EUROPEAN PATENT SPECIFICATION

Date of publication and mention of the grant of the patent: 08.09.2004 Bulletin 2004/37

Application number: 97106423.3

Date of filing: 18.04.1997

Voice recording and reproducing apparatus
Vorrichtung zur Sprachaufnahme und -wiedergabe
Dispositif d’enregistrement et de reproduction de la voix

Designated Contracting States:
DE FR GB

Priority:
22.04.1996 JP 10044196
17.05.1996 JP 12369796

Date of publication of application:
05.11.1997 Bulletin 1997/45

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Description

[0001] The present invention relates to a voice recording and reproducing apparatus and a voice recording and reproducing method.

[0002] A digital voice recording and reproducing apparatus converts an analog signal representing a voice to a digital signal and records the digital signal in a recording medium when the voice is recorded, and converts the digital signal to an analog signal when the voice is reproduced. Various types of digital voice recording and reproducing apparatuses have been developed and practically used.

[0003] EP 0706114 discloses such an apparatus for recording and organizing audio data which consists of a portable voice data recorder and a computer. Both devices can be connected to download voice data to the computer for subsequent typing or filing.

[0004] In JP 06251564, an information providing and collecting apparatus is disclosed, which can be used for recording audio information like dictations. The apparatus comprises a primary recording medium for short term data storage and a secondary recording medium, the latter being suited for long term storage of data from the primary recording medium which have been marked by use of an information selector means.

[0005] The digital voice recording and reproducing apparatus has been practically used also in a so-called dictation system in which the dictations, recorded by a plurality of dictators, are reproduced and typed by a typist, or in a so-called centralized type of dictation system in which a dictation is directly recorded by a dictator via a telephone network or the like to a reproducing apparatus located on the side of a typist.

[0006] In current dictation systems, in order to identify the dictator of a dictation, the dictator's name is inputted as voice at the beginning of the dictation. In the centralized type of dictation system, a predetermined number assigned to the dictator is inputted before the dictation is started by using the telephone.

[0007] However, it is troublesome to input the dictator's name as voice each time recording is made. Further, measures should be taken against the case in which a plurality of dictators have the same name.

[0008] Moreover, the digitally recorded dictation is often recorded in a rewritable solid-state memory, which may be used for a recording medium of a computer. It is very convenient if a single solid-state memory is commonly used for the voice recording and reproducing apparatus and the computer. However, in such a case, a recorded voice file is required to be discriminated from the other computer files to prevent confusion.

[0009] It is an object of the present invention to provide a voice recording and/or reproducing apparatus which can easily discriminate and manage a voice file.

[0010] In one aspect of the present invention, information unique to a voice recording and reproducing apparatus is stored in the body of the apparatus and the information is copied to an index portion of a voice file. The name of a voice file includes an identifier consisting of one to three characters.

[0011] Other and further objects, features and advantages of the invention will appear more fully from the following description.

[0012] The accompanying drawings are for the purpose of illustration only and not for limitation.

Fig. 1 is a block diagram showing the structure of a voice recording and reproducing apparatus of a first embodiment of the present invention.

Fig. 2 is an illustration of an example of information stored in a fixed information storing portion of the voice recording and reproducing apparatus of the first embodiment of the present invention.

Fig. 3 is an illustration of an example of a map of data recorded in a recording medium for recording index information, voice data and the like, by the voice recording and reproducing apparatus of the first embodiment of the present invention.

Fig. 4 is a flowchart of setting a user identification in the voice recording and reproducing apparatus of the first embodiment of the present invention.

Fig. 5 is a flowchart of recording an identification code as index information in the voice recording and reproducing apparatus of the first embodiment of the present invention.

Fig. 6 is a block diagram showing the structure of a voice recording and reproducing apparatus of a second embodiment of the present invention.

Fig. 7 is a perspective view of the voice recording and reproducing apparatus of the second embodiment of the present invention.

Fig. 8 is an elevation view of an arrangement of operation buttons of the voice recording and reproducing apparatus of the second embodiment of the present invention.

Fig. 9 is a right side view of the arrangement of the operation buttons of the voice recording and reproducing apparatus of the second embodiment of the present invention.

Fig. 10 is a left side view of the arrangement of the operation buttons of the voice recording and reproducing apparatus of the second embodiment of the present invention.

Fig. 11 is a plane view of the arrangement of the operation buttons of the voice recording and repro-
The voice recording and reproducing apparatus of the second embodiment of the present invention.

