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PORTABLE TELEPHONE APPARATUS INCLUDING ELECTRONIC NOTEBOOK FUNCTION

5 The present invention generally relates to a portable telephone apparatus. More specifically, the present invention is directed to a portable telephone set including an electronic notebook function capable of registering a plurality of telephone directory data. So-called "telephone directory data is constructed of one set of name data and telephone number data.

10 Various types of portable telephone sets or apparatuses have been widely marketed due to convenient functions thereof, for instance, everywhere and every time a telephone conversation is available. However, it is practically difficult for every one to correctly remember a large number of telephone numbers of friends, business partners, and community members etc. In a specific case, even if surnames or titles of firms are clearly memorized, last names or names of departments could not be correctly found out. To avoid such a problem, other types of portable telephone sets are very recently commercially available, in which a plurality of so-termed "telephone directory data" arranged by a pair of name data and telephone number data can be registered. In this typical conventional portable telephone set, 10 numeral keys of dialing are utilized as keys for entering character data required to register these names and titles.

25 However, even when an alphabetic character is employed which needs smaller character number than other characters, there are approximately 40 sorts of key input data, namely 30 10 sorts of numeral data, 26 sorts of character data, and several sorts of symbol data. As a consequence, the respective numeral keys used to the dialing function must have 4 or more sorts of key functions. For instance, the numeral key "1" owns 4 different key functions to enter 35 numeral data "1", character data "A", "B" and "C". On the other hand, the above-described conventional portable

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telephone set is equipped with the data input mode switch for selecting the numeral data input mode and the character data input mode. When, for example, the character data "C" is inputted, even if the character data input mode has been selected by operating the data input mode switch, the key for shifting the input digit must be manipulated after the numeral key "1" has been operated three time. In other words, the conventional portable telephone sets have such a drawback that the key operation must be performed at least four times, depending upon sorts of characters, namely a very cumbersome data input operation is necessarily required.

The present invention has been made in an attempt to solve the above-described drawback, and therefore, has an object to provide a portable telephone apparatus including an electronic notebook function, capable of simply dialing and also of simply performing data input operation such as telephone directory data entry operation.

Another object of the present invention is to provide a portable telephone apparatus including an electronic notebook, capable of automatically selecting a telephone mode and an electronic notebook mode. In the telephone mode, a dialing operation is available, whereas in the electronic notebook mode, a data input operation is available.

A further object of the present invention is to provide a portable telephone apparatus including an electronic notebook function, capable of searching data about the electronic notebook in a telephone mode.

To achieve the above-described objects and other features, a portable telephone apparatus equipped with an electronic notebook function, is characterized in that

a plurality of telephone keys (3) are provided on an outer surface of an openable/closable member (2) mounted on a case body (1) in openable/closable states, and a plurality of electronic notebook keys (4:5) are provided on a rear surface of a the openable/closable n\member (2) and



also a region of front surface of the case body (1), which is covered by the openable/closable member (2).

For a better understanding of the present invention, reference is made of the following descriptions in conjunction with the accompanying drawings:

Fig. 1 is a plan view of an outer view of a portable telephone apparatus according to a first preferred embodiment of the present invention;

Fig. 2 is a sectional view of the portable telephone apparatus, taken along a line X-X of Fig.1;

Fig. 3 is a front view of the portable telephone apparatus under condition that an openable/closable member is opened;

Fig. 4 is a schematic block diagram for representing an electronic circuit employed in the portable telephone apparatus;

Fig. 5 schematically shows a memory map of a RAM 31 shown in Fig. 4;

Fig. 6 represents a construction of a display area of a display unit 10;

Fig. 7 represents an example of the representation of the display unit 10;

Fig. 8 indicates another example of the representation of the display unit 10;

Fig. 9 is a flow chart for explaining an operation of the portable telephone apparatus in response to key operations;

Fig. 10 represents a key function;

Fig. 11 shows another example of the representation of the display unit 10; and

Fig. 12 is a front view of a portable telephone apparatus capable of equipping with an IC card.

CONSTRUCTION OF FIRST PORTABLE TELEPHONE APPARATUS

Fig. 1 is a front view for indicating an outer view of a portable telephone apparatus according to a first preferred embodiment of the present invention. Fig. 2 is a sectional view of the first portable telephone apparatus,



taken along a line X-X of Fig. 1. Fig. 3 is a front view of the first portable telephone apparatus having a member under open condition.

In these drawings, reference numeral 1 indicates a case body for storing a large number of electronic components which constitute an electronic circuit (will be described later), and reference numeral 2 shows an openable/closable member hinged to the case body 1 at a right edge portion of an upper surface of this case body 1. On an upper surface of this operable/closable member 2, there are provided a telephone keyboard 3 equipped with an ON/OFF key for turning ON/OFF a telephone function, 10 numeral entry keys for a dialing purpose, a # key, and a transmission key (S key) manipulated when a telephone call is made, and also when a telephone call is accepted. As shown in Fig. 1, in this first preferred embodiment, keys 3a, 3b and 3c used to search data about an electronic notebook (will be discussed later) are furthermore provided on this telephone keyboard 3. The first key 3a ("F" key) is to select a sort of electronic notebook data, the second key 3b ("▲" key) is to sequentially select the respective data included in the selected data, and the third key 3c ("▼" key) is to successively select the respective data included in the selected data in a direction opposite to that of the above-described "▲" key. A keyboard 4 for the electronic notebook is provided at a lower surface of the openable/closable member 2.

As illustrated in Figs. 2 and 3, the keyboard for the electronic notebook is also provided on the surface of the case body 1 covered with the openable/closable member 2. Then, a large number of keys required to control the function of the electronic notebook and also to enter data, are provided on the keyboard 4 of the electronic notebook and a keyboard 5 of the electronic notebook mounted on the case body 1 in a separate form. These keys are various control keys, numeral entry keys, character keys and symbol keys. The keyboard 4 is provided on the openable/closable



member 2. A depression button type switch 6 is provided on the case body 1 adjacent the keyboard 5 for the electronic notebook, which is turned ON/OFF when the openable/closable member 2 is opened/closed. This switch 6 is to detect to opening/closing states of the openable/closable member 2. In the first preferred embodiment, in response to the state detection signal of this switch 6, both of the mode selection control for selecting the telephone function mode and the electronic notebook function mode, and the power supply control for supplying power to the radio communication circuit unit 21 are carried out. More specifically, when the switch 6 is turned ON, namely when the openable/closable member 2 is closed, the telephone function mode is selected so that the display mode is set to the display mode for the telephone and the power is supplied to the radio communication circuit unit 21. Conversely, when the switch 6 is turned OFF, namely when the openable/closable member 2 is opened, the electronic notebook mode is set. Thus, the display mode is set to the display mode for the electronic notebook and the power supply to the radio communication circuit unit 21 is interrupted.

Then, electronic components except for the above-described keyboards 3, 4, 5 and switch 6 for constituting an electronic circuit are stored in the case body 1. That is, LSI (large-scale integration) 7, 8 and 9 for constructing the radio communication circuit unit, the data memory for the electronic notebook, and the control circuit, a display unit 10, a microphone 11, a speaker 12 and a circuit board 13 for electrically connecting these electronic components. Reference numeral 14 indicates an inner connector for electrically connecting the display unit 10 to a predetermined terminal on the circuit board 13. Although not shown in the drawings, an antenna for receiving a radio (wireless) signal, a sound producing element for a calling purpose, and a power source battery are provided in the case body 1. Then, a display window 15



for the display unit 10, a through hole 16 for the microphone 11 and a through hole 17 for the speaker 12 are formed in the upper surface of the case body 1.

CIRCUIT ARRANGEMENT OF FIRST PORTABLE TELEPHONE APPARATUS

5 In Fig. 4, there is shown a circuit block diagram of an electronic circuit of the first portable telephone apparatus.

 In this drawing, reference numeral 21 shows a radio communication circuit unit (radio telephone circuit unit).
10 This radio communication unit 21 is such a circuit for converting an acoustic (audio) signal inputted from the microphone 11 into a radio signal to transmit this radio signal from the antenna 22, and for converting another raid signal received by the antenna 22 into an acoustic signal
15 to supply the acoustic signal to the speaker 12. The type of this radio communication circuit arrangement is varied, depending upon the modulating system and the transmitting system. If the digital modulation system is employed and also the TDMA (Time Division Multiplex Access)-TDD (Time
20 Division Duplex) transmitting system is employed, this radio communication circuit unit 21 is so arranged, as shown in Fig. 4, by an A/D-D/A converting circuit unit 23, a speech coding unit 24, a burst mode controller 25 and a transmitter/receiver circuit unit 26. The A/D-D/A
25 converting circuit unit 23 converts the analog audio signal derived from the microphone 11 into the digital audio signal and supplies this digital audio signal to the speech coding unit 24. Furthermore, the digital audio signal from the speech coding unit 24 is converted into the analog
30 audio signal and the resultant analog audio signal is sent to the speaker 12 by this A/D-D/A converting circuit 23. The speech coding unit 24 compresses the data of the digital audio signal supplied from the A/D-D/A converting circuit unit 23 by the audio coding system with a higher
35 efficiency, and then supplies the compresses digital audio data to the burst mode controller 25. Also, this speech coding unit 24 expands the compressed digital audio data



derived from the burst mode controller 25 to the original data length thereof which will be sent to the A/D-D/A converting circuit 23. The burst mode controller 25 is such a circuit for performing a synchronization process and a frame process of the transmission/receiving signals based on the TDMA-TDD system. This burst mode controller 25 determines a transmission frame (time slot) when the radio communication is established between this first portable telephone apparatus and a radio station (not shown in detail), and also sends the data of the digital audio signal supplied from the speech coding unit 25 and control data (will be discussed later) supplied from a control unit 27 based on the determined transmission frame to the radio transmitter/receiver circuit unit 26. The burst mode controller 25 synchronizes the signal transmitted from the radio base station (not shown in detail), which is received in the burst mode by the transmitter/receiver circuit unit 26, decodes the received signal, and sends out a control signal portion contained in this received signal to the control unit 27, and also an audio signal portion contained in this received signal to the speech coding unit 25. The function of the transmitter/ receiver circuit unit 26 is to transmit/receive the radio signal digitally modulated between the radio station and the first radio telephone apparatus in accordance with the TDMA-TDD system (method). This transmitter/receiver circuit unit 26 is arranged by a transmitter circuit for transmitting the digital-modulated radio signal, a receiver circuit for receiving the digital-modulated radio signal so as to demodulate this digital-modulated radio signal, and a frequency synthesizer for changing the frequency of the radio signal when the communication is established between the radio station (not shown in detail) and this first radio telephone apparatus. These internal circuits of the radio communication circuit unit 21 are controlled by the above-described control unit 27.

In response to signals supplied from the



above-explained burst mode controller 25, and key input unit 28 containing the above-described three keyboard 3, 4, 5 and switch 6, the control unit 27 is to control the respective circuit units, as described above. This control unit 27 includes a microprocessor, a ROM (read-only memory) for previously storing a control program executed by this microprocessor, and a RAM (random access memory) for temporarily storing processed data and the like during the execution of the control program. It should be noted that the above-described ROM previously stores therein a call number specific to this first portable telephone apparatus (namely, ID code), pattern data such as characters and numerals displayed on the display unit 10, and data indicative of a mode name.

To this control unit 27, the respective circuits 23 to 26 for constituting the radio communication circuit unit 21 and the key input unit 28 are connected, and furthermore, an oscillating circuit unit 29 for outputting a reference clock signal, a sound producing unit 30, a RAM (random access memory) 31, a display drive unit 32 coupled to the above-described display unit 10, and a power supply circuit 33 for supply power to the radio communication circuit unit 21 are connected.

The sound producing unit 30 is such a circuit containing a compact speaker or a sound producing member : such as a piezoelectric vibrator. The control unit 27 compares the received call number supplied from the burst mode controller 25 of the radio communication circuit unit 21 with the self calling number stored in the ROM, and drives the sound producing unit 30 to produce the sound when a judgement is made that both of these numbers are coincident with each other.

MEMORY TABLE OF RAM 31

The RAM 31 is a memory for storing data about the electronic notebook. As represented in Fig. 5, the RAM 31 includes a telephone directory data storage unit TM having a plurality of storage areas; a schedule data storage unit



SM, and a memorandum data storage unit MM. Each of these storage areas of the telephone directory data storage unit TM is subdivided to a subarea for storing names and the like, and a subarea for storing telephone numbers, the name and telephone number data which have been entered by the electronic notebook keyboards 4 and 5, are subdivided and thereafter stored into the corresponding subareas.

Similarly, each of storage areas of the schedule data storage unit SM are subdivided into a subarea for storing a content of a schedule, a subarea for storing a starting date/time, and a subarea for storing an ending date/time. It should be noted that the storage area of the memorandum data storage unit MM is not subdivided, and therefore the data inputted from the electronic notebook keyboards 4 and 5 are stored into this storage area within one memory time. Then, the data stored in these memory units are displayed on the display unit 10 via the control unit 27 and the display drive unit 32 by operating the data searching keys (namely, the above-described keys 3a, 3b and 3c) provided on the telephone keyboard 3, and also the data searching key provided on either the electronic notebook keyboard 4 or 5.

The display unit 10 is constructed of, for instance, a matrix type liquid crystal display apparatus. The display area of this display unit 10 is subdivided into three areas 10a, 10b and 10c as represented in Fig. 6, for example. The area 10a corresponds to such an area for displaying the selected function name, mode name, and condition information, whereas the areas 10b and 10c correspond to areas for displaying the data inputted from the key input unit 28 and the data read out from the RAM 31. As represented in Fig. 7, the mode name "TEL" and a mark indicative of reception sensitivity are displayed in the area 10a. Then, the dialing data inputted by manipulating the numeral entry keys of the keyboard 3 are displayed on the area 10c. When the mode is selected to the telephone directory search mode in the electronic notebook mode, as



shown in Fig. 8, the mode name "TEL. No. SEARCH" is displayed on the area 10a, and also the name portion of the searched date and the telephone number portion thereof are displayed on the area 10b and 10c, respectively. In the electronic notebook mode, indications in the other modes, will be displayed in a similar manner as shown in Fig. 8.

The power source circuit 33 is to supply power from the power battery 34 to the respective circuit 23 to 26 of the radio communication circuit unit 21. In this power source circuit 33, a switching circuit employing a switching element, for instance, transistors and the like is provided. The control unit 27 turns ON/OFF the above switching circuit in response to the operation signals of the ON/OFF keys employed in the telephone keyboard 3 and the condition signal of the detection switch 6 provided on the case body 1, and also controls the power supply to the radio communication circuit unit 21. Concretely speaking, when the detection switch 6 is brought into the ON-state, namely when the openable/closable member 2 is closed, the switching circuit is turned ON/OFF every time the ON/OFF key is manipulated. To the contrary, when the detection switch 6 is brought into the OFF-state, namely when the openable/closable member 2 is opened, the switching circuit is turned OFF without any conditions. In other words, in accordance with the portable telephone apparatus of this preferred embodiment, when the openable/closable member 2 is closed, the power supply to the radio communication circuit unit 21 may be arbitrarily interrupted/commenced by operating the ON/OFF key, whereas when the openable/closable member 2 is opened, the power supply to the radio communication circuit unit 21 may be automatically interrupted. As a consequence, when the openable/closable member 2 is opened, namely when the electronic notebook mode is selected in this portable telephone apparatus, since no call is acceptable, an operator of this portable telephone apparatus, who is registering the data required for the electronic notebook, is not bothered by the



telephone calling.

It should be noted that power is supplied from a second power source circuit 35 to other circuit portions than the radio communication circuit unit 21.

