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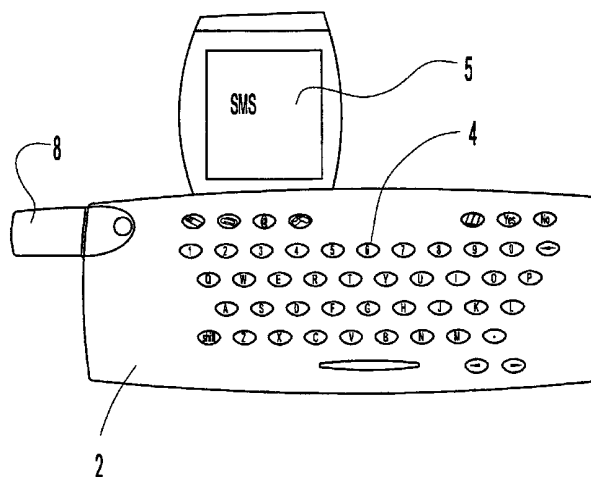
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A PORTABLE COMMUNICATION DEVICE



(57) Abstract: A portable communication device (1) has a casing (2) with two keypads (3, 4) and a common display (5). The display (5) is pivotally attached to the casing (2) and can be folded between at least a first position, in which the display (5) is located on the same side of the casing (2) as the first keypad (3), and a second position, in which the display (5) is projecting from one edge of the casing (2), thereby making the whole display (5) visible from the same side of the casing (2) as the second keypad (4). The display, in the first position (5), is located in a cavity at the front side of the casing (2), thereby creating an even exterior to the front side of the casing (2). The device (1) has means comprising a controller for presenting the information on the display (5) in alignment with the orientation of the buttons of the keypad (3, 4) currently in use during normal operation of the communication device (1).



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Telefonaktiebolaget L M Ericsson
A PORTABLE COMMUNICATION DEVICE

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Field of the Invention

The present invention relates to a portable communication device having a casing provided with first and second keypads arranged on opposite sides of the casing, and a common display for operating the device. The two separate keypads functions as both a telephone and a QWERTY-terminal for sending and receiving sound and alphanumeric and/or graphical information.

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Description of the Prior Art

In a communication device, such as a mobile telephone or a mobile station, the common way of writing and sending messages is to use the keypad of the telephone for inputting information. This is unpractical due to few and small buttons of the keypad. By using an additional so-called QWERTY-keypad can an expanded communication function easier to use be achieved. The most common kind of device comprises two halves of about the same size pivotally attached together by a hinge, each half having a separate display and in which the halves can be unfolded, whereby the QWERTY-board together with a bigger display compared to the display at the other half are revealed and ready for use. Such a device is disclosed in EP-A1-776 140.

Another solution disclosed in EP-A2-472 361 is to join two parts, a portable PC and a mobile telephone, pivotally together as one device with a common display, whereby the PC and the telephone, each having a separate keypad, are placed in one half of the device and the display is placed in the other slightly bigger half of the device. The half with the PC, telephone and adherent keypads covers a part of the display arranged in the other

half when the device is in the folded position, and the part of the display that is not covered is visible to the user when the telephone keypad is being used, i.e. the whole display can not be seen. When the device is unfolded it can
5 be used as a PC and receive and send information.

The main problem with the first state-of-the-art solution is that a device having two main parts pivotally joined together is big, unpractical, heavy and requires two displays, thereby affording a lot of space and efforts for
10 the user when it is used or transported. The main problem with the second state-of-the-art solution is that the user has to use both hands when opening and closing the device and that the user can not see the whole display when the telephone is being used.

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Summary of the Invention

The object of the present invention is to remedy the disadvantages of the prior art solutions described above.