Fig. 12 is a flowchart of an operation of a system controller of the voice recording and reproducing apparatus of the second embodiment of the present invention.

Fig. 13 is a flowchart of acquiring file information from a card in the voice recording and reproducing apparatus of the second embodiment of the present invention.

Fig. 14 is a conceptual illustration of the structure of a voice file in the voice recording and reproducing apparatus of the second embodiment of the present invention.

Fig. 15 is a flowchart of a part of a recording process in the voice recording and reproducing apparatus of the second embodiment of the present invention.

Fig. 16 is a flowchart of the other part of the recording process in the voice recording and reproducing apparatus of the second embodiment of the present invention.

Fig. 17 is a block diagram showing the structure of a voice reproducing apparatus as an example not covered by the invention.

Fig. 18 is a flowchart of an operation of a system controller of a voice reproducing apparatus as an example not covered by the invention.

Fig. 19 is a flowchart of a part of a voice file transfer process in a voice reproducing apparatus as an example not covered by the invention.

Fig. 20 is a flowchart of the other part of the voice file transfer process in a voice reproducing apparatus as an example not covered by the invention.

[0013] The present invention will be described in further detail by way of example with reference to the accompanying drawings.

[0014] Fig. 1 is a block diagram of the structure of a voice recording and reproducing apparatus of a first embodiment of the present invention.

[0015] The voice recording and reproducing apparatus of the first embodiment comprises a microphone 1 for converting a voice to an analog electrical signal. A pre-amplifier 2 connected to the microphone 1 amplifies the analog signal. An unnecessary frequency band is cut off from the amplified analog signal by a low-pass filter 3 to prevent aliasing noises from being generated, and the analog signal is converted to a digital signal by an analog-to-digital converter (hereinafter called "A/D converter") 4.

[0016] The digital signal is inputted to a digital signal processor (hereinafter called "DSP") 5.

[0017] The DSP 5 is coupled to a control circuit 6 for controlling operations of the DSP 5, as well as to an input-output buffer (hereinafter called "I/O buffer") as a buffer means for temporally storing coded data. The control circuit 6 is coupled to a main control circuit 8 described below, and is controlled thereby.

[0018] Further, a battery 20 for supplying electric power to the whole voice recording and reproducing apparatus supplies an operating voltage to the DSP 5 via a main power switch 16.

[0019] When recording, the DSP 5 is controlled by the control circuit 6 so that the digital signal from the A/D converter 4 is compressively transformed (coded) to data in a predetermined format. The coded data are temporally stored in the I/O buffer 7, and then transmitted to the main control circuit 8.

[0020] On the other hand, when reproducing, the DSP 5 is controlled by the control circuit 6 to decompressively transform (decode) the data from the main control circuit 8. The decoded digital signal is inputted to a digital-to-analog converter (hereinafter called "D/A converter") 11.

[0021] The D/A converter 11 converts the decoded digital signal to an analog signal, and the analog signal is inputted to a power amplifier 12 for amplifying the analog signal and driving a speaker 13 via a low-pass filter (not shown) for cutting off an unnecessary frequency band from the analog signal to reduce quantization noises. The speaker 13 converts the analog signal to a voice.

[0022] The main control circuit 8 comprises a microprocessor as a central processing unit (CPU), and serves as a control means for controlling the operations of respective portions of the voice recording and reproducing apparatus. Further, the main control circuit 8 is an element of a data recording means for controlling the reading and writing of predetermined index information, and of a file number generating means for generating a file number as a source of the index information.

[0023] That is, the main control circuit 8 is coupled to a fixed information storing portion 21 in which information unique to the voice recording and reproducing apparatus is stored before the voice recording and reproducing apparatus is shipped. The main control circuit 8 controls the reading of the fixed information out of the fixed information storing portion 21, and the writing of the fixed information, directly or after being properly processed, into a recording medium 10 comprising an IC memory detachably coupled to or included within the voice recording and reproducing apparatus.

[0024] When a user identification is set by the user for himself or herself, the main control circuit 8 implements the same steps as described above, based on information not from the fixed information storing portion 21 but from a random access memory (herein after called "RAM") 8a in the main control circuit 8. The details of
the implementation of the process will be described below.

Although, in the first embodiment, the fixed information storage portion 21 is an external recording medium, e.g., a read only memory (hereinafter called "ROM"), coupled to the main control circuit 8, it is not limited to this specific form. For example, the fixed information storage portion 21 may be an electrically writable nonvolatile memory in the main control circuit 8.