5 OPERATION FLOW OF FIRST PORTABLE TELEPHONE APPARATUS

Referring now to Figs. 9 and 10, an operation of the first portable telephone apparatus with the above-described circuit arrangement will be explained. Fig. 9 is a flow chart for representing an operation flow of this portable
10 telephone apparatus with the above-explained key operations. Fig. 10 represents key functions of various keys employed on the telephone keyboard 3.

In Fig. 9, at a step S1, a judgement is made as to whether or not the key input signal is issued from the key
15 input unit 28. In other words, a check is done as to whether or not any key provided on the keyboards 3, 4 and 5 is operated at the first step S1. The process defined at this step S1 is repeatedly executed until the key operation is detected. When the key input signal is issued, the
20 process operation is advanced to a step S2 at which another check is done whether or not the detection switch 6 is brought into the ON-state. That is, it is judged whether or not the openable/closable member 2 is closed. As a result, if it is judged that the openable/closable member 2
25 is closed, since the operated key corresponds to the key of the telephone keyboard 3, a key process of the telephone mode, as defined after a step 4 is performed (will be described later). Conversely, when it is judged that the openable/closable member 2 is opened, since the operated
30 key corresponds to the key of either the electronic notebook keyboard 4 or 5, a key process of the telephone notebook mode at the step S3 is executed.

In accordance with the key process of the telephone mode, a check is done at a first step S4 as to whether or
35 not the above-described key input operation is performed by operating the key 3a employed in the telephone keyboard 3. If YES (namely, the key 3a is operated), then the process



operation is advanced to a step S5 at which the mode changing process is performed. This mode changing process is performed as shown in Fig. 10 as follows: When the key 3a is operated during the normal mode of the telephone function, the telephone directory data search mode is set so that first telephone directory data is displayed on the display unit 10; when the key 3a is operated during the telephone data searching mode, the schedule data search mode is set, whereby first schedule data is displayed on the display unit 10; and when the key 3a is operated during the schedule data search mode, the normal mode is set so that the reception standby condition is represented, namely the representation shown in Fig. 7 is returned. It should be noted that the data representation of the electronic notebook function searched in this telephone mode is different from the search data representation in the electronic notebook mode. For instance, when the searched data corresponds to the telephone directory data, the representation as shown in Fig. 8 is made in the electronic notebook mode, whereas another representation as indicated in Fig. 11 is made in the telephone mode. Then, when an S-key (will be described later) is operated under such a display condition as shown in Fig. 11, in a radio communication line setting process (will be explained later), the telephone number data being displayed is transmitted as dialing data via the burst mode controller 25 of the radio communication circuit unit 21 and the transmitter/receiver circuit unit 26 employed therein to the radio station (not shown in detail).

To the contrary, referring back to the flow chart shown in Fig. 9, when it is judged that the key 3a is not operated at the step S4, the process operation is advanced to a step S6 at which a judgement is made whether the above-described key input operation is carried out by operating the key 3b, or the key 3c. If YES (namely, key 3b or 3c is operated), then the process operation is advanced to a step S7 at which a search process is



executed. As shown in Fig. 10, this process is to successively display data while the mode is set to either a telephone directory data search mode, a schedule data search mode. If the mode is set to the normal mode, even when the key 3b and/or the key 3c is manipulated, no process is carried out, but the process operation is returned to the previous step S1.

When a judgement is made that the key 3b and 3c are not operated at the process of the step S6, the process operation is advanced to a further step S8. At this step S8, a check is done whether or not the key input is made by manipulating the ON/Off key. When the ON/OFF key is operated at the step S8, the process operation is advanced to a step S9 at which the switching state of the switch circuit in the power source circuit 33 is changed. That is, when the switch circuit is brought into the ON-state, this power supply circuit 33 is turned OFF, whereas when the switch circuit is brought into the OFF-state, the power supply circuit 33 is turned ON. As a result, the power supply to the radio communication circuit unit 21 is controlled and thus the telephone function is ON/OFF controlled.

If a judgement result at the step S8 is made that the ON/OFF key is not operated, the process operation is advanced to a next step S10. At this step S10, a check is done whether or not the key input operation is performed by manipulating the dialing key (numeral entry key and "#" key). If this key input operation is done by operating the dialing key, the process operation is advanced to a subsequent step S11 at which an input process for the dialing data is performed. As previously stated, the dialing data inputted by operating the numeral entry key is displayed on the area 10c of the display unit 10. Then, the "#" key is used to cancel the inputted dialing data. It should be noted that when this input process of the dialing data is carried out after the S-key has been operated (will be described later), the input dialing data and a cancel



signal produced in response to the operations of the "#" key are also transmitted via the burst mode controller 25 and the transmitter/receiver circuit 26 in the radio communication circuit unit 21 to the radio station. As represented in Fig. 10, this "#" key is used to not only cancel the dialing data, but also execute such a process that either the telephone directory data search mode, or the schedule data search mode is returned to the normal mode.

If another judgement result is made at the previous step S10 that the key input operation is not performed by manipulating the dialing key, namely if the key input operation is carried out by operating the S-key, the process operation is advanced to a further step S12 at which a process for setting a radio communication line between this first portable telephone apparatus and the radio station. As previously stated, the S-key is such a key manipulated when a call is accepted, and a call is transmitted. When this S-key is operated after a call is accepted, namely when the S-key is operated after an operator listens to the calling sound produced by driving the sound producing unit 30, under control of the control unit 27, the ID code of the radio station which has transmitted the call number, the self ID code and a response signal to the calling operation are sent out via the burst mode controller 25 and the transmitter/receiver circuit unit 26 employed in the radio communication circuit unit 21, so that a radio communication line is established between this radio station and the first portable telephone apparatus, and then the telephone communication mode is made. To the contrary, when this S-key is operated while no call is made, under control of the control unit 27, an ID code of a radio station where a radio communication is available, an own ID code and a call request signal are sent out via the burst mode controller 25 and the transmitter/receiver circuit unit 26 employed in the radio communication circuit unit 21 to this radio station in



order to establish a radio communication line between this radio station and the first portable telephone apparatus. It should be noted that when the S-key is operated while the dialing data is set, namely when the S-key is manipulated after either the dialing data has been set by operating the numeral entry key, or the data about the telephone at the process of the step S7 has been selected, the dialing data is transmitted to the radio station via a radio communication line which has been set subsequent to the establishment of this radio communication line.

ADVANTAGES OF FIRST PORTABLE TELEPHONE APPARATUS

In accordance with the above-described first preferred embodiment, since the keyboard to enter the data about the electronic notebook is provided at two different portions of the case body 1, namely the rear surface of the openable/closable member 2 on which upper surface, the telephone keyboard 3 is arranged, and also the region of the case body 1 covered by the openable/ closable member 2, a large quantity of keys are arranged. Furthermore, since a large number of key functions are no longer given to a single key, the simple key operation to enter the data about the electronic notebook can be achieved. Also the switch 6 is employed to detect the open/close state of the openable/closable member 2, so that the state signal of this switch 6 is produced. When a detection is made that the openable/closable member 2 is opened based upon this state signal, namely when the electronic notebook keyboards 4 and 5 are exposed, the power supply to the radio communication circuit unit 21 is interrupted and therefore the telephone function is turned OFF (i.e., not operable). As a result, while the first portable telephone apparatus is used as the electronic notebook, any operators never receiver a telephone call. Accordingly, the data entry process for the telephone notebook is not bothered by the telephone call.

Not only the telephone keys, but also the keys 3a, 3b, 3c for searching the data about the electronic notebook are



employed on the telephone keyboard 3 arranged on the upper surface of the openable/closable member 2. Since the telephone directory data and the schedule data can be displayed by manipulating these search keys, a telephone number and a name of a person who will be telephoned can be conformed before a telephone conversation is made. Furthermore, if he wants to have an appointment during the conversation, the operator of this portable telephone apparatus can immediately confirm own schedule. A telephone conversation may be, of course, made with employment of the telephone number of the searched telephone directory data.

MODIFICATIONS

In the above-described first preferred embodiment, the depression button type switch 6 is mounted on the case body 1 so as to detect the opening/closing state of the openable/closable member 2. Not only such a depression button type switch, but also a pressure sensitive type switch and a light sensitive type switch may be utilized as this detection switch. Also, there is no limitation to mount this detection switch. Thus, any mounting places of the main body 1 may be selected, depending upon the types of the detection switch. For instance, this detection switch may be provided on a supporting member for supporting a rotation of the openable/closable member 2, and on this openable/closable member 2.

In the first preferred embodiment, the first portable telephone apparatus is so arranged that when the detection is made in response to the state signal of the detection switch 6 that the openable/closable member 2 is opened, the power supply to the radio communication circuit unit is immediately turned ON/OFF. When a radio telephone system is constructed in such a manner that a telephone transfer service and a voice (audio) storage service are available at a network side, when a detection is established that the openable/closable member 2 is opened in response to the state signal from the detection switch 6, a predetermined



signal is transmitted to a radio station at a first stage. In other words, either a transfer demand signal for demanding that a present telephone call is transferred to another telephone set, or a voice storage service demanding signal for demanding that the present telephone call is connected to a voice storage service center, is sent out at a first stage, and thereafter the power supply to the radio communication circuit unit 21 is interrupted. It is, of course, possible to control the power supply to the radio communication circuit unit 21 by operating only the ON/OFF switch in a similar manner to that of the normal portable telephone apparatus. In this case, in response to the condition signal of the detection switch 6, the mode is selected from the telephone mode to the electronic notebook mode, and vice versa.

There are two sorts of electronic notebook data searchable in the telephone mode in the first preferred embodiment. Alternatively, only a single sort of telephone directory data may be employed. In the latter case, the key 3a for selecting the data sort is no longer required.

To emphasize the electronic notebook function and the telephone function, a unit member including an IC such as an IC card 18 may be mounted on a portable telephone apparatus as a portable telephone apparatus equipped with an IC card 18 according to a second preferred embodiment of the present invention, as shown in Fig. 12. In this second portable telephone apparatus of Fig. 12, voice (audio) information may be recorded on the IC card 18. As represented in Fig. 12, the case body 1 includes a hole 19 for storing the IC card 18. Although not shown in this drawing, two pairing connectors are mounted on the tip portion of the IC card 18 and the wall of the storing hole 19. One connector mounted on the wall of the storage hole 19 is electrically connected to the control unit 27 and the speech coding unit 24. A RAM built in this IC card 18 is electrically connected to the control unit 27 and the speech coding unit 24 when the IC card 18 is inserted into



the storing hole 19. As a result, when a recording switch
3d employed on the keyboard 3 is manipulated during a
telephone communication, a telephone conversation including
a voice of a telephone speaker and/or a voice of a
telephone listener can be recorded on the IC card 18. If
the power supply to the radio communication circuit unit 21
is controlled by manipulating only the ON/OFF switch, and
also an IC card having a ROM for previously storing an
answering message and/or a RAM for a recording purpose is
employed as the IC card 18, when the electronic notebook
mode is set by opening the openable/closable member 2, a
similar process operation to that of a telephone answering
machine may be carried out. That is, when a telephone call
is detected, the answering message stored in the ROM is
reproduced and then is sent to the radio station. At the
same time, or after the answering message has been
reproduced, a process for recording a voice of a telephone
listener is carried out in the RAM. This recording process
should be preferable performed without driving the sound
producing unit 30 when a telephone calling is detected in
order that the key input process in the electronic notebook
mode is smoothly performed.

It should also be noted that as an IC card having an
improved electronic notebook function, an IC employed in
this IC card is arranged by a ROM, and dictionary data are
stored in this ROM. In this case, the IC card having the
dictionary data is electrically connected to the control
unit 27 via the connector mounted on the wall of the
storing hole 19, so that the contents of the storage data
in the ROM are displayed on the display unit 10 under
control of the control unit 27.





Claims

1. A portable telephone apparatus equipped with an electronic notebook function, characterized in that:

5 a plurality of telephone keys (3) are provided on an outer surface of an openable/closable member (2) mounted on a case body (1) in openable/closable states, and a plurality of electronic notebook keys (4;5) are provided on a rear surface of the openable/closable member (2) and also a region of a front surface of the case body (1), which is covered by the openable/closable member (2).

10 2. A portable telephone apparatus as claimed in Claim 1, further comprising:

detecting means (6) for detecting an opening/closing state of said openable/closable member (2) to output a state detection signal; and

15 controlling means (27) for controlling a function of said portable telephone apparatus in response to the state detection signal.

20 3. A portable telephone apparatus as claimed in Claim 2, wherein said controlling means is a means for selectively controlling a telephone mode and an electronic notebook mode.

25 4. A portable telephone apparatus as claimed in Claim 2, wherein said controlling means is a means (27;33) for controlling a power supply to a radio communication circuit (21) capable of performing a telephone function.

5. A portable telephone apparatus as claimed in Claim 1, further comprising:

30 a radio communication circuit unit (21) capable of performing a telephone function;

signal transmitting means (27) for transmitting a predetermined information signal via said radio communication circuit unit (21) to a radio station;

35 power supplying means (33) for supplying power to said radio communication circuit unit (21);

detecting means (6) for detecting an opening/closing state of said openable/closable member (2) to output a





state detection signal; and

controlling means (27) coupled to said detecting means (6), for initiating said signal transmitting means when a detection is made that said openable/closable member is opened in response to said state detection signal, whereby said predetermined information signal is sent out to the radio station, and subsequently for controlling said power supplying means (33) to interrupt the power supply to said radio communication circuit unit (21).

6. A portable telephone apparatus as claimed in Claim 5, wherein said radio communication circuit unit (21) is arranged by at least a burst mode controller (25), and a radio transmitter/receiver circuit (26) when said predetermined information signal is transmitted in accordance with the TDMA-TDD (time division multiplex access-time division duplex) system.

7. A portable telephone apparatus as claimed in Claim 1, wherein a search key (3a, 3b, 3c) for searching and displaying data which has been inputted by operating the operation key (4:5) for the electronic notebook and been stored into a built-in memory (31), is mounted on the outer surface of the openable/closable member (2).

8. A portable telephone apparatus as claimed in Claim 7, wherein said search key is constructed of a data sort selecting key (3a) for selecting a sort of data stored in the built-in memory (31); and a data selecting key (3b; 3c) for successively selecting data from the sort of data selected by the data selecting key (3a).

9. A portable telephone apparatus as claimed in Claim 1, wherein said case body (1) includes:

a mounting unit (19) for detachably mounting a unit member (18) having an IC (integrated circuit) used to expand a function.

10. A portable telephone apparatus as claimed in Claim 1, wherein, said case body (1) includes:

a mounting unit (19) for detachably mounting a unit member (18) having an IC used to record a sound thereon.





- 21 -

11. A portable telephone apparatus as claimed in Claim 1, wherein a mounting unit (19) for detachably mounting a unit member (18) equipped with an answering message recording memory and/or a speech recording memory is mounted on said case body (1); a detecting means (6) for detecting an opening/closing state of said openable/closable member (2) is provided; and also a control means 27 is provided to drive said memory in case that a call is made when an opening state of said openable/closable member (2) is detected by said detecting means (6).

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ABSTRACT: (Fig. 1)

"PORTABLE TELEPHONE APPARATUS INCLUDING ELECTRONIC
NOTEBOOK FUNCTION"

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In a portable telephone apparatus equipped with an electronic notebook function, a telephone operation key (3) such as a dialing key is mounted on an upper surface of an openable/closable member mounted on an upper surface of a case body (1), whereas electronic notebook operation keys (4:5) such as a character input key are provided at a region of a surface of the case body (1) covered by the openable/closable member (2), and also at a rear surface of said openable/closable member (2). The portable telephone apparatus further includes a switch (6) for detecting an opening/closing state of the openable/closable member (2), and a mode selecting unit for selecting a telephone mode and an electronic notebook mode in response to a detection signal derived from the detecting signal (3). Furthermore, a search key (3a, 3b, 3c) for searching storage data about the electronic notebook is employed on this upper surface of the openable/closable member (2). When this search key (3) is operated, electronic notebook data such as telephone directory data constructed of one pair of a telephone number and a name, may be displayed on a display unit.

