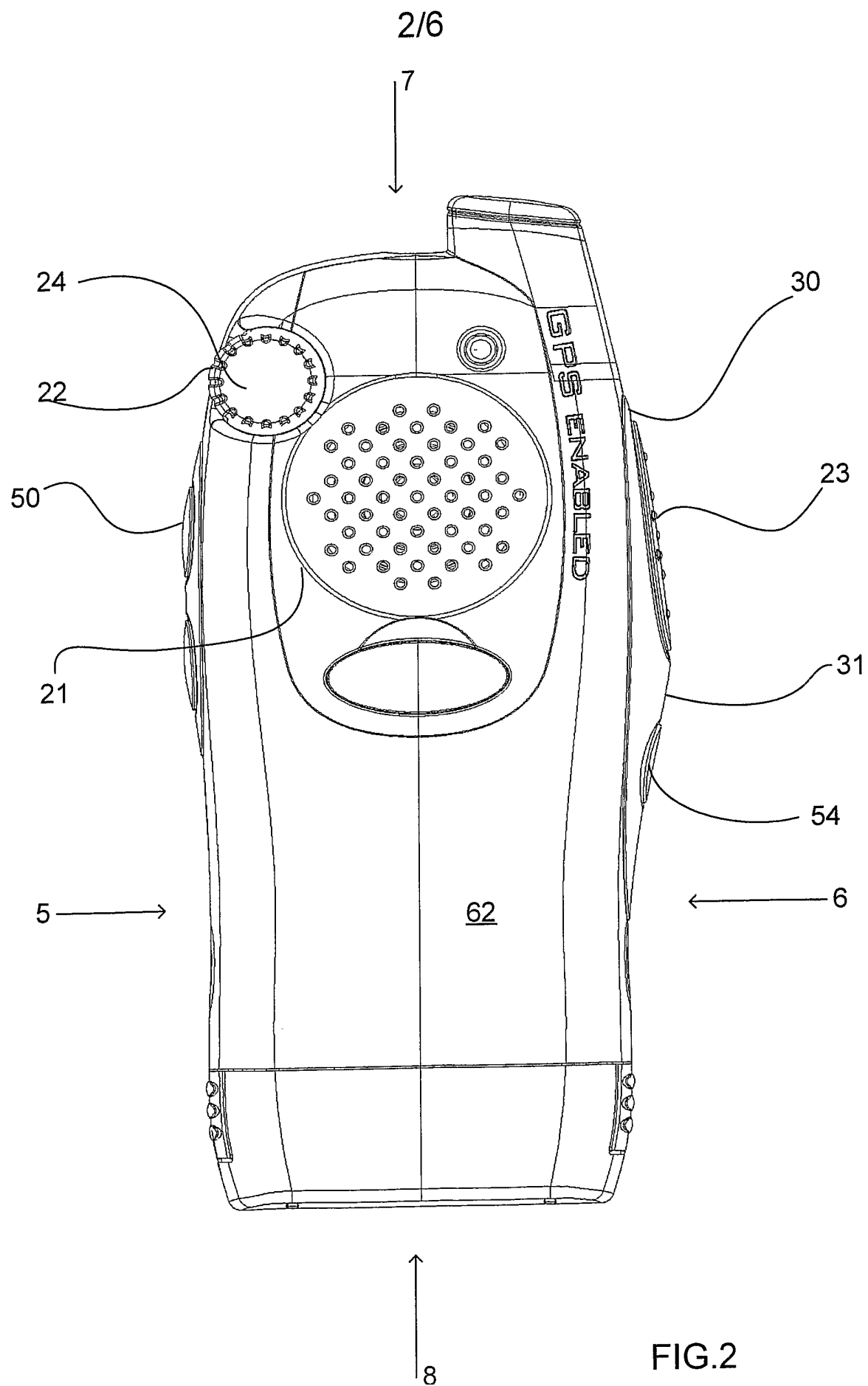


FIG.1



3/6