Fig. 2 illustrates an example of information stored in the fixed information storage portion 21.

As described above, the fixed information is stored in the fixed information storage portion 21 of the voice recording and reproducing apparatus before the apparatus is shipped. The stored information includes the version number (Ver No.) of the control system, the name of the manufacturer, the model name, the serial number (e.g., 0013527 shown in Fig. 2) or the like, of the apparatus.

In the first embodiment, the fixed information storage portion 21 is the external ROM coupled to the main control circuit 8. However, since some of the fixed information, such as the version number of the control system, the name of the manufacturer, the model name or the like, will be determined in the phase of product design, they may be stored as software in a ROM in the main control circuit 8. The serial number may be written into a nonvolatile memory included within or externally coupled to the control circuit 8, while the apparatus is produced or assembled.

Further, the information can be stored in any kinds of data storing devices from which the stored information can be read, e.g., the DSP 5, the control circuit 6, the recording medium 10 or the like.

The control relating to the index information by the main control circuit 8 is implemented in accordance with the operation of an operating portion 19 comprising a plurality of operation buttons and switches. That is, the information reading or writing as described above, or the like operation is implemented by the operation of a corresponding operation button or switch of the operating portion 19. Thus, the main control unit 8 controls the operation of the fixed information storage portion 21, the RAM 8a, an address control circuit 9, and the recording medium 10, as well as the operation of the DSP 5.

As described above, the I/O buffer 7 is coupled to the main control circuit 8. Data from the DSP 5 is input to the main control unit 8 via the I/O buffer 7.

The recording medium 10 and the address control circuit 9 are coupled to the main control circuit 8. The main control circuit 8 provides an appropriate address signal to the address control circuit 9 in accordance with the operation of the operating portion 19 to record the recording medium 10. The recording medium 10 is voice data recording by the dictation system. When recording by the dictation system, a dictation record is recorded as a file comprising a plurality of sectors in the recording medium 10 under the control of the main control circuit 8. When the dictation is recorded as the index information, voice data or the like, by the voice recording and reproducing apparatus of the first embodiment of the present invention.

As described above, the I/O buffer 7 is coupled to the main control circuit 8. Data from the DSP 5 is input to the main control unit 8 via the I/O buffer 7.

The recording medium 10 as an IC memory includes a temporal recording medium portion and a main recording medium portion. The temporal recording medium portion adopts a static random access memory (hereinafter called "SRAM"), an electrically erasable and programmable read only memory (EEPROM), a high-dielectric memory, a flash memory, or the like, which the data can be read from and written in at a higher speed than the main recording medium portion. The main recording medium portion uses a flash memory, a magneto-optical disc, a magnetic disc, magnetic tape, or the like. In the voice recording and reproducing apparatus of the first embodiment, the SRAM is adopted for the temporal recording medium portion, and the flash memory is adopted for the main recording medium portion.

The address indicating the recording position of voice information may be stored in the recording medium 10 as the IC memory detachably coupled to the main control circuit 8 or an internal recording medium (not shown) as an IC memory associated with the address control circuit 9 located in the recording and reproducing apparatus.

The main control circuit 8 is coupled to the operating portion 19 as described above, and further via a driving circuit 14 to a display 15 for displaying an operation mode, a state of user identification setting, or the like.

The operating portion 19 includes various kinds of operation buttons, i.e., a voice recording button REC, a playing button PL, a stop button ST, a fast forwarding button FF, a fast returning button REW, a priority setting button P, a menu button MENU for setting a menu mode for selecting a function in a menu, a set button SET for setting the selected function, an exit button EXIT for exiting from the menu mode, a button (not shown) for deleting voice data, an I mark button (not shown) for recording a predetermined index mark, an E mark button (not shown), and the like.

Fig. 3 illustrates an example of a map of data recorded in a recording medium for recording the index information, voice data or the like, by the voice recording and reproducing apparatus of the first embodiment of the present invention.

One of the main functions of the voice recording and reproducing apparatus of the first embodiment is voice data recording by the dictation system. When recording by the dictation system, a dictation record is recorded as a file comprising a plurality of sectors in the recording medium 10 under the control of the main control circuit 8. At this time, as shown in Fig. 3, information relating to the dictation is recorded as the index information in the first sector of the area corresponding to the dictation.

In the first embodiment, the index information includes the version number of the control system read...
in the operating portion 19. In the first embodiment, the
can be set.