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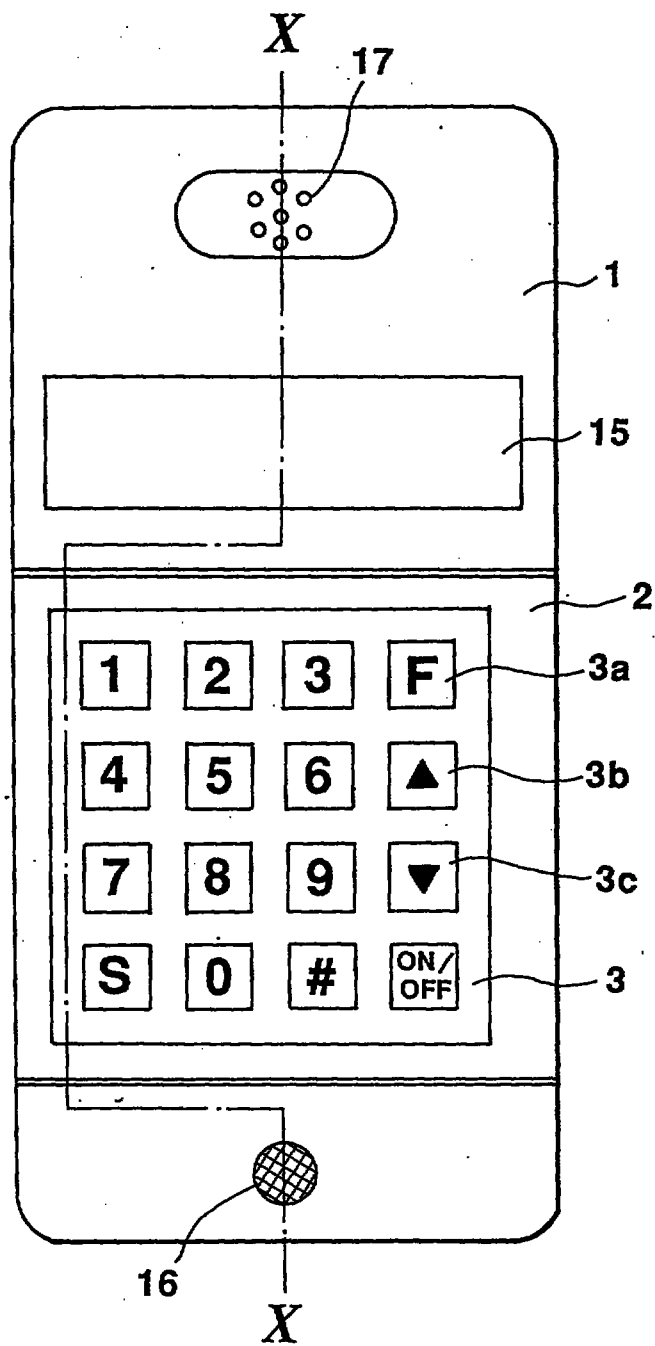


FIG. 1

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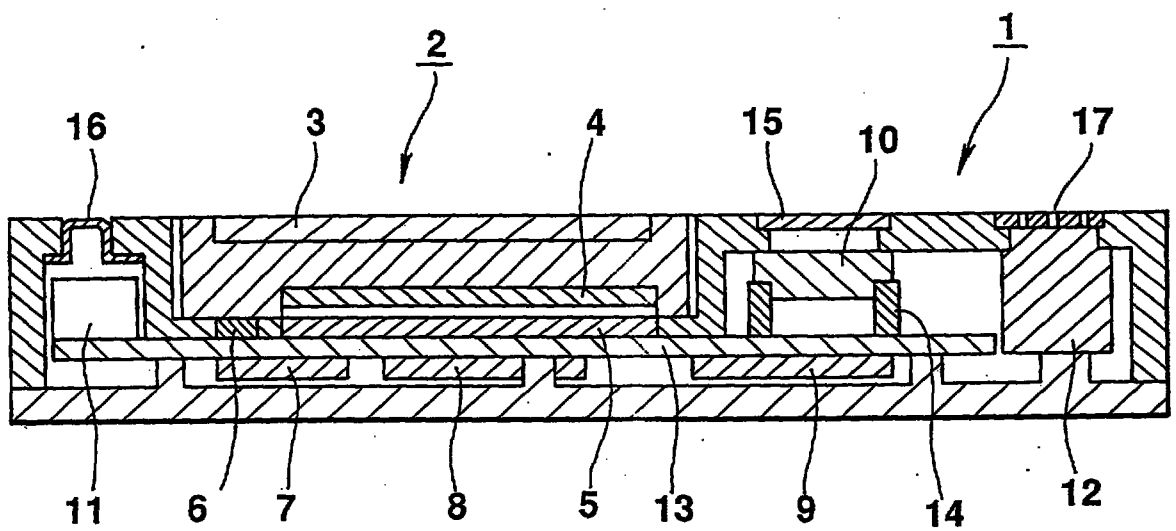


FIG. 2

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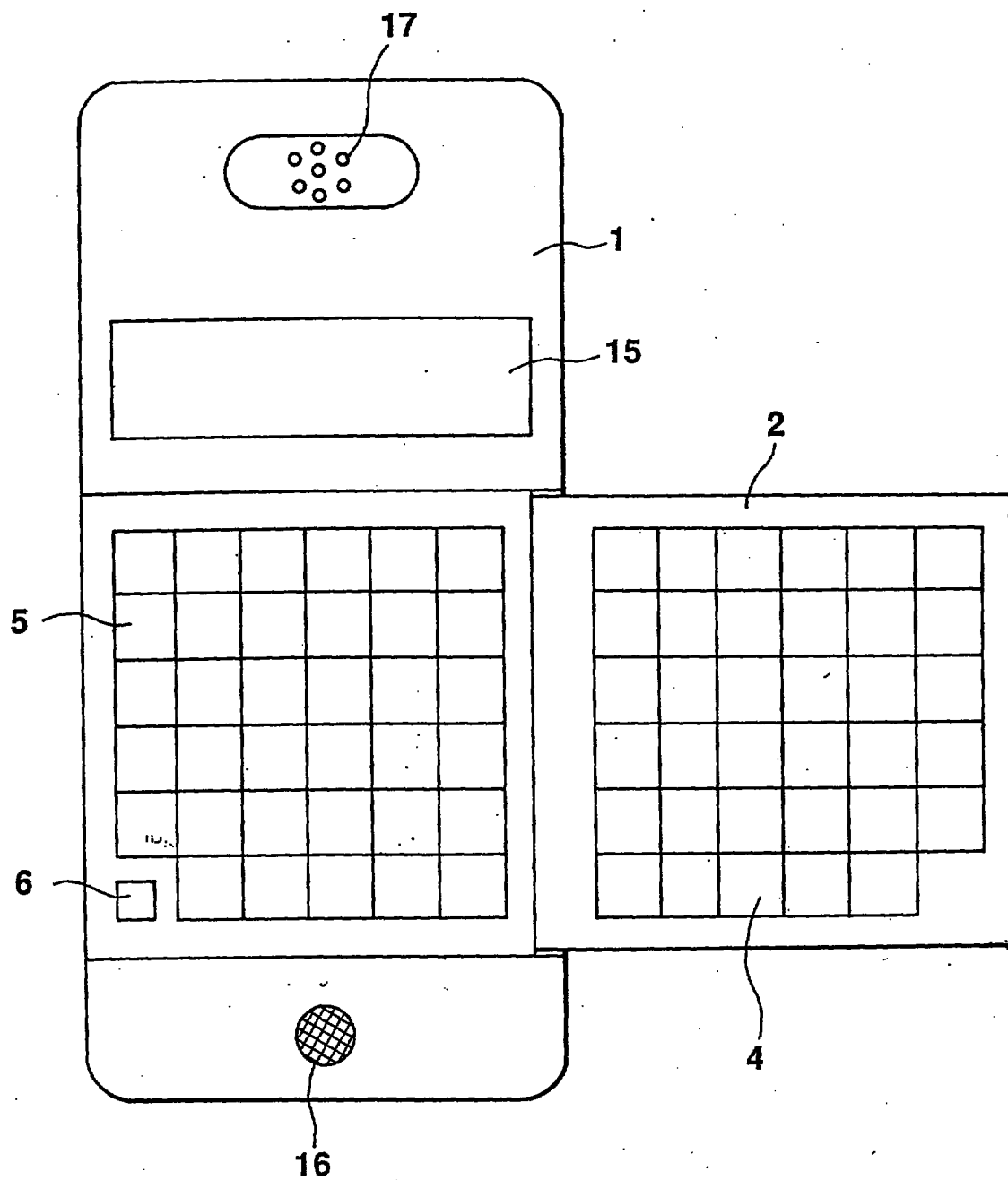


FIG. 3

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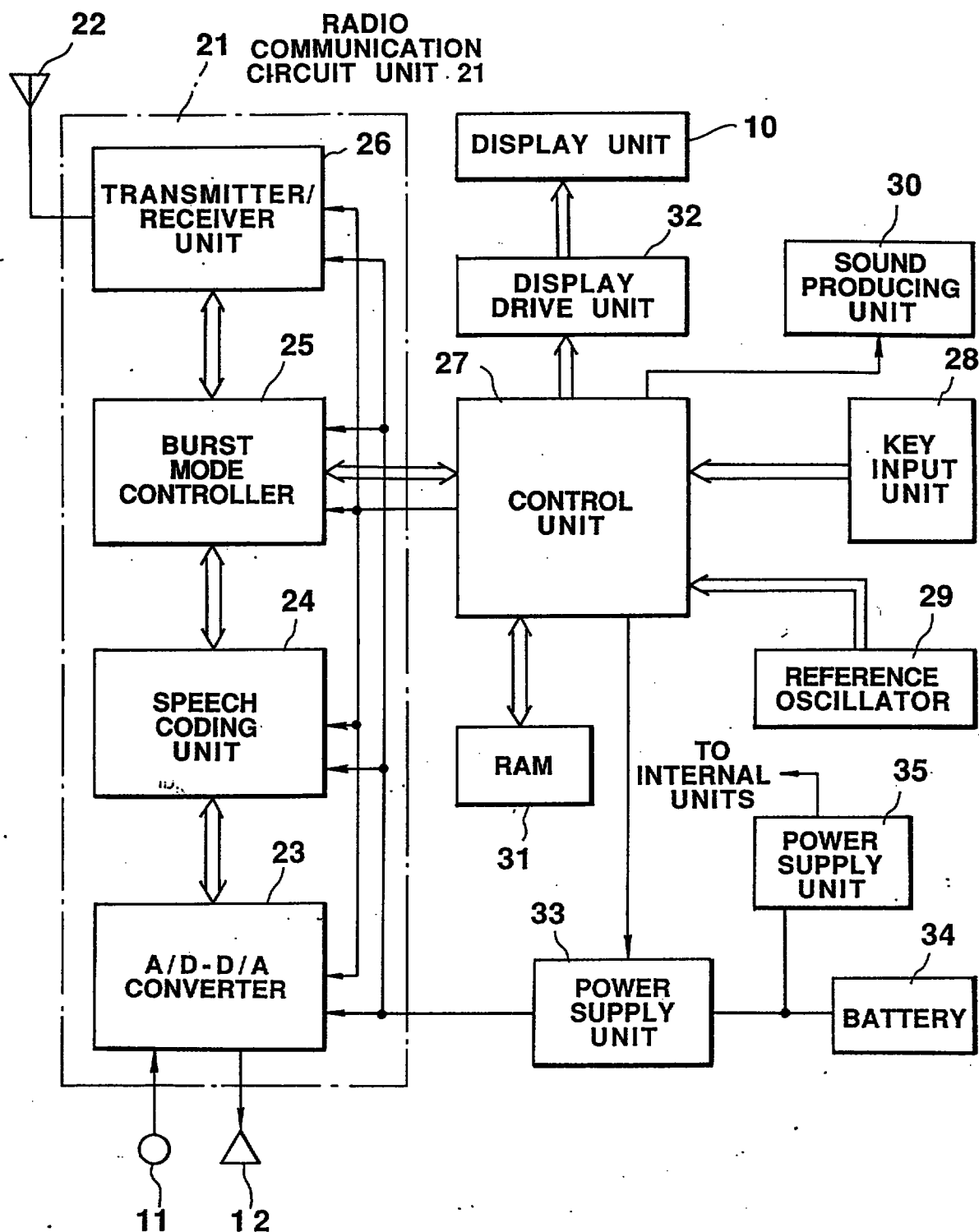


FIG. 4

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NAME		TEL No.	
CONTENTS OF SCHEDULE	START TIME	END TIME	
MEMO DATA			

TM

SM

MM

FIG. 5

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	10a
	10b
	10c

FIG.6

TEL	

FIG.7

TEL. No. SEARCH
AIHARA HIROSHI
0425-12-3456

FIG.8

TEL		TEL. No. SEARCH
AIHARA HIROSHI		
0425-12-3456		

FIG.11

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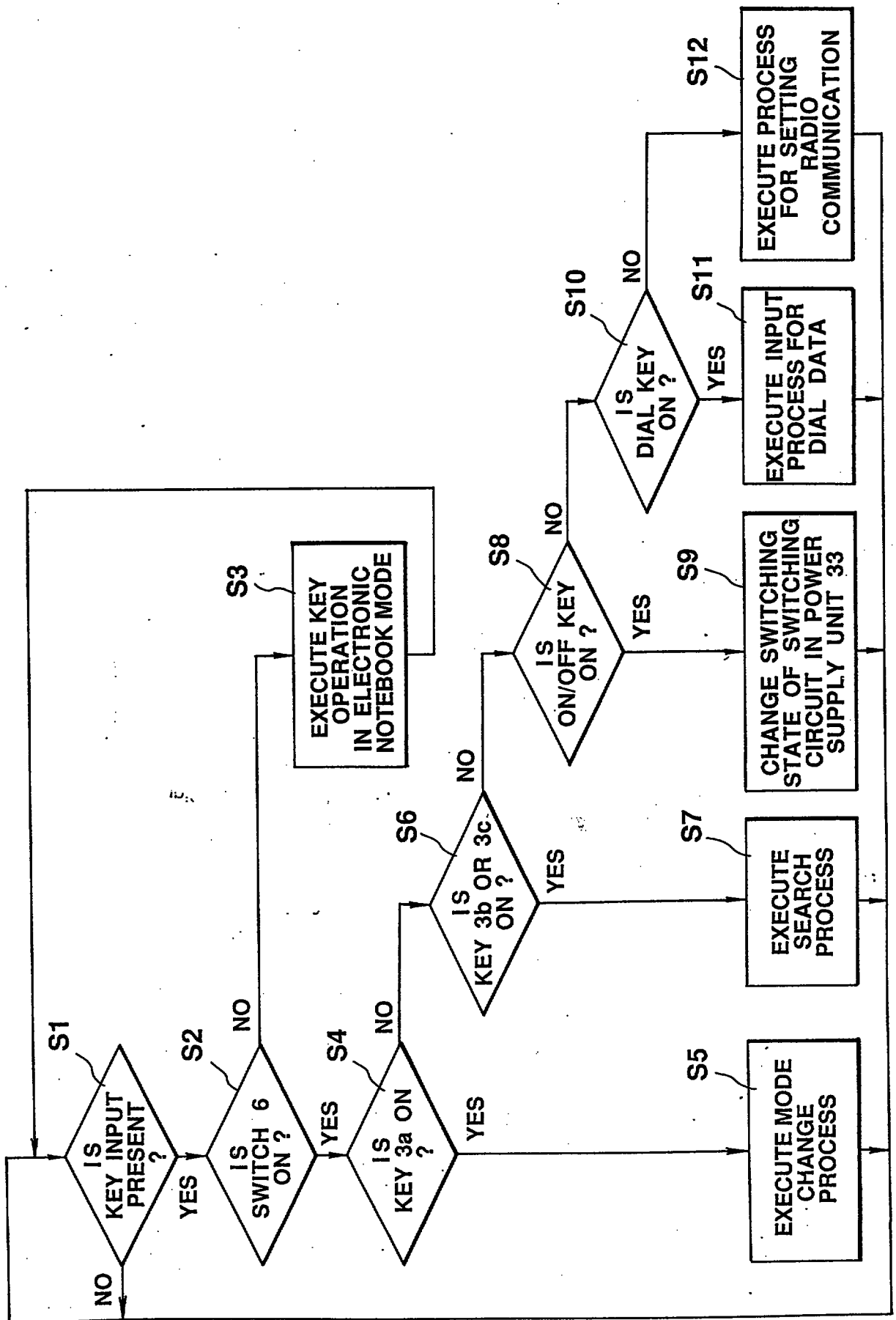