This object is achieved for a portable communication
20 device having a casing and comprising a first and a second keypad arranged on opposite sides of the casing, and a common display, which is pivotally connected to the casing and can be folded in or up between at least a first position and a second position, whereby the whole display
25 is visible from the keypad currently in use, and that the display in the first position is located in a cavity at the front of the casing, thereby creating an even exterior to the front of the casing. Additionally, the display is connected to a controller, operationally connected to the
30 device, comprising separate or existing processing means such as a CPU, control circuits, indicator and memory means, and is used with these together with suitable software during normal operation of the communication device, as is readily realized by a man skilled in the art.

By providing the portable communication device with the two keypads and the common display according to the invention, the following advantages are obtained: the size and weight of the device are reduced due to a smaller display located in a cavity in a first position, thereby requiring less space when put into a pocket or the like.

Other objects, features and advantages of the present invention are disclosed in the subsequent detailed disclosure, and in the drawings as well as in the appended claims.

Brief Description of the Drawings

The present invention will now be described in further detail, reference being made to the accompanying drawings, in which:

FIG 1 is a front view of a communication device with a pivotable display in a first closed position according to a preferred embodiment of the invention;

FIG 2 is a side view showing the communication device with the pivotable display, which is folded up and is shown in a position before it is visible from the back side of the communication device;

FIG 3 is a side view showing the communication device with the pivotable display in the first position; and

FIG 4 is a view of the back side of the communication device with the QWERTY-keypad and the display in their second fully opened position for usage.

Detailed Description of the Invention

FIGS 1-4 illustrate a preferred embodiment for operating and simplifying the handling and transportation of a communication device 1. Preferably, the communication device 1 is a radio telephone, such as a mobile or cellular telephone. The device 1 comprises a casing 2 provided with first and second keypads 3,4 arranged on opposite sides of

the casing 2, and a common display 5 accessible to a user, a loud speaker 6 and a microphone 7. The display 5 is pivotally connected to the casing 2 so that it can be folded between at least a first position, in which the display 5 is located on the same side of the casing 2 as the first keypad 3, and a second position, in which the display 5 is projecting from one edge of the casing 2, thereby making the whole display 5 visible from the same side of the casing 2 as the second keypad 4. The display 5 can be swivelled from the first position, in which the device 1 functions as a telephone together with keypad 3, to the second position, in which the device 1 functions as a QWERTY-terminal together with keypad 4. The device 1 has means for presenting the information on the display 5 in a first orientation, when the display 5 is in its first position, and in a second orientation, when the display 5 is in its second position, i.e. the information is presented in alignment with the orientation of the buttons of the keypad (3,4) that is being used. The means for displaying the information comprises a controller, operationally connected to the device 1, with separate or existing processing means (such as a central processor unit (CPU), a digital signal processor (DSP) or a programmable logic array (PLA)) together with a memory (such as an electrically erasable programmable read-only memory (EEPROM), a flash memory or similar means) and indicator means (such as a magnetic or mechanical switch or similar means) and a set of program instructions stored in the memory and executable by the controller. Alternatively, the controller could be realized solely in hardware, for instance as an application-specific integrated circuit (ASIC), discrete components or other components fulfilling the demands. The indicator means checks if the display 5 is located in its first position or in its second position

and sends the indication in electric form to the controller that executes suitable measures thereto.

In FIG 1 and 3, when the display 5 is located in its first position and placed in a cavity below the surface of the casing 2, preferably flush with the surface, thereby
5 providing an even exterior to the casing 2.

FIG 2 shows the display 5 not completely folded up in a position before its second position, where it can be seen from keypad 4 at the back side of the device 1. The user
10 has retracted the display 5 from the first position seen in FIG 1 and the display has rotated around the axis of motion arranged at one end of the display 5 and the casing 2, respectively. The information presented on the display 5 is shown with the same orientation as in FIG 1.

15 In FIG 4 keypad 4, at the back side of the device 1, and display 5 are shown in the second position. The information presented on the display 5 is oriented perpendicular compared to the orientation in the first position in FIG 1.