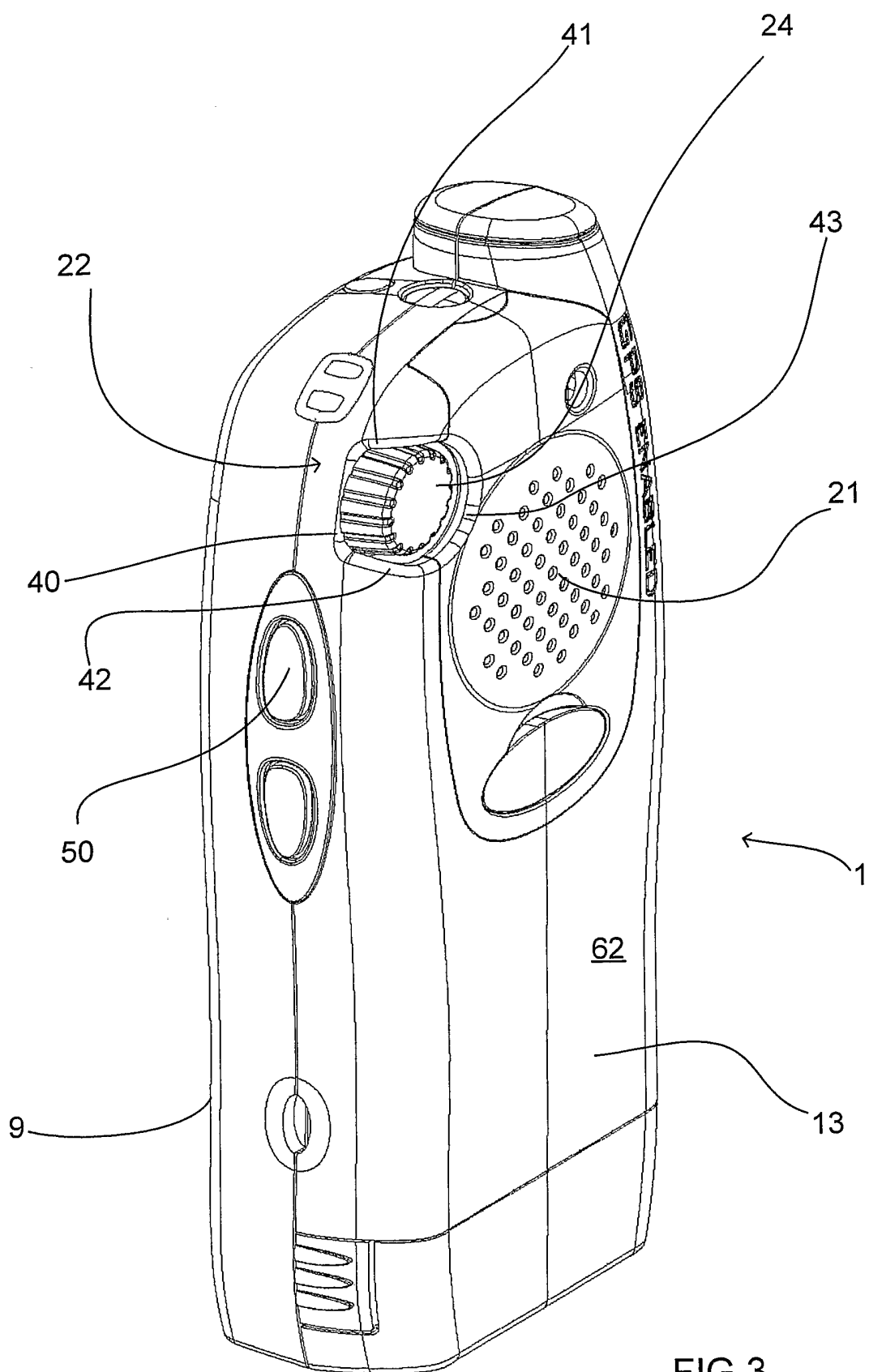
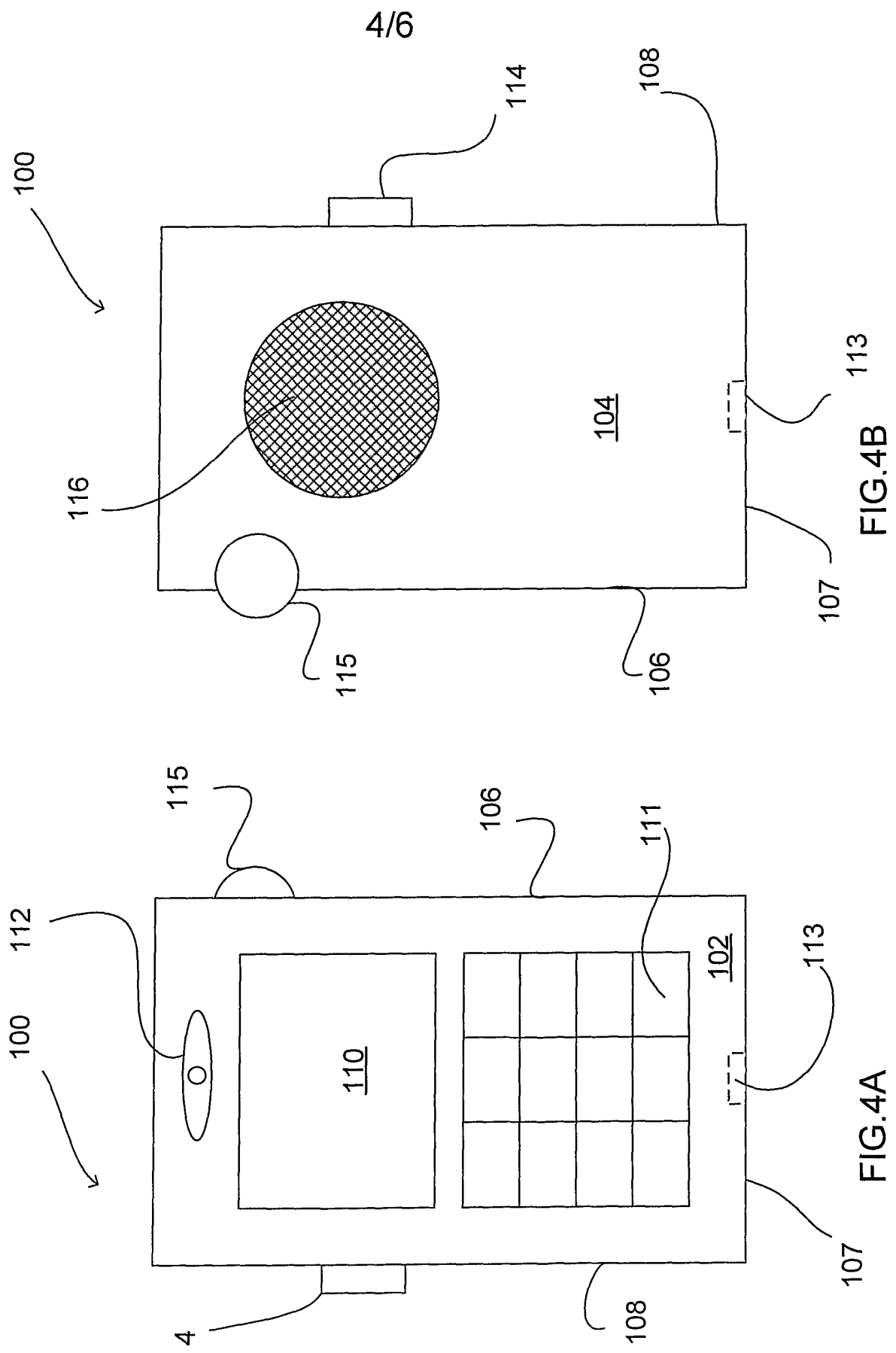