FIG. 9

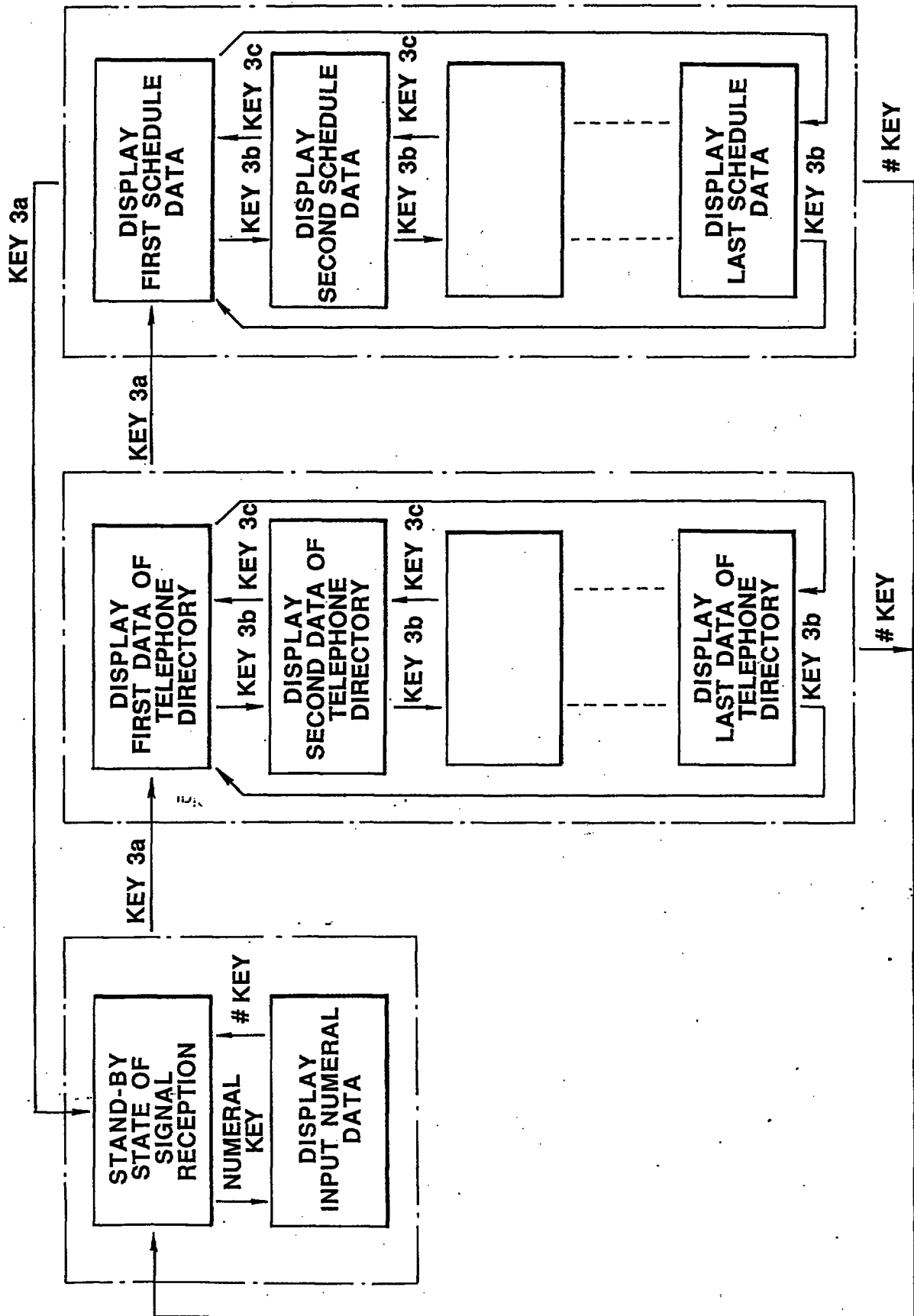


FIG. 10

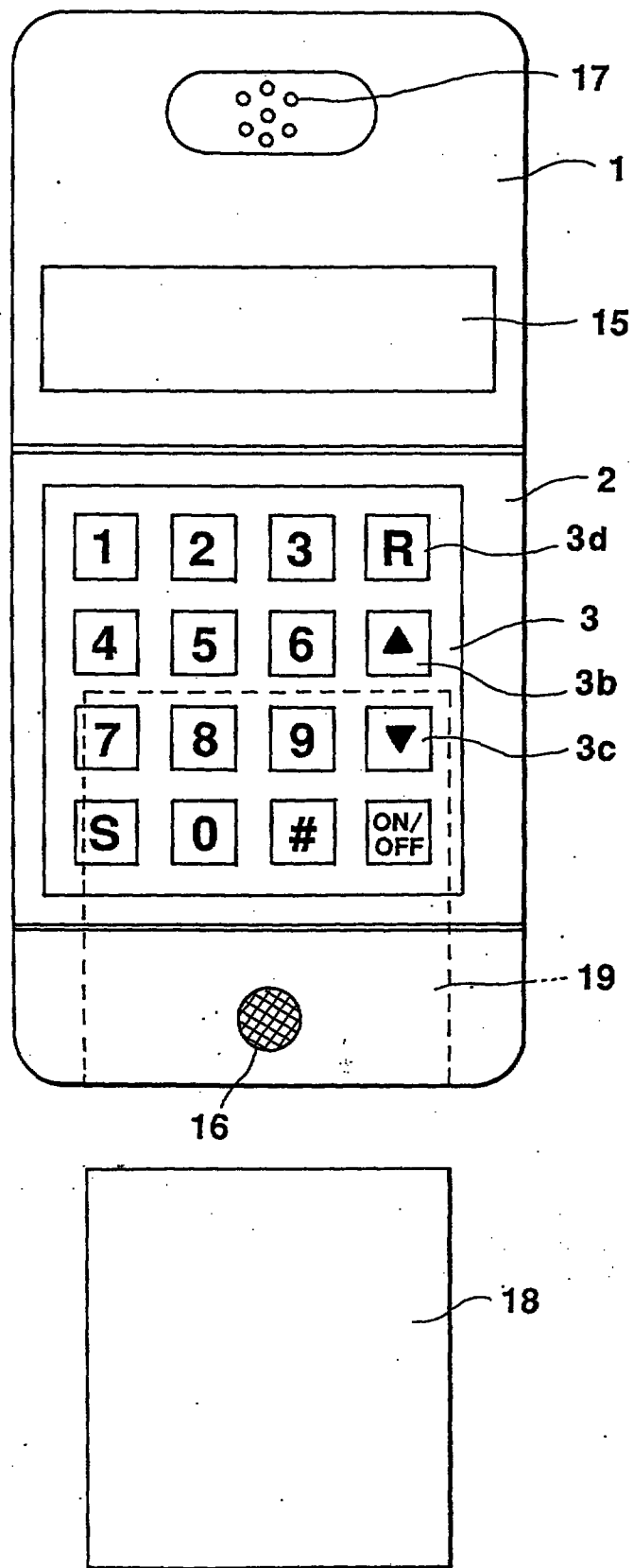


FIG.12

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PORTABLE TELEPHONE APPARATUS INCLUDING ELECTRONIC NOTEBOOK FUNCTION

5 The present invention generally relates to a portable
telephone apparatus. More specifically, the present
invention is directed to a portable telephone set including
an electronic notebook function capable of registering a
plurality of telephone directory data. So-called
10 "telephone directory data is constructed of one set of name
data and telephone number data.

Various types of portable telephone sets or
apparatuses have been widely marketed due to convenient
functions thereof, for instance, everywhere and every time
a telephone conversation is available. However, it is
15 practically difficult for every one to correctly remember a
large number of telephone numbers of friends, business
partners, and community members etc. In a specific case,
even if surnames or titles of firms are clearly memorized,
last names or names of departments could not be correctly
20 found out. To avoid such a problem, other types of
portable telephone sets are very recently commercially
available, in which a plurality of so-termed "telephone
directory data" arranged by a pair of name data and
telephone number data can be registered. In this typical
25 conventional portable telephone set, 10 numeral keys of
dialing are utilized as keys for entering character data
required to register these names and titles.

However, even when an alphabetic character is employed
which needs smaller character number than other characters,
30 there are approximately 40 sorts of key input data, namely
10 sorts of numeral data, 26 sorts of character data, and
several sorts of symbol data. As a consequence, the
respective numeral keys used to the dialing function must
have 4 or more sorts of key functions. For instance, the
35 numeral key "1" owns 4 different key functions to enter
numeral data "1", character data "A", "B" and "C". On the
other hand, the above-described conventional portable

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☒ Claim(s) : paged 19. to paged 21.	
☐ Drawing(s) : paged to paged	
☐ Abstract : paged to paged	
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REPLACEMENT SHEETS	SG
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☒ Claim(s) : paged 19. to paged 21.	
☒ Drawing(s) : paged 19. to paged 24.	
☒ Abstract : paged 22. to paged 22.	
DATE OF RECEIPT 25/10/96	

telephone set is equipped with the data input mode switch for selecting the numeral data input mode and the character data input mode. When, for example, the character data "C" is inputted, even if the character data input mode has been selected by operating the data input mode switch, the key for shifting the input digit must be manipulated after the numeral key "1" has been operated three time. In other words, the conventional portable telephone sets have such a drawback that the key operation must be performed at least four times, depending upon sorts of characters, namely a very cumbersome data input operation is necessarily required.

The present invention has been made in an attempt to solve the above-described drawback, and therefore, has an object to provide a portable telephone apparatus including an electronic notebook function, capable of simply dialing and also of simply performing data input operation such as telephone directory data entry operation.

Another object of the present invention is to provide a portable telephone apparatus including an electronic notebook, capable of automatically selecting a telephone mode and an electronic notebook mode. In the telephone mode, a dialing operation is available, whereas in the electronic notebook mode, a data input operation is available.

A further object of the present invention is to provide a portable telephone apparatus including an electronic notebook function, capable of searching data about the electronic notebook in a telephone mode.

To achieve the above-described objects and other features, a portable telephone apparatus equipped with an electronic notebook function, is characterized in that

a plurality of telephone keys (3) are provided on an outer surface of an openable/closable member (2) mounted on a case body (1) in openable/closable states, and a plurality of electronic notebook keys (4:5) are provided on a rear surface of a the openable/closable n\member (2) and

also a region of front surface of the case body (1), which is covered by the openable/closable member (2).

For a better understanding of the present invention, reference is made of the following descriptions in

5 conjunction with the accompanying drawings:

Fig. 1 is a plan view of an outer view of a portable telephone apparatus according to a first preferred embodiment of the present invention;

10 Fig. 2 is a sectional view of the portable telephone apparatus, taken along a line X-X of Fig.1;

Fig. 3 is a front view of the portable telephone apparatus under condition that an openable/closable member is opened;

15 Fig. 4 is a schematic block diagram for representing an electronic circuit employed in the portable telephone apparatus;

Fig. 5 schematically shows a memory map of a RAM 31 shown in Fig. 4;

20 Fig. 6 represents a construction of a display area of a display unit 10;

Fig. 7 represents an example of the representation of the display unit 10;

Fig. 8 indicates another example of the representation of the display unit 10;

25 Fig. 9 is a flow chart for explaining an operation of the portable telephone apparatus in response to key operations;

Fig. 10 represents a key function;

30 Fig. 11 shows another example of the representation of the display unit 10; and

Fig. 12 is a front view of a portable telephone apparatus capable of equipping with an IC card.

CONSTRUCTION OF FIRST PORTABLE TELEPHONE APPARATUS

35 Fig. 1 is a front view for indicating an outer view of a portable telephone apparatus according to a first preferred embodiment of the present invention. Fig. 2 is a sectional view of the first portable telephone apparatus,

taken along a line X-X of Fig. 1. Fig. 3 is a front view of the first portable telephone apparatus having a member under open condition.

5 In these drawings, reference numeral 1 indicates a case body for storing a large number of electronic components which constitute an electronic circuit (will be described later), and reference numeral 2 shows an openable/closable member hinged to the case body 1 at a right edge portion of an upper surface of this case body 1.
10 On an upper surface of this operable/closable member 2, there are provided a telephone keyboard 3 equipped with an ON/OFF key for turning ON/OFF a telephone function, 10 numeral entry keys for a dialing purpose, a # key, and a transmission key (S key) manipulated when a telephone call is made, and also when a telephone call is accepted. As
15 shown in Fig. 1, in this first preferred embodiment, keys 3a, 3b and 3c used to search data about an electronic notebook (will be discussed later) are furthermore provided on this telephone keyboard 3. The first key 3a ("F" key)
20 is to select a sort of electronic notebook data, the second key 3b ("▲" key) is to sequentially select the respective data included in the selected data, and the third key 3c ("▼" key) is to successively select the respective data included in the selected data in a direction opposite to
25 that of the above-described "▲" key. A keyboard 4 for the electronic notebook is provided at a lower surface of the openable/closable member 2.

As illustrated in Figs. 2 and 3, the keyboard for the electronic notebook is also provided on the surface of the
30 case body 1 covered with the openable/closable member 2. Then, a large number of keys required to control the function of the electronic notebook and also to enter data, are provided on the keyboard 4 of the electronic notebook and a keyboard 5 of the electronic notebook mounted on the
35 case body 1 in a separate form. These keys are various control keys, numeral entry keys, character keys and symbol keys. The keyboard 4 is provided on the openable/closable

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member 2. A depression button type switch 6 is provided on the case body 1 adjacent the keyboard 5 for the electronic notebook, which is turned ON/OFF when the openable/closable member 2 is opened/closed. This switch 6 is to detect to opening/closing states of the openable/closable member 2. In the first preferred embodiment, in response to the state detection signal of this switch 6, both of the mode selection control for selecting the telephone function mode and the electronic notebook function mode, and the power supply control for supplying power to the radio communication circuit unit 21 are carried out. More specifically, when the switch 6 is turned ON, namely when the openable/closable member 2 is closed, the telephone function mode is selected so that the display mode is set to the display mode for the telephone and the power is supplied to the radio communication circuit unit 21. Conversely, when the switch 6 is turned OFF, namely when the openable/closable member 2 is opened, the electronic notebook mode is set. Thus, the display mode is set to the display mode for the electronic notebook and the power supply to the radio communication circuit unit 21 is interrupted.