20 Modifications regarding the pivotable attachment of the display 5 are possible, for example, other locations of the attachment, thereby requiring different orientation of the presented information on the display 5, can give the same advantage as described above, e g the attachment could
25 be placed at another side of the display 5 and the casing 2, respectively. The keypads 3,4 could be realized, e g as touch sensitive surfaces giving the same functions, the device 1 could also have voice recognition means that provides the same functions as the keypads or similar
30 means.

CLAIMS

1. A portable communication device (1) having a casing (2) provided with first and second keypads (3,4) arranged on opposite sides of the casing (2), and a common display (5) for operating the device (1),

c h a r a c t e r i z e d

in that the display (5) is pivotally connected to the casing (2) in a way that the display (5) can be folded between at least a first position , in which the display (5) is located on the same side of the casing (2) as the first keypad (3), and a second position, in which the display (5) is projecting from one edge of the casing (2), thereby making the whole display (5) visible from the same side of the casing (2) as the second keypad (4).

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2. A portable communication device (1) according to claim 1, c h a r a c t e r i z e d in that the display (5) in the first position is located in a cavity at the front side of the casing (2), thereby creating an even exterior to the front side of the casing (2).

20

3. A portable communication device (1) according to claim 1 or 2, c h a r a c t e r i z e d in that the device (1) comprises means for displaying information on the display (5) in a first orientation, when the display (5) is in its first position, and in a second orientation, when the display (5) is in its second position, i e the information is presented in alignment with the orientation of the buttons of the keypad (3,4) currently in use.

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4. A portable communication device (1) according to claim 3, wherein the means for displaying information comprises a controller, operationally connected to the device (1), having separate or existing processing means; together with a memory; and indicator means; and a set of

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program instructions stored in the memory and executable by the controller.

- 5 5. A portable communication device (1) according to any of the preceding claims, wherein the portable communication device (1) is a radio telephone, preferably a mobile or cellular telephone comprising a loudspeaker (6), a microphone (7), and an antenna (8).