Next, in step S14, the user inputs a predetermined
If the user identification is inputted in step S14,
and reproducing apparatus is personally used, the
identification code based on the user identifi-
code will be described below.

Further, the index information includes start
sector addresses, end sector addresses, and the like.

Referring to the flowcharts of Figs. 4 and 5, a
method of generating the dictation identification code in
the voice recording and reproducing apparatus of the
first embodiment will now be described.

In the voice recording and reproducing appa-
ratus of the first embodiment, the user can set a user
identification for himself or herself. When the user iden-
tification is set, the main control circuit 8 generates the
dictation identification code based on the user identifi-
code and records it as the index information.

Accordingly, referring to Fig. 4, a method of
setting the user identification will be described.

In step S11, the main control circuit 8 deter-
moves which the control system has been reset due
to the system having been down or the like. If the system
has been reset, the display 15 automatically displays an
identification setting menu in step S13 to invite the user
to set his or her identification code. If it is not necessary
to identify the user since, for example, the voice record-
ing and reproducing apparatus is personally used, the
identification code is not set if the user makes no input
operation.

If it is determined in step S11 that the system
has not been reset, the process goes to step S12, in which
it is determined whether the menu button MENU
for setting operating conditions of the voice recording
and reproducing apparatus has been pressed for a pre-
determined time period (t seconds) or not. If the menu
button MENU has been pressed for the predetermined
time period, it is recognized that the user has the inten-
tion to set the user identification, and the process goes
to step S13, in which the identification setting menu is
displayed on the display 15 so that the user identification
can be set.

Next, in step S14, the user inputs a predetermined
identification code consisting of, for example, four
characters by pressing a predetermined button located
in the operating portion 19. In the first embodiment, the
identification code is a predetermined combination of
four alphanumeric characters comprising Arabic numer-
als, Latin alphabets or the like. The four alphanumeric
characters are selected by the predetermined button, e.
g., the button SET for setting a selected function, to set
the identification code. The setting button is not limited
to the button SET. Another button or a plurality of buttons
may be used.

If the user identification is not set within a pre-
determined time period (step S15), the process goes back
to step S11 with no user identification set.

If the user identification is inputted in step S14,
the process goes to step S16, in which the main control
circuit 8 stores the identification code in the RAM 8a
within the main control circuit 8. Thus, the user identifi-
cation is registered.

The menu selecting button will now be de-
described.

Especially a portable digital recorder such as
the voice recording and reproducing apparatus of the
first embodiment is required to perform many operating
functions with a small number of buttons. Accordingly,
it is common to use a combination of a plurality of but-
tons, such as the menu button MENU, the button SET
for setting the selected function, the button EXIT for ex-
iting from the menu mode, or the like, to set various func-
tions, such as adjusting the sensitivity of a microphone,
setting a voice actuated recording mode, changing a bit
rate, selecting a coding method, or the like. These func-
tions are normally selected from those which are not of-
ten used.

The function for setting the user identification
code in the voice recording and reproducing apparatus
of the first embodiment is less used than the above func-
tions. Once the function is used, it will seldom be used
again.

In the first embodiment, considering this situa-
tion, it is designed that the identification setting mode
can be established only when the menu button MENU
has been pressed for a predetermined time period,
which is different from the usual menu operation.

Next, referring to a flowchart of Fig. 5, a meth-
od of recording the identification code as the index in-
formation in the voice recording and reproducing appa-
ratus of the first embodiment will be described.

In step S21, the main control circuit 8 deter-
moves whether the apparatus is in a recording mode or
not. If it is determined that the apparatus is in the record-
ing mode, the process goes to step S22, in which the
main control circuit 8 determines whether the recording
of one dictation has been completed or not. The com-
pletion of the recording does not mean a mere pause
mode, but means that an operation for ending the re-
cording of one dictation has been effectuated, for ex-
ample, by pushing the E mark button. If it is determined in
step S21 that the apparatus is not in the recording mode,
the process waits until the apparatus is in the recording
mode.
If it is determined in step S22 that the recording has not been completed, the process goes to step S23, in which the main control circuit 8 generates a four-digit number (e.g., 1234) as a file number corresponding to the one dictation. If a plurality of files are created, consecutive file numbers are given to them. Each file number is unique to the corresponding dictation. The file numbers are not limited to consecutive numbers and may be random numbers. Further, the file numbers are not limited to four-digit numbers, and any kinds of alphanumeric characters may be used. If the recording has not been completed in step S22, the process waits for its completion.