Then, electronic components except for the above-described keyboards 3, 4, 5 and switch 6 for constituting an electronic circuit are stored in the case: body 1. That is, LSI (large-scale integration) 7, 8 and 9 for constructing the radio communication circuit unit, the data memory for the electronic notebook, and the control circuit, a display unit 10, a microphone 11, a speaker 12 and a circuit board 13 for electrically connecting these electronic components. Reference numeral 14 indicates an inner connector for electrically connecting the display unit 10 to a predetermined terminal on the circuit board 13. Although not shown in the drawings, an antenna for receiving a radio (wireless) signal, a sound producing element for a calling purpose, and a power source battery are provided in the case body 1. Then, a display window 15

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for the display unit 10, a through hole 16 for the microphone 11 and a through hole 17 for the speaker 12 are formed in the upper surface of the case body 1.

CIRCUIT ARRANGEMENT OF FIRST PORTABLE TELEPHONE APPARATUS

5 In Fig. 4, there is shown a circuit block diagram of an electronic circuit of the first portable telephone apparatus.

10 In this drawing, reference numeral 21 shows a radio communication circuit unit (radio telephone circuit unit). This radio communication circuit unit 21 is such a circuit for converting an acoustic (audio) signal inputted from the microphone 11 into a radio signal to transmit this radio signal from the antenna 22, and for converting another radio signal received by the antenna 22 into an acoustic signal to supply the acoustic signal to the speaker 12. The type of this radio communication circuit arrangement is varied, depending upon the modulating system and the transmitting system. If the digital modulation system is employed and also the TDMA (Time Division Multiplex Access)-TDD (Time Division Duplex) transmitting system is employed, this radio communication circuit unit 21 is so arranged, as shown in Fig. 4, by an A/D-D/A converting circuit unit 23, a speech coding unit 24, a burst mode controller 25 and a transmitter/receiver circuit unit 26. The A/D-D/A converting circuit unit 23 converts the analog audio signal derived from the microphone 11 into the digital audio signal and supplies this digital audio signal to the speech coding unit 24. Furthermore, the digital audio signal from the speech coding unit 24 is converted into the analog audio signal and the resultant analog audio signal is sent to the speaker 12 by this A/D-D/A converting circuit 23. The speech coding unit 24 compresses the data of the digital audio signal supplied from the A/D-D/A converting circuit unit 23 by the audio coding system with a higher efficiency, and then supplies the compressed digital audio data to the burst mode controller 25. Also, this speech coding unit 24 expands the compressed digital audio data

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derived from the burst mode controller 25 to the original data length thereof which will be sent to the A/D-D/A converting circuit 23. The burst mode controller 25 is such a circuit for performing a synchronization process and a frame process of the transmission/receiving signals based on the TDMA-TDD system. This burst mode controller 25 determines a transmission frame (time slot) when the radio communication is established between this first portable telephone apparatus and a radio station (not shown in detail), and also sends the data of the digital audio signal supplied from the speech coding unit 25 and control data (will be discussed later) supplied from a control unit 27 based on the determined transmission frame to the radio transmitter/receiver circuit unit 26. The burst mode controller 25 synchronizes the signal transmitted from the radio base station (not shown in detail), which is received in the burst mode by the transmitter/receiver circuit unit 26, decodes the received signal, and sends out a control signal portion contained in this received signal to the control unit 27, and also an audio signal portion contained in this received signal to the speech coding unit 25. The function of the transmitter/receiver circuit unit 26 is to transmit/receive the radio signal digitally modulated between the radio station and the first radio telephone apparatus in accordance with the TDMA-TDD system (method). This transmitter/receiver circuit unit 26 is arranged by a transmitter circuit for transmitting the digital-modulated radio signal, a receiver circuit for receiving the digital-modulated radio signal so as to demodulate this digital-modulated radio signal, and a frequency synthesizer for changing the frequency of the radio signal when the communication is established between the radio station (not shown in detail) and this first radio telephone apparatus. These internal circuits of the radio communication circuit unit 21 are controlled by the above-described control unit 27.

In response to signals supplied from the

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above-explained burst mode controller 25, and key input unit 28 containing the above-described three keyboard 3, 4, 5 and switch 6, the control unit 27 is to control the respective circuit units, as described above. This control unit 27 includes a microprocessor, a ROM (read-only memory) for previously storing a control program executed by this microprocessor, and a RAM (random access memory) for temporarily storing processed data and the like during the execution of the control program. It should be noted that the above-described ROM previously stores therein a call number specific to this first portable telephone apparatus (namely, ID code), pattern data such as characters and numerals displayed on the display unit 10, and data indicative of a mode name.

To this control unit 27, the respective circuits 23 to 26 for constituting the radio communication circuit unit 21 and the key input unit 28 are connected, and furthermore, an oscillating circuit unit 29 for outputting a reference clock signal, a sound producing unit 30, a RAM (random access memory) 31, a display drive unit 32 coupled to the above-described display unit 10, and a power supply circuit 33 for supply power to the radio communication circuit unit 21 are connected.

The sound producing unit 30 is such a circuit containing a compact speaker or a sound producing member : such as a piezoelectric vibrator. The control unit 27 compares the received call number supplied from the burst mode controller 25 of the radio communication circuit unit 21 with the self calling number stored in the ROM, and drives the sound producing unit 30 to produce the sound when a judgement is made that both of these numbers are coincident with each other.

MEMORY TABLE OF RAM 31

The RAM 31 is a memory for storing data about the electronic notebook. As represented in Fig. 5, the RAM 31 includes a telephone directory data storage unit TM having a plurality of storage areas; a schedule data storage unit

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SM, and a memorandum data storage unit MM. Each of these storage areas of the telephone directory data storage unit TM is subdivided to a subarea for storing names and the like, and a subarea for storing telephone numbers, the name and telephone number data which have been entered by the electronic notebook keyboards 4 and 5, are subdivided and thereafter stored into the corresponding subareas. Similarly, each of storage areas of the schedule data storage unit SM are subdivided into a subarea for storing a content of a schedule, a subarea for storing a starting date/time, and a subarea for storing an ending date/time. It should be noted that the storage area of the memorandum data storage unit MM is not subdivided, and therefore the data inputted from the electronic notebook keyboards 4 and 5 are stored into this storage area within one memory time. Then, the data stored in these memory units are displayed on the display unit 10 via the control unit 27 and the display drive unit 32 by operating the data searching keys (namely, the above-described keys 3a, 3b and 3c) provided on the telephone keyboard 3, and also the data searching key provided on either the electronic notebook keyboard 4 or 5.

The display unit 10 is constructed of, for instance, a matrix type liquid crystal display apparatus. The display area of this display unit 10 is subdivided into three areas 10a, 10b and 10c as represented in Fig. 6, for example. The area 10a corresponds to such an area for displaying the selected function name, mode name, and condition information, whereas the areas 10b and 10c correspond to areas for displaying the data inputted from the key input unit 28 and the data read out from the RAM 31. As represented in Fig. 7, the mode name "TEL" and a mark indicative of reception sensitivity are displayed in the area 10a. Then, the dialing data inputted by manipulating the numeral entry keys of the keyboard 3 are displayed on the area 10c. When the mode is selected to the telephone directory search mode in the electronic notebook mode, as

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shown in Fig. 8, the mode name "TEL. No. SEARCH" is displayed on the area 10a, and also the name portion of the searched date and the telephone number portion thereof are displayed on the area 10b and 10c, respectively. In the electronic notebook mode, indications in the other modes, will be displayed in a similar manner as shown in Fig. 8.

The power source circuit 33 is to supply power from the power battery 34 to the respective circuit 23 to 26 of the radio communication circuit unit 21. In this power source circuit 33, a switching circuit employing a switching element, for instance, transistors and the like is provided. The control unit 27 turns ON/OFF the above switching circuit in response to the operation signals of the ON/OFF keys employed in the telephone keyboard 3 and the condition signal of the detection switch 6 provided on the case body 1, and also controls the power supply to the radio communication circuit unit 21. Concretely speaking, when the detection switch 6 is brought into the ON-state, namely when the openable/closable member 2 is closed, the switching circuit is turned ON/OFF every time the ON/OFF key is manipulated. To the contrary, when the detection switch 6 is brought into the OFF-state, namely when the openable/closable member 2 is opened, the switching circuit is turned OFF without any conditions. In other words, in accordance with the portable telephone apparatus of this preferred embodiment, when the openable/closable member 2 is closed, the power supply to the radio communication circuit unit 21 may be arbitrarily interrupted/commenced by operating the ON/OFF key, whereas when the openable/closable member 2 is opened, the power supply to the radio communication circuit unit 21 may be automatically interrupted. As a consequence, when the openable/closable member 2 is opened, namely when the electronic notebook mode is selected in this portable telephone apparatus, since no call is acceptable, an operator of this portable telephone apparatus, who is registering the data required for the electronic notebook, is not bothered by the

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telephone calling.

It should be noted that power is supplied from a second power source circuit 35 to other circuit portions than the radio communication circuit unit 21.

5 OPERATION FLOW OF FIRST PORTABLE TELEPHONE APPARATUS

Referring now to Figs. 9 and 10, an operation of the first portable telephone apparatus with the above-described circuit arrangement will be explained. Fig. 9 is a flow chart for representing an operation flow of this portable telephone apparatus with the above-explained key operations. Fig. 10 represents key functions of various keys employed on the telephone keyboard 3.

10 In Fig. 9, at a step S1, a judgement is made as to whether or not the key input signal is issued from the key input unit 28. In other words, a check is done as to whether or not any key provided on the keyboards 3, 4 and 5 is operated at the first step S1. The process defined at this step S1 is repeatedly executed until the key operation is detected. When the key input signal is issued, the process operation is advanced to a step S2 at which another check is done whether or not the detection switch 6 is brought into the ON-state. That is, it is judged whether or not the openable/closable member 2 is closed. As a result, if it is judged that the openable/closable member 2 is closed, since the operated key corresponds to the key of the telephone keyboard 3, a key process of the telephone mode, as defined after a step 4 is performed (will be described later). Conversely, when it is judged that the openable/closable member 2 is opened, since the operated key corresponds to the key of either the electronic notebook keyboard 4 or 5, a key process of the telephone notebook mode at the step S3 is executed.

20 In accordance with the key process of the telephone mode, a check is done at a first step S4 as to whether or not the above-described key input operation is performed by operating the key 3a employed in the telephone keyboard 3. If YES (namely, the key 3a is operated), then the process

operation is advanced to a step S5 at which the mode changing process is performed. This mode changing process is performed as shown in Fig. 10 as follows: When the key 3a is operated during the normal mode of the telephone function, the telephone directory data search mode is set so that first telephone directory data is displayed on the display unit 10; when the key 3a is operated during the telephone data searching mode, the schedule data search mode is set, whereby first schedule data is displayed on the display unit 10; and when the key 3a is operated during the schedule data search mode, the normal mode is set so that the reception standby condition is represented, namely the representation shown in Fig. 7 is returned. It should be noted that the data representation of the electronic notebook function searched in this telephone mode is different from the search data representation in the electronic notebook mode. For instance, when the searched data corresponds to the telephone directory data, the representation as shown in Fig. 8 is made in the electronic notebook mode, whereas another representation as indicated in Fig. 11 is made in the telephone mode. Then, when an S-key (will be described later) is operated under such a display condition as shown in Fig. 11, in a radio communication line setting process (will be explained later), the telephone number data being displayed is transmitted as dialing data via the burst mode controller 25 of the radio communication circuit unit 21 and the transmitter/receiver circuit unit 26 employed therein to the radio station (not shown in detail).

To the contrary, referring back to the flow chart shown in Fig. 9, when it is judged that the key 3a is not operated at the step S4, the process operation is advanced to a step S6 at which a judgement is made whether the above-described key input operation is carried out by operating the key 3b, or the key 3c. If YES (namely; key 3b or 3c is operated), then the process operation is advanced to a step S7 at which a search process is

executed. As shown in Fig. 10, this process is to successively display data while the mode is set to either a telephone directory data search mode, a schedule data search mode. If the mode is set to the normal mode, even
5 when the key 3b and/or the key 3c is manipulated, no process is carried out, but the process operation is returned to the previous step S1.

When a judgement is made that the key 3b and 3c are not operated at the process of the step S6, the process
10 operation is advanced to a further step S8. At this step S8, a check is done whether or not the key input is made by manipulating the ON/OFF key. When the ON/OFF key is operated at the step S8, the process operation is advanced to a step S9 at which the switching state of the switch
15 circuit in the power source circuit 33 is changed. That is, when the switch circuit is brought into the ON-state, this power supply circuit 33 is turned OFF, whereas when the switch circuit is brought into the OFF-state, the power supply circuit 33 is turned ON. As a result, the power
20 supply to the radio communication circuit unit 21 is controlled and thus the telephone function is ON/OFF controlled.

If a judgement result at the step S8 is made that the ON/OFF key is not operated, the process operation is
25 advanced to a next step S10. At this step S10, a check is done whether or not the key input operation is performed by manipulating the dialing key (numeral entry key and "#" key). If this key input operation is done by operating the dialing key, the process operation is advanced to a
30 subsequent step S11 at which an input process for the dialing data is performed. As previously stated, the dialing data inputted by operating the numeral entry key is displayed on the area 10c of the display unit 10. Then, the
35 "#" key is used to cancel the inputted dialing data. It should be noted that when this input process of the dialing data is carried out after the S-key has been operated (will be described later), the input dialing data and a cancel

signal produced in response to the operations of the "#" key are also transmitted via the burst mode controller 25 and the transmitter/receiver circuit 26 in the radio communication circuit unit 21 to the radio station. As represented in Fig. 10, this "#" key is used to not only cancel the dialing data, but also execute such a process that either the telephone directory data search mode, or the schedule data search mode is returned to the normal mode.

If another judgement result is made at the previous step S10 that the key input operation is not performed by manipulating the dialing key, namely if the key input operation is carried out by operating the S-key, the process operation is advanced to a further step S12 at which a process for setting a radio communication line between this first portable telephone apparatus and the radio station. As previously stated, the S-key is such a key manipulated when a call is accepted, and a call is transmitted. When this S-key is operated after a call is accepted, namely when the S-key is operated after an operator listens to the calling sound produced by driving the sound producing unit 30, under control of the control unit 27, the ID code of the radio station which has transmitted the call number, the self ID code and a response signal to the calling operation are sent out via the burst mode controller 25 and the transmitter/receiver circuit unit 26 employed in the radio communication circuit unit 21, so that a radio communication line is established between this radio station and the first portable telephone apparatus, and then the telephone communication mode is made. To the contrary, when this S-key is operated while no call is made, under control of the control unit 27, an ID code of a radio station where a radio communication is available, an own ID code and a call request signal are sent out via the burst mode controller 25 and the transmitter/receiver circuit unit 26 employed in the radio communication circuit unit 21 to this radio station in

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order to establish a radio communication line between this radio station and the first portable telephone apparatus. It should be noted that when the S-key is operated while the dialing data is set, namely when the S-key is manipulated after either the dialing data has been set by operating the numeral entry key, or the data about the telephone at the process of the step S7 has been selected, the dialing data is transmitted to the radio station via a radio communication line which has been set subsequent to the establishment of this radio communication line.