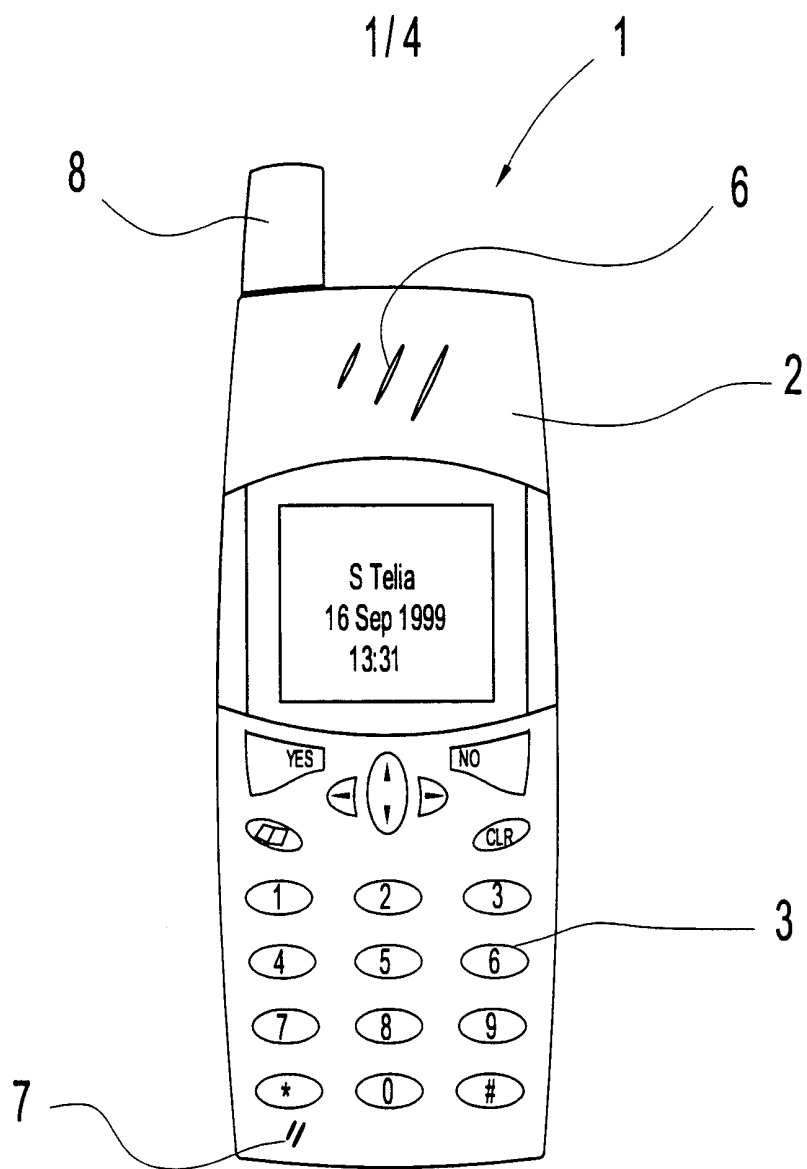


Fig. 1

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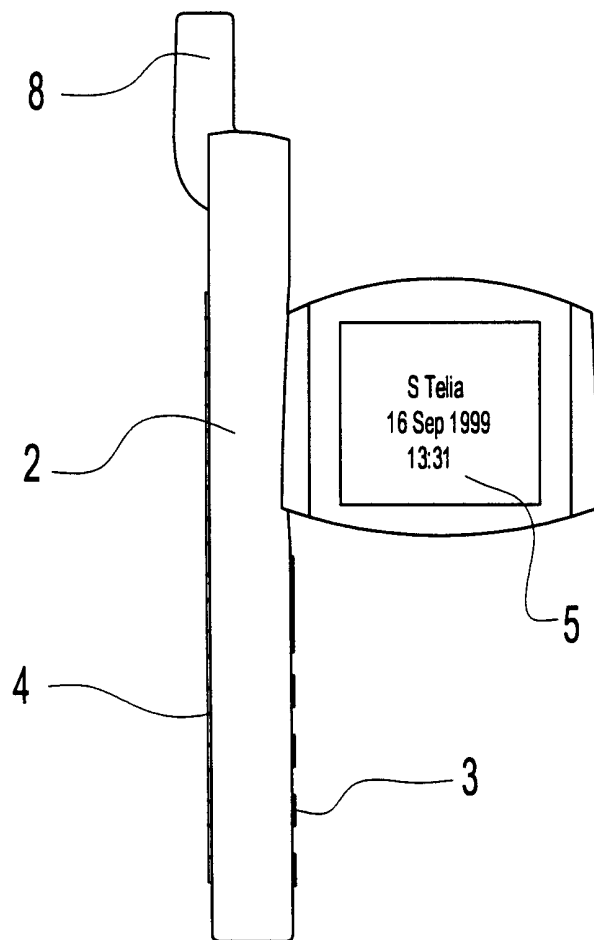


Fig. 2

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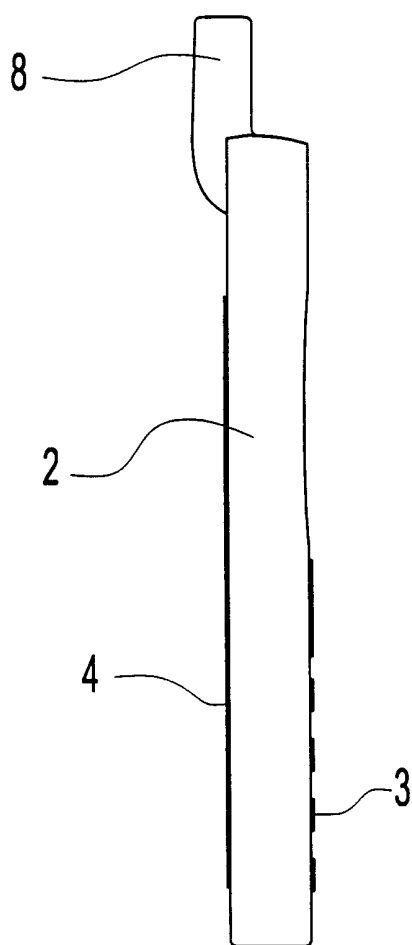