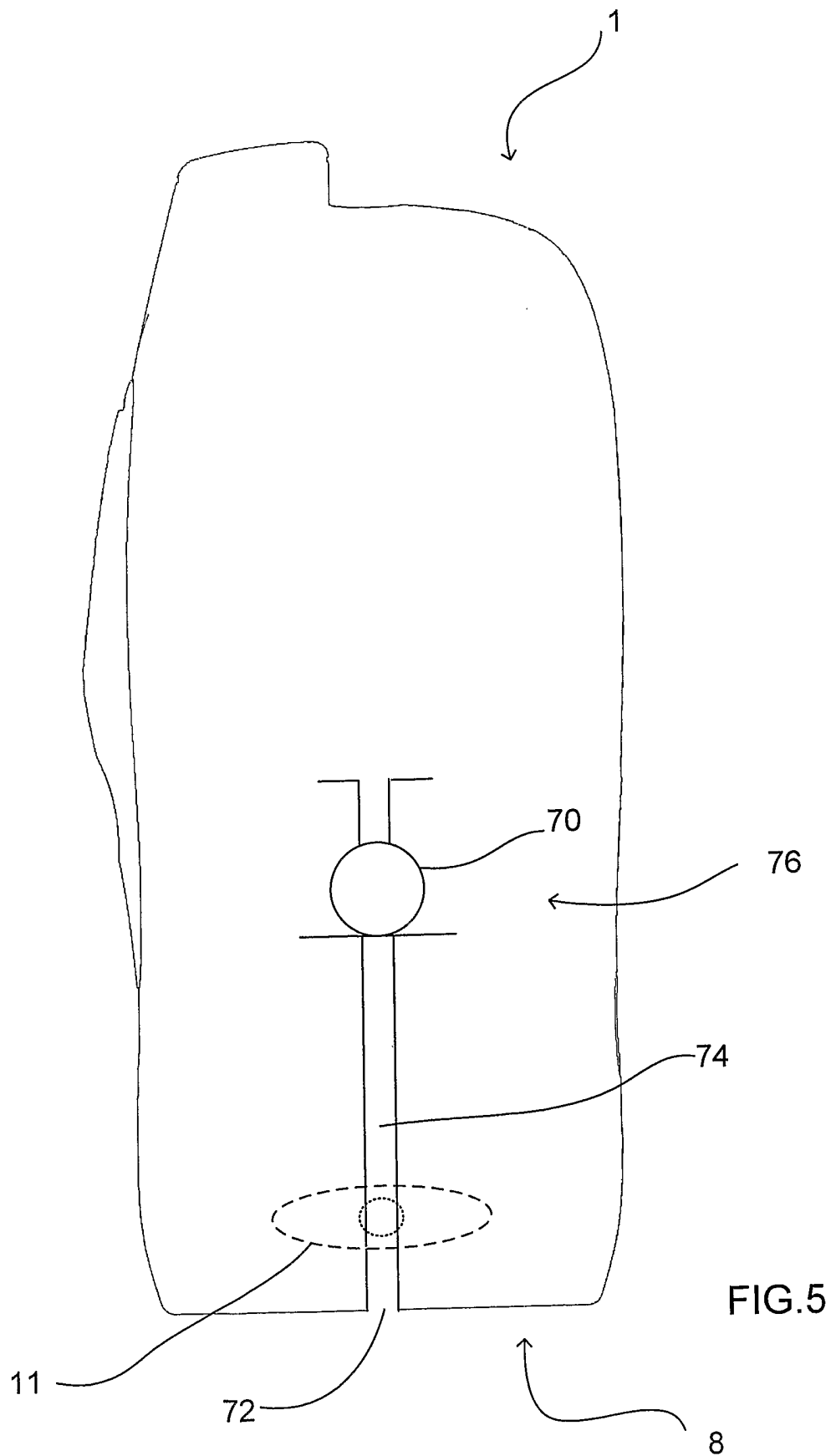