ADVANTAGES OF FIRST PORTABLE TELEPHONE APPARATUS

In accordance with the above-described first preferred embodiment, since the keyboard to enter the data about the electronic notebook is provided at two different portions of the case body 1, namely the rear surface of the openable/closable member 2 on which upper surface, the telephone keyboard 3 is arranged, and also the region of the case body 1 covered by the openable/ closable member 2, a large quantity of keys are arranged. Furthermore, since a large number of key functions are no longer given to a single key, the simple key operation to enter the data about the electronic notebook can be achieved. Also the switch 6 is employed to detect the open/close state of the openable/closable member 2, so that the state signal of this switch 6 is produced. When a detection is made that the openable/closable member 2 is opened based upon this state signal, namely when the electronic notebook keyboards 4 and 5 are exposed, the power supply to the radio communication circuit unit 21 is interrupted and therefore the telephone function is turned OFF (i.e., not operable). As a result, while the first portable telephone apparatus is used as the electronic notebook, any operators never receiver a telephone call. Accordingly, the data entry process for the telephone notebook is not bothered by the telephone call.

Not only the telephone keys, but also the keys 3a, 3b, 3c for searching the data about the electronic notebook are

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employed on the telephone keyboard 3 arranged on the upper surface of the openable/closable member 2. Since the telephone directory data and the schedule data can be displayed by manipulating these search keys, a telephone number and a name of a person who will be telephoned can be conformed before a telephone conversation is made. Furthermore, if he wants to have an appointment during the conversation, the operator of this portable telephone apparatus can immediately confirm own schedule. A telephone conversation may be, of course, made with employment of the telephone number of the searched telephone directory data.

MODIFICATIONS

In the above-described first preferred embodiment, the depression button type switch 6 is mounted on the case body 1 so as to detect the opening/closing state of the openable/closable member 2. Not only such a depression button type switch, but also a pressure sensitive type switch and a light sensitive type switch may be utilized as this detection switch. Also, there is no limitation to mount this detection switch. Thus, any mounting places of the main body 1 may be selected, depending upon the types of the detection switch. For instance, this detection switch may be provided on a supporting member for supporting a rotation of the openable/closable member 2, and on this openable/closable member 2.

In the first preferred embodiment, the first portable telephone apparatus is so arranged that when the detection is made in response to the state signal of the detection switch 6 that the openable/closable member 2 is opened, the power supply to the radio communication circuit unit is immediately turned ON/OFF. When a radio telephone system is constructed in such a manner that a telephone transfer service and a voice (audio) storage service are available at a network side, when a detection is established that the openable/closable member 2 is opened in response to the state signal from the detection switch 6, a predetermined

signal is transmitted to a radio station at a first stage. In other words, either a transfer demand signal for demanding that a present telephone call is transferred to another telephone set, or a voice storage service demanding signal for demanding that the present telephone call is connected to a voice storage service center, is sent out at a first stage, and thereafter the power supply to the radio communication circuit unit 21 is interrupted. It is, of course, possible to control the power supply to the radio communication circuit unit 21 by operating only the ON/OFF switch in a similar manner to that of the normal portable telephone apparatus. In this case, in response to the condition signal of the detection switch 6, the mode is selected from the telephone mode to the electronic notebook mode, and vice versa.

There are two sorts of electronic notebook data searchable in the telephone mode in the first preferred embodiment. Alternatively, only a single sort of telephone directory data may be employed. In the latter case, the key 3a for selecting the data sort is no longer required.

To emphasize the electronic notebook function and the telephone function, a unit member including an IC such as an IC card 18 may be mounted on a portable telephone apparatus as a portable telephone apparatus equipped with an IC card 18 according to a second preferred embodiment of the present invention, as shown in Fig. 12. In this second portable telephone apparatus of Fig. 12, voice (audio) information may be recorded on the IC card 18. As represented in Fig. 12, the case body 1 includes a hole 19 for storing the IC card 18. Although not shown in this drawing, two pairing connectors are mounted on the tip portion of the IC card 18 and the wall of the storing hole 19. One connector mounted on the wall of the storage hole 19 is electrically connected to the control unit 27 and the speech coding unit 24. A RAM built in this IC card 18 is electrically connected to the control unit 27 and the speech coding unit 24 when the IC card 18 is inserted into

the storing hole 19. As a result, when a recording switch 3d employed on the keyboard 3 is manipulated during a telephone communication, a telephone conversation including a voice of a telephone speaker and/or a voice of a telephone listener can be recorded on the IC card 18. If the power supply to the radio communication circuit unit 21 is controlled by manipulating only the ON/OFF switch, and also an IC card having a ROM for previously storing an answering message and/or a RAM for a recording purpose is employed as the IC card 18, when the electronic notebook mode is set by opening the openable/closable member 2, a similar process operation to that of a telephone answering machine may be carried out. That is, when a telephone call is detected, the answering message stored in the ROM is reproduced and then is sent to the radio station. At the same time, or after the answering message has been reproduced, a process for recording a voice of a telephone listener is carried out in the RAM. This recording process should be preferable performed without driving the sound producing unit 30 when a telephone calling is detected in order that the key input process in the electronic notebook mode is smoothly performed.

It should also be noted that as an IC card having an improved electronic notebook function, an IC employed in this IC card is arranged by a ROM, and dictionary data are stored in this ROM. In this case, the IC card having the dictionary data is electrically connected to the control unit 27 via the connector mounted on the wall of the storing hole 19, so that the contents of the storage data in the ROM are displayed on the display unit 10 under control of the control unit 27.



Claims

1. A portable telephone apparatus equipped with an electronic notebook function, characterized in that:

5 a plurality of telephone keys (3) are provided on an outer surface of an openable/closable member (2) mounted on a case body (1) in openable/closable states, and a plurality of electronic notebook keys (4:5) are provided on a rear surface of the openable/closable member (2) and also a region of a front surface of the case body (1), which is covered by the openable/closable member (2).

10 2. A portable telephone apparatus as claimed in Claim 1, further comprising:

detecting means (6) for detecting an opening/closing state of said openable/closable member (2) to output a state detection signal; and

15 controlling means (27) for controlling a function of said portable telephone apparatus in response to the state detection signal.

20 3. A portable telephone apparatus as claimed in Claim 2, wherein said controlling means is a means for selectively controlling a telephone mode and an electronic notebook mode.

25 4. A portable telephone apparatus as claimed in Claim 2, wherein said controlling means is a means (27;33) for controlling a power supply to a radio communication circuit (21) capable of performing a telephone function.

5. A portable telephone apparatus as claimed in Claim 1, further comprising:

30 a radio communication circuit unit (21) capable of performing a telephone function;

signal transmitting means (27) for transmitting a predetermined information signal via said radio communication circuit unit (21) to a radio station;

35 power supplying means (33) for supplying power to said radio communication circuit unit (21);

detecting means (6) for detecting an opening/closing state of said openable/closable member (2) to output a

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state detection signal; and

controlling means (27) coupled to said detecting means (6), for initiating said signal transmitting means when a detection is made that said openable/closable member is opened in response to said state detection signal, whereby said predetermined information signal is sent out to the radio station, and subsequently for controlling said power supplying means (33) to interrupt the power supply to said radio communication circuit unit (21).

6. A portable telephone apparatus as claimed in Claim 5, wherein said radio communication circuit unit (21) is arranged by at least a burst mode controller (25), and a radio transmitter/receiver circuit (26) when said predetermined information signal is transmitted in accordance with the TDMA-TDD (time division multiplex access-time division duplex) system.

7. A portable telephone apparatus as claimed in Claim 1, wherein a search key (3a, 3b, 3c) for searching and displaying data which has been inputted by operating the operation key (4:5) for the electronic notebook and been stored into a built-in memory (31), is mounted on the outer surface of the openable/closable member (2).

8. A portable telephone apparatus as claimed in Claim 7, wherein said search key is constructed of a data sort selecting key (3a) for selecting a sort of data stored in the built-in memory (31); and a data selecting key (3b; 3c) for successively selecting data from the sort of data selected by the data selecting key (3a).

9. A portable telephone apparatus as claimed in Claim 1, wherein said case body (1) includes:

a mounting unit (19) for detachably mounting a unit member (18) having an IC (integrated circuit) used to expand a function.

10. A portable telephone apparatus as claimed in Claim 1, wherein, said case body (1) includes:

a mounting unit (19) for detachably mounting a unit member (18) having an IC used to record a sound thereon.

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11. A portable telephone apparatus as claimed in
Claim 1, wherein a mounting unit (19) for detachably
mounting a unit member (18) equipped with an answering
message recording memory and/or a speech recording memory
5 is mounted on said case body (1); a detecting means (6) for
detecting an opening/closing state of said
openable/closable member (2) is provided; and also a
control means 27 is provided to drive said memory in case
that a call is made when an opening state of said
10 openable/closable member (2) is detected by said detecting
means (6).

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ABSTRACT: (Fig. 1)

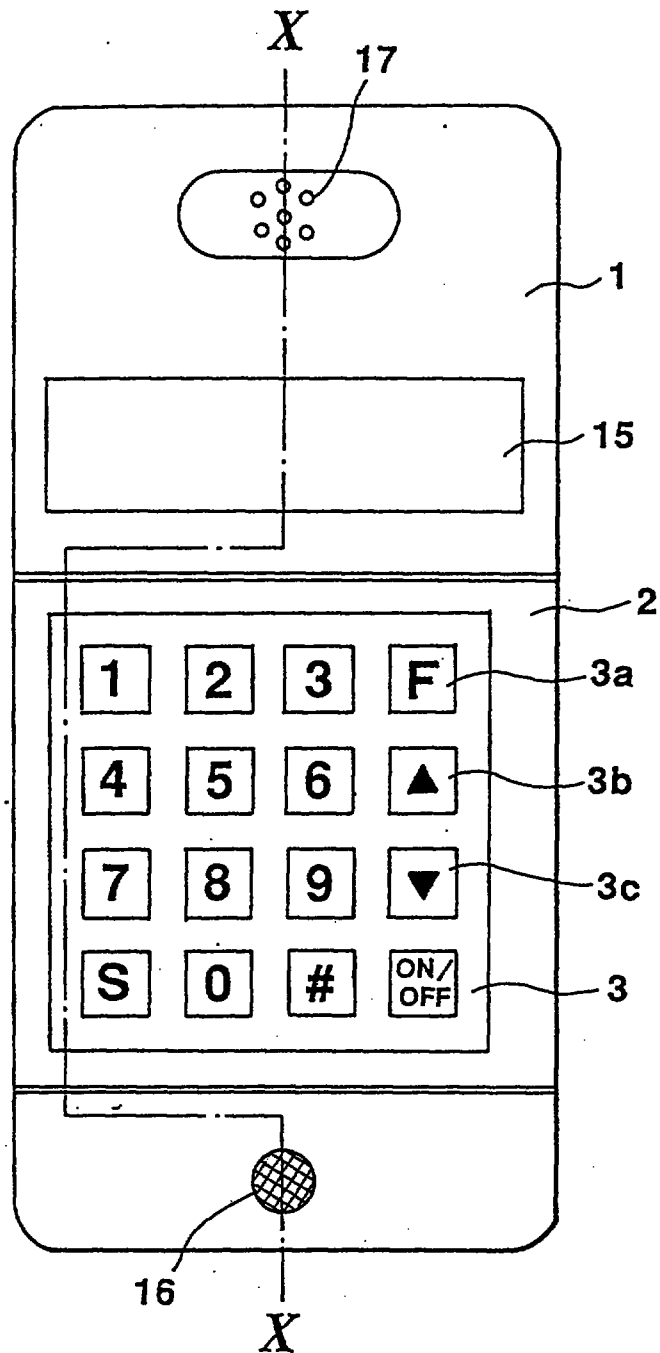
"PORTABLE TELEPHONE APPARATUS INCLUDING ELECTRONIC
NOTEBOOK FUNCTION"

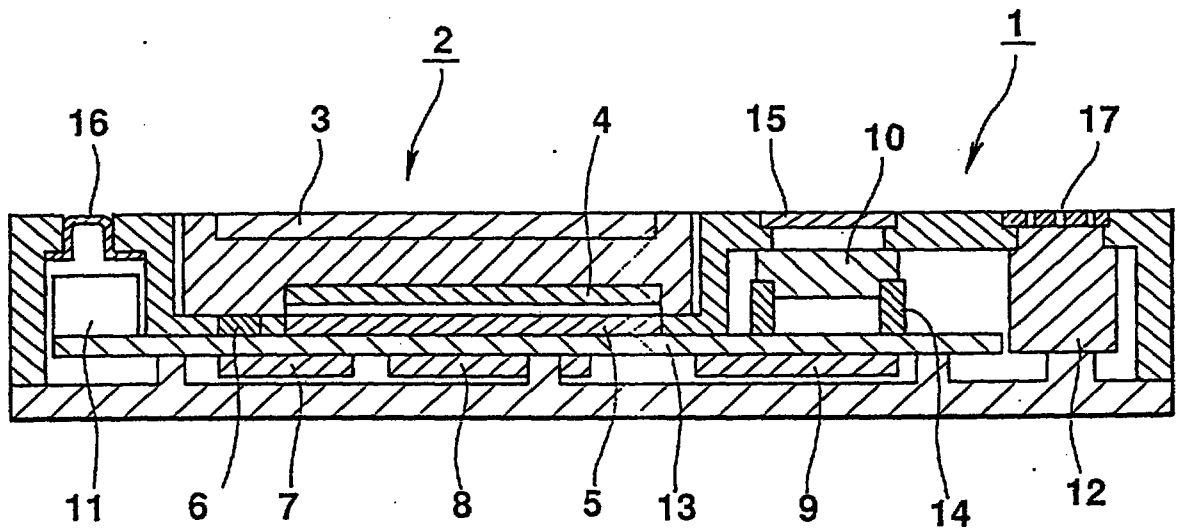
5
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25

In a portable telephone apparatus equipped with an electronic notebook function, a telephone operation key (3) such as a dialing key is mounted on an upper surface of an openable/closable member mounted on an upper surface of a case body (1), whereas electronic notebook operation keys (4:5) such as a character input key are provided at a region of a surface of the case body (1) covered by the openable/closable member (2), and also at a rear surface of said openable/closable member (2). The portable telephone apparatus further includes a switch (6) for detecting an opening/closing state of the openable/closable member (2), and a mode selecting unit for selecting a telephone mode and an electronic notebook mode in response to a detection signal derived from the detecting signal (3). Furthermore, a search key (3a, 3b, 3c) for searching storage data about the electronic notebook is employed on this upper surface of the openable/closable member (2). When this search key (3) is operated, electronic notebook data such as telephone directory data constructed of one pair of a telephone number and a name, may be displayed on a display unit.