Fig. 3

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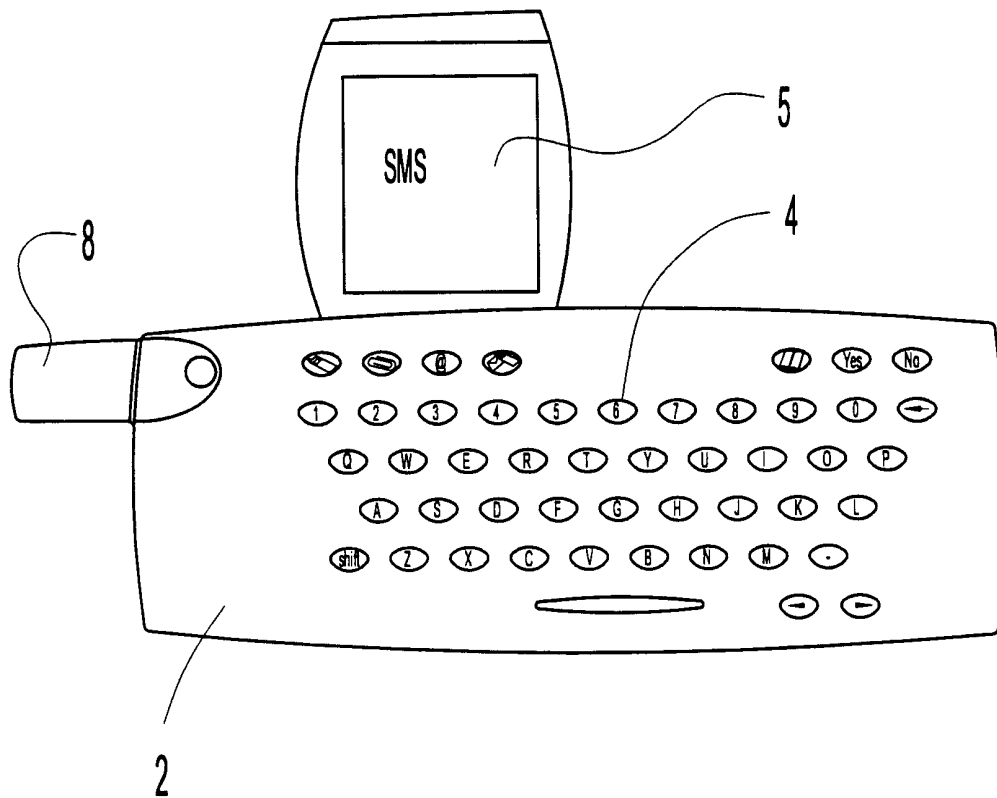


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 00/01746

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04B 1/02

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04B, H04M, H04Q

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

SE,DK,FI,NO classes as above

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0933908 A2 (NOKIA MOBILE PHONES LTD.), 4 August 1999 (04.08.99), column 3, line 40 - column 6, line 37, figures 1-5	1,3-5
Y	--	2
X	US 5337346 A (T.UCHIKURA), 9 August 1994 (09.08.94), column 2, line 59 - column 4, line 7, figures 1-3	1,5
Y	US 5898774 A (K.SHINDO), 27 April 1999 (27.04.99), column 6, line 43 - column 8, line 17, figures 10-13	2
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☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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"P" document published prior to the international filing date but later than the priority date claimed

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INTERNATIONAL SEARCH REPORT

Information on patent family members

02/11/00

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Patent document cited in search report				Publication date		Patent family member(s)		Publication date	
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US	5898774	A	27/04/99	CN	1140270	A		15/01/97	
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				US	5661641	A		26/08/97	
				US	5818701	A		06/10/98	