FIG.3



5/6



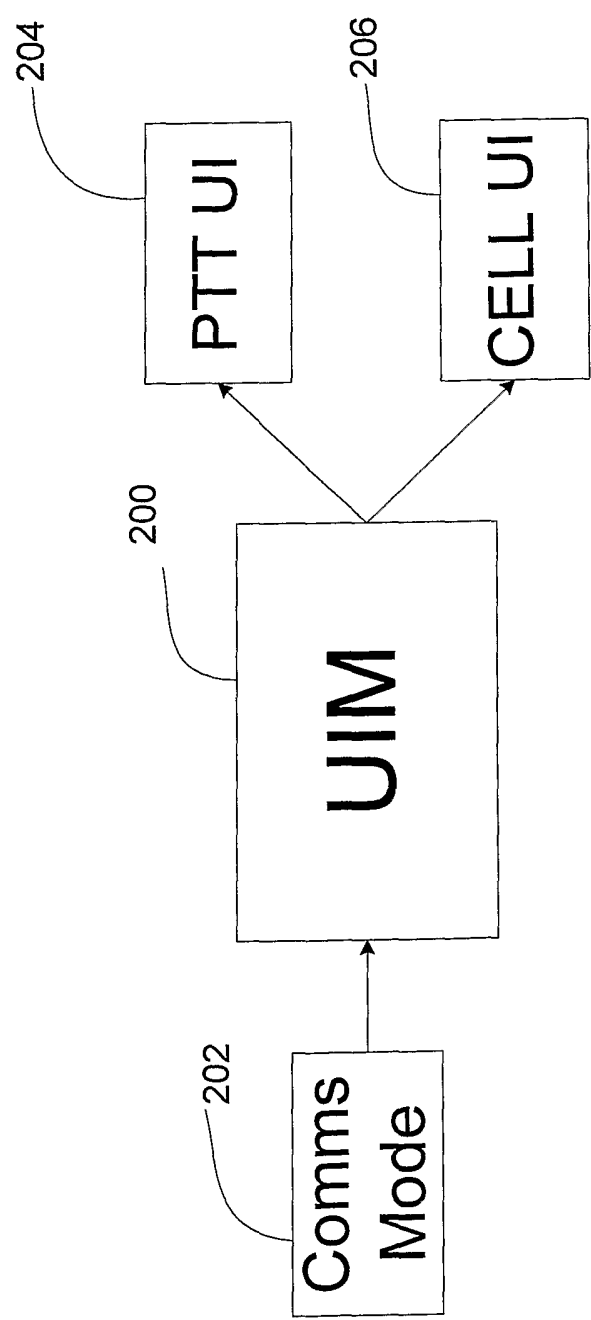


FIG.6