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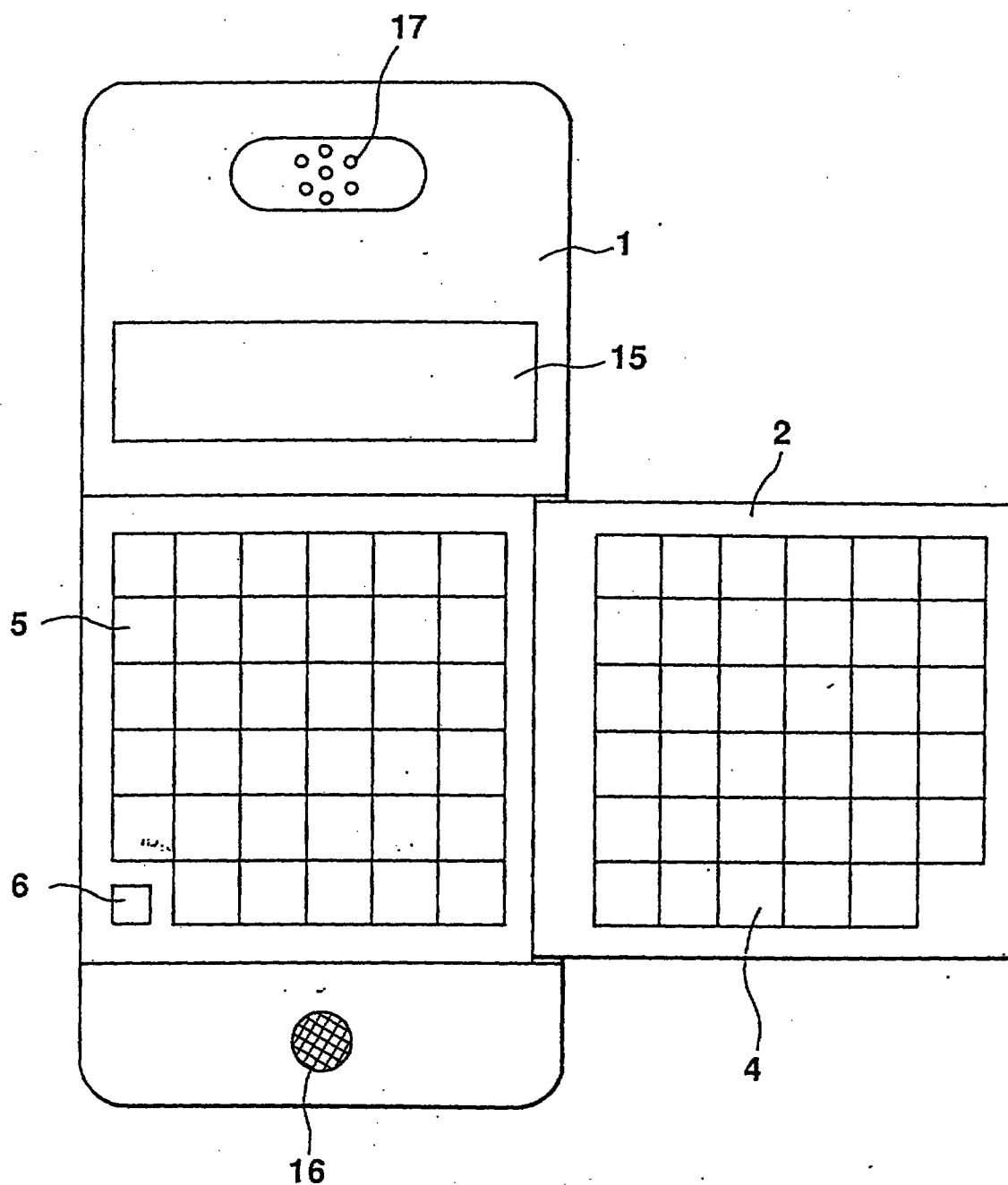
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**FIG. 1**

**FIG. 2**

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**FIG. 3**

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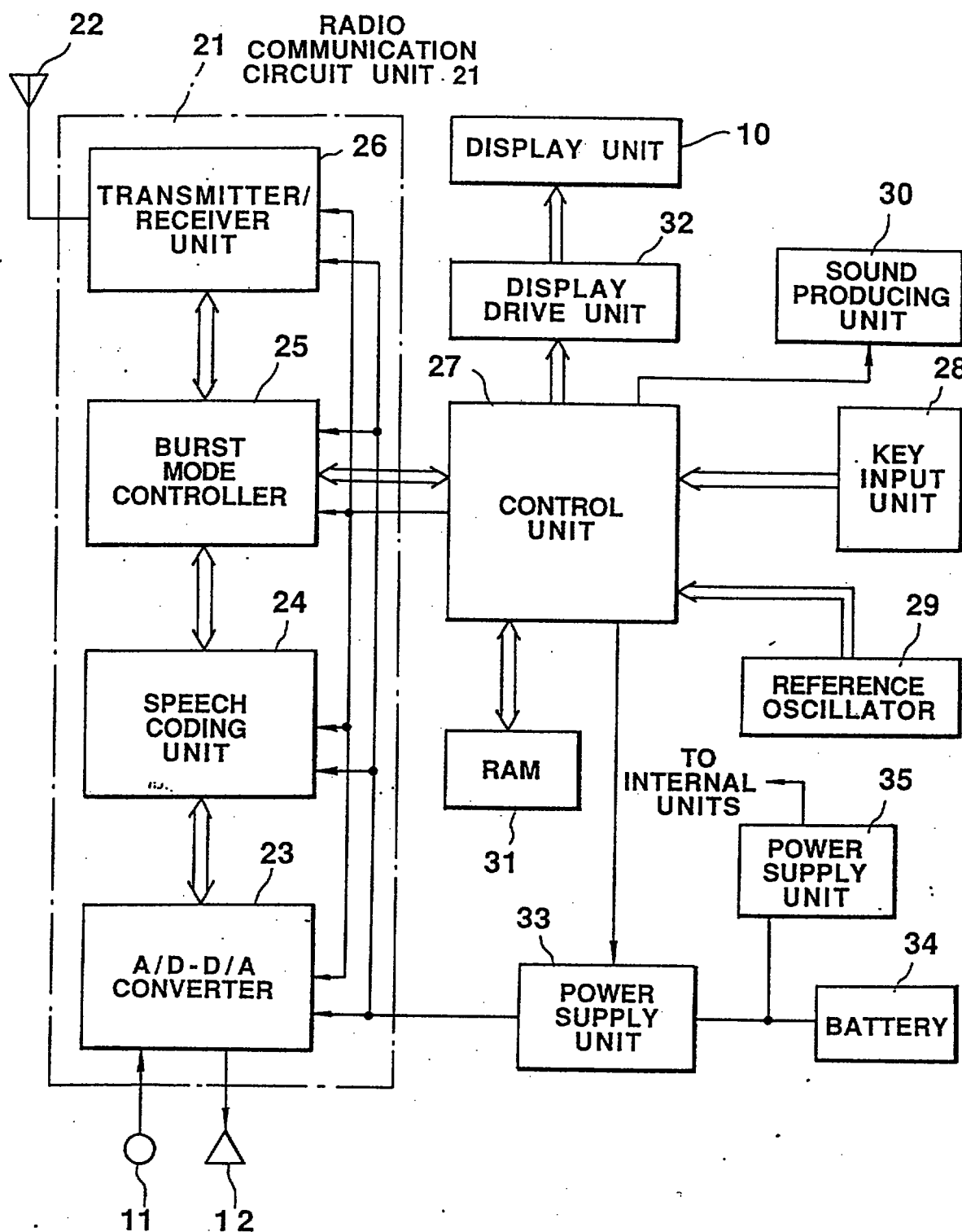


FIG. 4

NAME		TEL No.	
CONTENTS OF SCHEDULE	START TIME	END TIME	
MEMO DATA			

TM

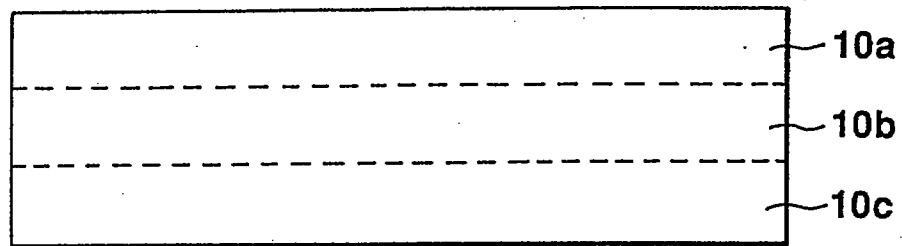
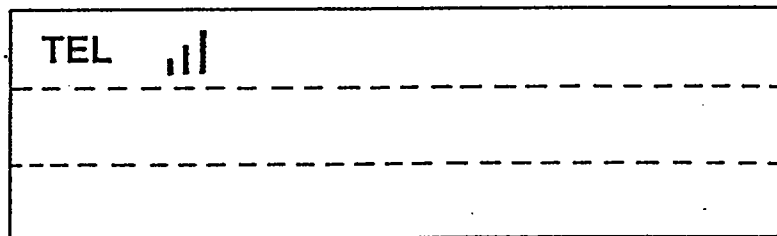
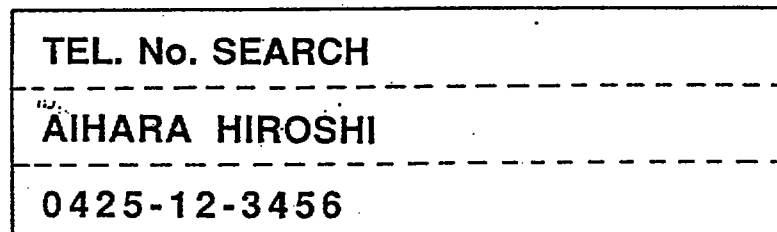
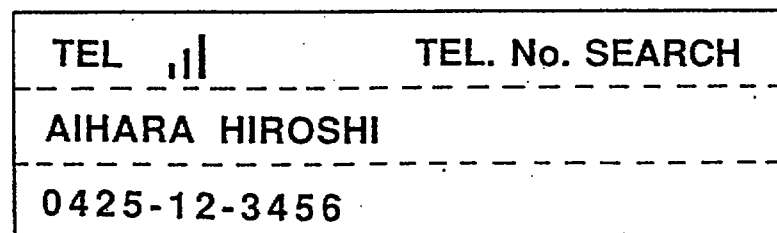
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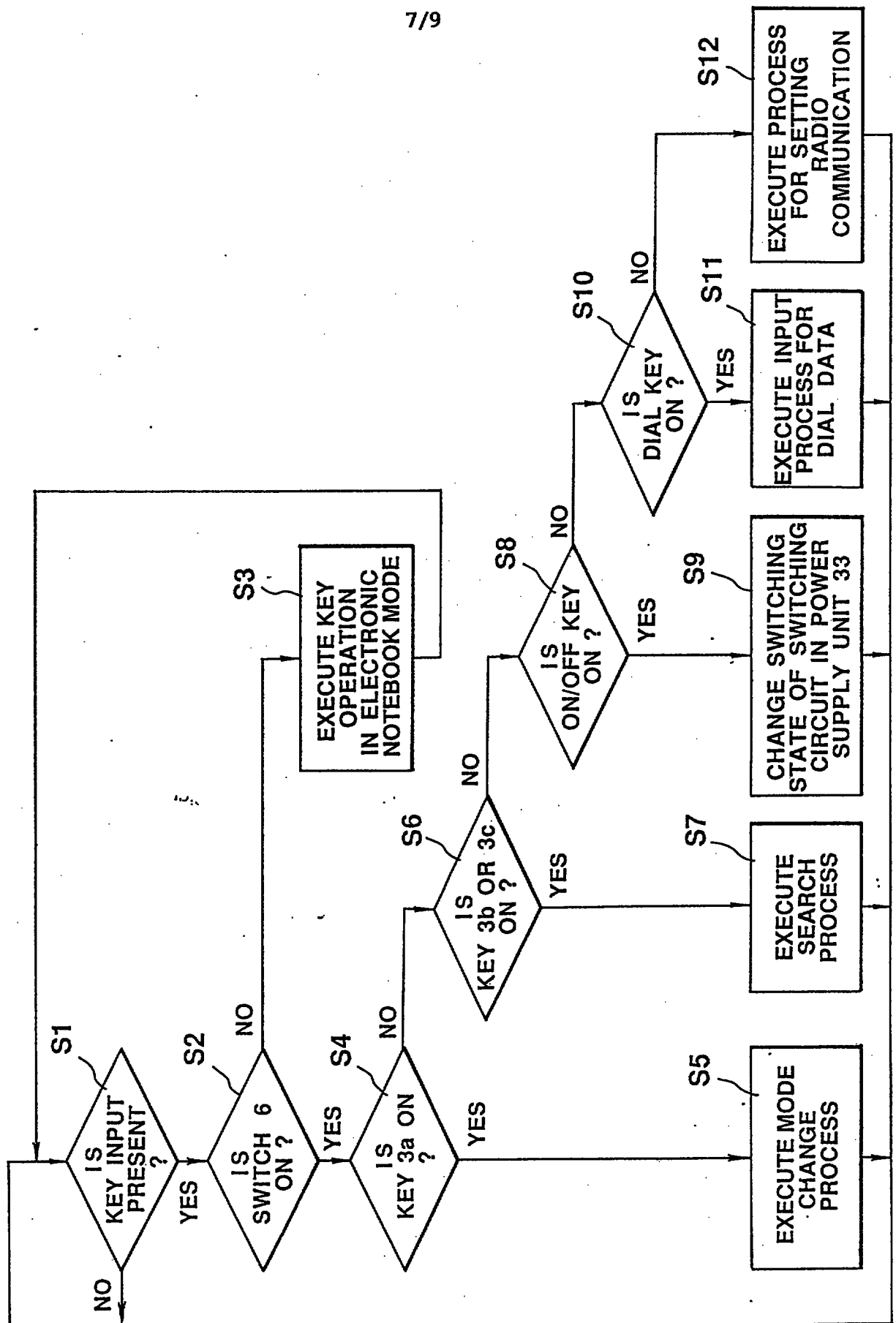
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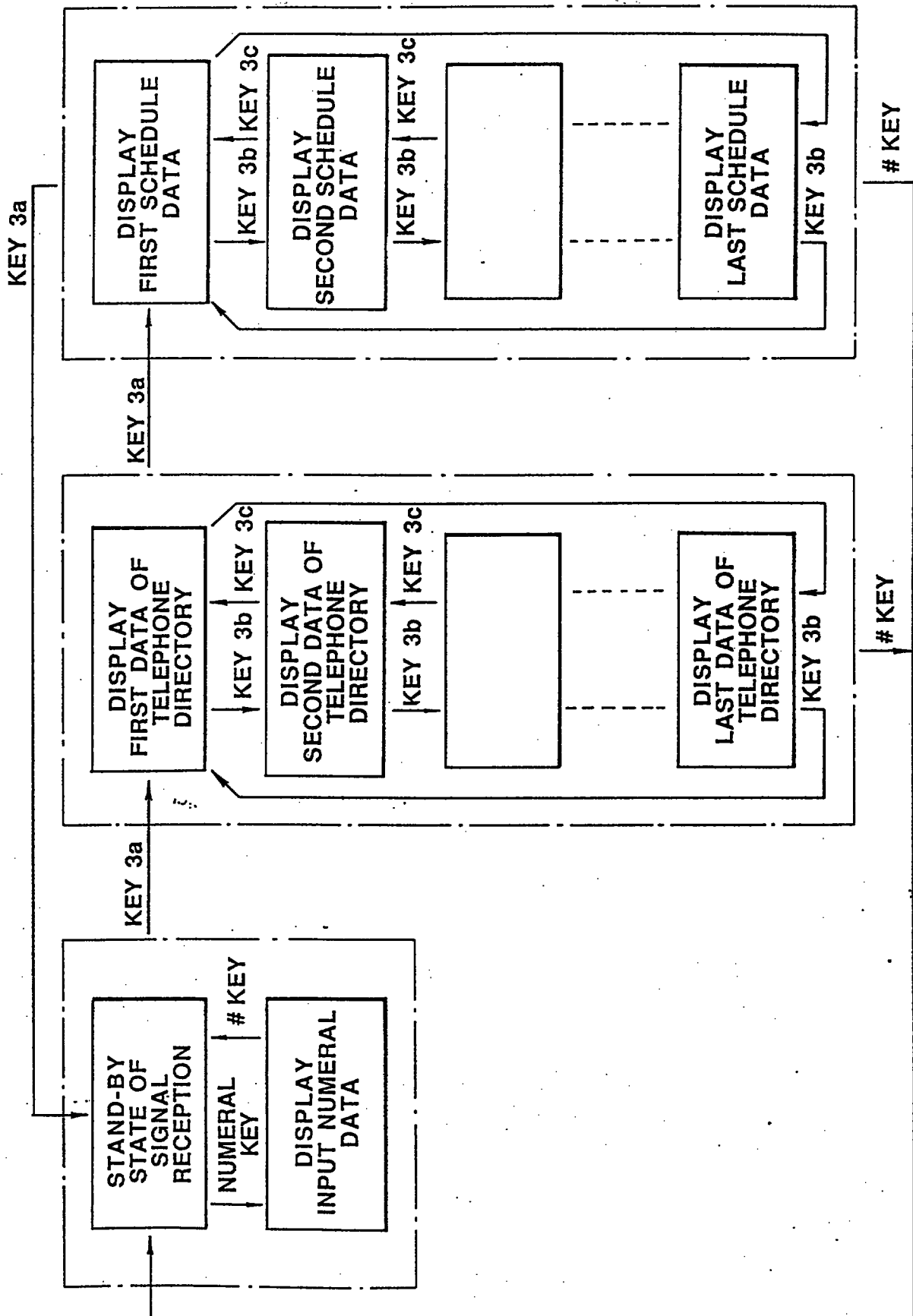
FIG. 5

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**FIG. 6****FIG. 7****FIG. 8****FIG. 11**

**FIG. 9**

**FIG.10**

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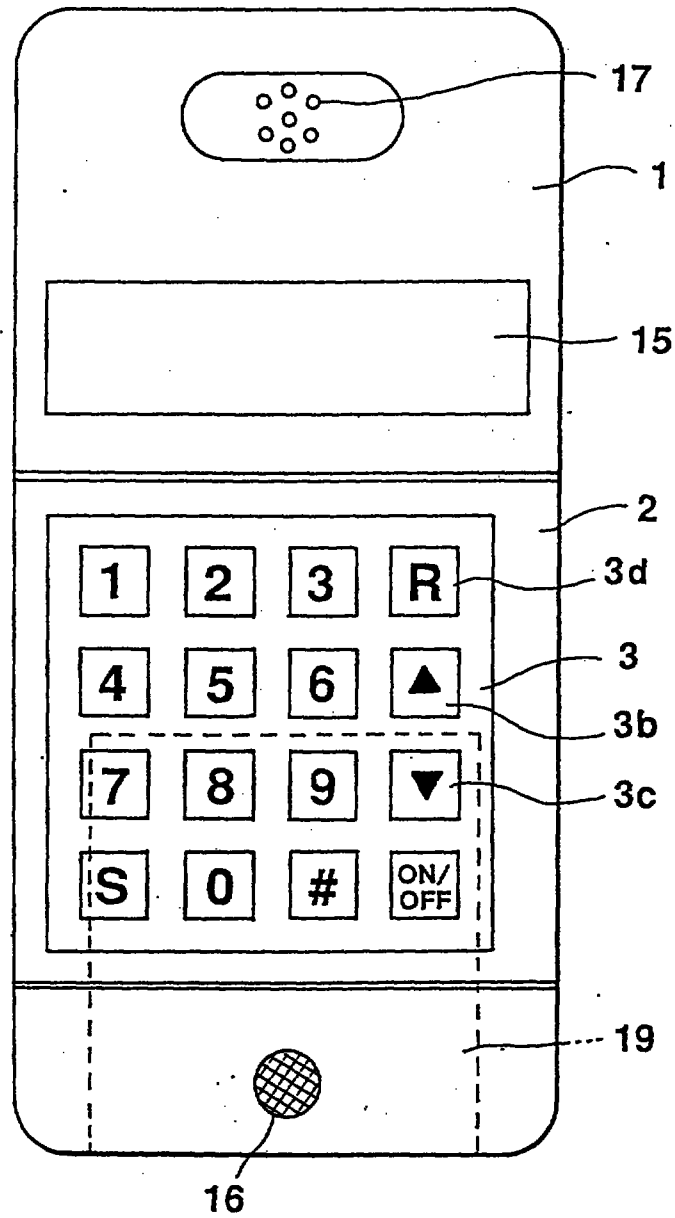


FIG.12

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REPLACEMENT SHEET		SG
☐ Description	: paged	to paged
☒ Claim(s)	: paged <u>11</u>	to paged <u>27</u>
☐ Drawing(s)	: paged	to paged
☐ Abstract	: paged	to paged
DATE OF RECEIPT		<u>20/8/91</u>

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Claims

1. A portable telephone apparatus equipped with an electronic notebook function, characterized in that:
 - a plurality of telephone keys (3) are provided on an outer surface of an openable/closable member (2) mounted on a case body (1) in openable/closable states, and a plurality of electronic notebook keys (5) are provided on a region of a front surface of the case body (1), which is covered by the openable/closable member (2).
2. A portable telephone apparatus as claimed in claim 1, wherein said openable/closable member (2) provides another electronic notebook keys (4) on a rear surface.
3. A portable telephone apparatus as claimed in claim 1 or 2, further comprising:
 - detecting means (6) for detecting an opening/closing state of said openable/closable member (2) to output a state detection signal; and
 - controlling means (27) for controlling a function of said portable telephone apparatus in response to the state detection signal.
4. A portable telephone apparatus as claimed in claim 3, wherein said controlling means is means for selectively controlling a telephone mode and an electronic notebook mode.
5. A portable telephone apparatus as claimed in claim 3, wherein said controlling means is means (27;33) for controlling a power supply to a radio communication circuit (21) capable of performing a telephone function.
6. A portable telephone apparatus as claimed in claim 1 or 2, further comprising:
 - a radio communication circuit unit (21) capable of performing a telephone function;
 - signal transmitting means (27) for transmitting a predetermined information signal via said radio communication circuit unit (21) to a radio station;
 - power supplying means (33) for supplying power to said radio communication circuit unit (21);
 - detecting means (6) for detecting an opening/closing state of said openable/closable member (2) to output a

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state detection signal; and

controlling means (27) coupled to said detecting means (6), for initiating said signal transmitting means when a detection is made that said openable/closable member is opened in response to said state detection signal, whereby
5 said predetermined information signal is sent out to the radio station, and subsequently for controlling said power supplying means (33) to interrupt the power supply to said radio communication circuit unit (21).

10 7. A portable telephone apparatus as claimed in Claim 6, wherein said radio communication circuit unit (21) is arranged by at least a burst mode controller (25), and a radio transmitter/receiver circuit (26) when said
predetermined information signal is transmitted in
15 accordance with the TDMA-TDD (time division multiplex access-time division duplex) system.

8. A portable telephone apparatus as claimed in Claim 1 or 2, wherein a search key (3a, 3b, 3c) for searching and displaying data which has been inputted by operating
20 the operation key (4:5) for the electronic notebook and been stored into a built-in memory (31), is mounted on the outer surface of the openable/closable member (2).

9. A portable telephone apparatus as claimed in Claim 8, wherein said search key is constructed of a data
25 sort selecting key (3a) for selecting a sort of data stored in the built-in memory (31); and a data selecting key (3b; 3c) for successively selecting data from the sort of data selected by the data selecting key (3a).

10. A portable telephone apparatus as claimed in
30 Claim 1 or 2, wherein said case body (1) includes:
a mounting unit (19) for detachably mounting a unit member (18) having an IC (integrated circuit) used to expand a function.

11. A portable telephone apparatus as claimed in
35 Claim 1 or 2, wherein, said case body (1) includes:
a mounting unit (19) for detachably mounting a unit member (18) having an IC used to record a sound thereon.



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12. A portable telephone apparatus as claimed in Claim 1 or 2, wherein a mounting unit (19) for detachably mounting a unit member (18) equipped with an answering message recording memory and/or a speech recording memory is mounted on said case body (1); detecting means (6) for
5 detecting an opening/closing state of said openable/closable member (2) is provided; and also control means 27 is provided to drive said memory in case that a call is made when an opening state of said
10 openable/closable member (2) is detected by said detecting means (6).

13. A portable telephone apparatus as claimed in claim 6, wherein said predetermined information signal is an information signal for requesting a network to transfer a telephone call to a predetermined another telephone set.

14. A portable telephone apparatus as claimed in claim 6, wherein said predetermined information signal is an information signal for requesting a network to connect a telephone call to a voice storage service center.

15. A portable telephone apparatus as claimed in claim 8, wherein said data stored in the built-in memory (31) are telephone directory data comprised of name data and telephone number data.

16. A portable telephone apparatus as claimed in claim 9, wherein one of the data stored in the built-in memory (31) is telephone directory data comprised of name data and telephone number data.

17. A portable telephone apparatus as claimed in claim 15 or 16, further comprising:

means (27;28) for transmitting the telephone number data being displayed as dialing data.

18. A portable telephone apparatus as claimed in claim 8, further comprising:

means (27;28) for transmitting the data being displayed.

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19. A portable telephone apparatus as claimed in claim 12, wherein said controlling means (27) comprises means for reproducing the answering message stored in said answering message recording memory and transmitting a reproduced answering message.

20. A portable telephone apparatus as claimed in claim 12, wherein said controlling means (27) comprises means for recording a voice of caller in the speech recording memory.

21. A portable telephone apparatus as claimed in claim 12, wherein said controlling means (27) includes means for reproducing the answering message stored in said answering message recording memory and transmitting a reproduced answering message, and means for recording a voice of caller in the speech recording memory at same time or after reproducing of the answering message.

22. A portable telephone apparatus as claimed in claim 1 or 2, further comprising:

memory means (18) for storing an answering message and/or recording a message from a caller;

detecting means (6) for detecting an opening/closing state of said openable/closable member (2); and

control means (27) for activating said memory means in case that a call is made when an opening state of said openable/closable member (2) is detected by said detecting means (6).

23. A portable telephone apparatus as claimed in claim 22, wherein said controlling means (27) comprises means for reproducing the answering message stored in said memory means and transmitting a reproduced answering message.

24. A portable telephone apparatus as claimed in claim 22, wherein said controlling means (27) comprises means for recording a message from caller in said memory means.

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25. A portable telephone apparatus as claimed in claim 22, wherein said controlling means (27) includes means for reproducing the answering message stored in said memory means and transmitting a reproduced answering message, and means for recording a message from caller in said memory means at the same time or after reproducing the answering message.

26. A portable telephone apparatus equipped with an electronic notebook function, characterized in that a display unit (10) and a plurality of electronic notebook operation keys (5) are mounted on a surface of a case body (1), an openable/closable member (2) covering the plurality of operation keys (5) is turnably provided on the case body (1), and a plurality of telephone operation keys (3) and a search key (3a to 3c) for searching and displaying data which has been input by operating the operation keys (5) and stored into a built-in memory (31) are provided on an outer surface of the openable/closable member (2).

27. A portable telephone apparatus as claimed in claim 26, wherein a plurality of electronic notebook operation keys (4) other than the plurality of electronic notebook operation keys (5) are mounted on an inner surface of the openable/closable member (2).

28. A portable telephone apparatus as claimed in claim 27, wherein the openable/closable member (2) is turnably hinged to one edge of the case body (1).

29. A portable telephone apparatus as claimed in one of claims 26 to 28, further comprising:

detecting means (6) for detecting an opening/closing state of the openable/closable member (2) to output a detection signal; and

controlling means (27) for controlling a function of the portable telephone apparatus in response to the detection signal output from the detecting means (6).

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30. A portable telephone apparatus as claimed in claim 29, wherein the controlling means (27) selectively sets a telephone mode and an electronic notebook mode.

31. A portable telephone apparatus as claimed in claim 29, wherein the controlling means (27) controls a power supply to a radio communication circuit unit (21) capable of performing a telephone function.

32. A portable telephone apparatus as claimed in one of claims 26 to 28, further comprising:

signal transmitting means for transmitting a predetermined information signal to a radio station via the radio communication circuit unit (21);

power supplying means (33) for supplying power to the radio communication circuit unit (21);

detecting means (6) for detecting an opening/closing state of the openable/closable member (2) to output a detection signal; and

controlling means (27) coupled to the detecting means (6), for initiating the signal transmitting means when a detection is made that the openable/closable member (2) is opened in response to the detection signal output from the detecting means (6), whereby the predetermined information signal is sent out to the radio station, and subsequently for controlling the power supply means (33) to interrupt the power supply to the radio communication circuit unit (21).

33. A portable telephone apparatus as claimed in claim 32, wherein the predetermined information signal is an information signal for requesting a communication network to transfer a telephone call to a predetermined telephone set.

34. A portable telephone apparatus as claimed in claim 32, wherein the predetermined information signal is an information signal for requesting a communication network to connect a telephone call to a voice storage service center.

35. A portable telephone apparatus as claimed in claim 26,

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wherein the data stored in the build-in memory (31) is telephone directory data comprised of a set of data including a name and a telephone number.

36. A portable telephone apparatus as claimed in claim 26, wherein the search key (3a to 3c) includes a data sort selecting key (3a) for selecting a sort of data stored in the built-in memory (31) and a data selecting key (3b, 3c) for successively selecting data from the sort of data selected by the data selecting key (3a).

37. A portable telephone apparatus as claimed in claim 36, wherein the sort of data stored in the built-in memory (31) is telephone directory data comprised of a set of data including a name and a telephone number.

38. A portable telephone apparatus as claimed in claim 35 or 37, further comprising means for, when the name and the telephone number are displayed on the display unit (10), transmitting the displayed telephone number as dialing data by a predetermined key operation.

39. A portable telephone apparatus as claimed in one of claims 26 to 28, 35 and 37, further comprising means for transmitting a telephone number displayed on the display unit (10) as dialing data by a predetermined key operation.

40. A portable telephone apparatus as claimed in one of claims 26 to 28, wherein the case body (1) includes a mounting unit (19) for detachably mounting a unit member (18) having a function expanding IC.

41. A portable telephone apparatus as claimed in one of claims 26 to 28, wherein the case body (1) includes a mounting unit (19) for detachably mounting a unit member (18) having a speech recording IC.

42. A portable telephone apparatus as claimed in one of claim 41, further comprising means for storing a message in the speech recording IC by a predetermined key operation during a telephone call.

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43. A portable telephone apparatus as claimed in one of claims 26 to 28, wherein a mounting unit (19) for detachably mounting a unit member (18) equipped with an answering message recording memory and/or a speech recording memory is mounted on the case body (1), a detecting means (6) for detecting an opening/closing state of the openable/closable member (2) is provided, and controlling means (27) is provided to drive the memory in case that a call is made when an opening state of the openable/closable member (2) is detected by the detecting means (6).

44. A portable telephone apparatus as claimed in claim 43, wherein the controlling means (27) reproduces the answering message stored in the answering message recording memory and then transmits the reproduced answering message.

45. A portable telephone apparatus as claimed in claim 43, wherein the controlling means (27) includes means for reproducing the answering message stored in the answering message recording memory and then transmitting the reproduced answering message and means for setting the speech recording memory in a recordable state after or at a same time when the answering message is transmitted.

46. A portable telephone apparatus as claimed claim 43, wherein the controlling means (27) includes means for storing a message in the memory by a predetermined key operation during a telephone call.

47. A portable telephone apparatus as claimed in one of claims 26 to 28, further comprising:

memory means for storing an answering message;

detecting means (6) for detecting an opening/closing state of the openable/closable member (2); and

means for activating the memory means and transmitting an answering message in case that a call is made when an opening state of the openable/closable member (2) is detected by the detecting means (6).

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48. A portable telephone apparatus as claimed in one of claims 26 to 28, further comprising:

first memory means for storing an answering message;

second memory means for recording a speech;

detecting means (6) for detecting an opening/closing state of the openable/closable member (2); and

control means (27) for activating the first memory means and transmitting an answering message in case that a call is made when an opening state of the openable/closable member (2) is detected by the detecting means (6) and for setting the second memory means in a recordable state after or at a same time when the answering message is transmitted.

49. A portable telephone apparatus as claimed claim 48, wherein the controlling means (27) includes means for storing a message in the second memory means by a predetermined key operation during a telephone call.

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