In step S24, the main control circuit 8 determines whether the user identification has been registered in the RAM 8a within the main control circuit 8 or not. If the user identification has been registered, the process goes to step S25, in which based on the user identification and the file number, a new identification code for the dictation file is generated. In the first embodiment, for example, four alphanumeric characters (e.g., ABCD) registered as the user identification are combined with a four-digit file number (e.g., 1234) to be the new identification (e.g., ABCD1234). In step S27, the new identification is recorded in the index information area of the recording medium 10. Thus, a unique identification code (dictation identification code) is assigned to each dictation in the recording medium 10.

If it is determined in step S24 that the user identification has not been registered, the process goes to step S26, in which the main control circuit 8 reads from the fixed information storage portion 21 some parts of fixed information, for example, the first two characters (e.g., XY) of the name of the manufacturer and the last two figures (e.g., 27) of the serial number, which are then combined with the four-digit file number (e.g., 1234) to be a new identification code (e.g., XY271234). The new identification code is recorded in the index information area of the recording medium 10 in the same way as described above.

Thus, in the voice recording and reproducing apparatus of the first embodiment, whenever a voice is recorded in the IC memory, identification information unique to the user or the apparatus is recorded in the index information assigned to each dictation. Accordingly, it is not necessary to tell the name of the dictator.

Further, since the identification information is combined with a file number given to each dictation to be recorded, the dictator and the dictation can be identified by a single identification code. Hence, when the recorded dictation data are transferred to, for example, a personal computer, the data can be managed only by the information in the file.

Referring to Figs. 6-16, a voice recording and reproducing apparatus of a second embodiment of the present invention will now be described.

Fig. 7 is a perspective view of the voice recording and reproducing apparatus, and Figs 8-11 are an elevation view, a right side view, a left side view, and a plane view, respectively, showing an arrangement of operation buttons and switches on the voice recording and reproducing apparatus.

A voice recording and reproducing apparatus 51 can be used as a voice recording apparatus and a voice reproducing apparatus and has a shape designed to be easily held by a hand, as can be appreciated from Fig. 7. The voice recording and reproducing apparatus 51 is provided approximately at the center of its front portion with a liquid crystal display (hereinafter called "LCD") 39a for displaying various kinds of information. Under the LCD 39a is a speaker portion 44a incorporating a speaker 44 described below. Above the LCD 39a is an erasing button 52 corresponding to an erasing button ERASE described below. On the right side of the LCD 39a are, in the order from the upper side to the lower side, an up button 53, a down button 54, and a menu button 55 respectively corresponding to an up button UP, a down button DOWN, and a menu button MENU which are described below.

As shown in Fig. 9, the right side of the voice recording and reproducing apparatus 51 comprises, in the order from the upper side to the lower side, a voice recording button 56, a stop button 57, a playing button 58, a fast returning button 59, and a fast forwarding button 60 respectively corresponding to a voice recording button REC, a stop button STOP, a playing button PLAY, a fast returning button REW, and a fast forwarding button FF which are described below.

As shown in Fig. 10, the left side of the voice recording and reproducing apparatus 51 comprises, in the order from the lower side to the upper side, a voice actuated recording mode setting button 62, a coding mode changing button 63, and a hold mode setting button 64 respectively corresponding to a voice actuated recording mode setting switch VCVA, a coding mode changing switch RATE, and a hold mode setting switch HOLD which are described below. Under the hold mode setting button 64 are an ejecting button 65 for ejecting a flash memory card 38 as a recording medium described below, and an input portion 66 for inputting a direct current from an external power source. Further, there is a lid member 61 which is opened and closed by the ejecting button 65 to install and remove the flash memory card 38.

As shown in Fig. 11, the top side of the voice recording and reproducing apparatus 51 comprises an I mark button 67 corresponding to an I mark button I described below; a light-emitting diode (LED) 68 for indicating by emitting light that the voice recording and reproducing apparatus 51 is in the voice recording mode; an earphone jack 69; a microphone/remote jack 70 for setting button 64 respectively corresponding to a voice actuated recording button FF which are described below.

Referring to Figs. 6-16, a voice recording and reproducing apparatus of a second embodiment of the present invention will now be described.
and portable. In addition, it is easy to hold and operate.

[0068] Next, Fig. 6 is a block diagram showing the structure of the voice recording and reproducing apparatus 51.

[0069] This voice recording and reproducing apparatus 51 comprises the microphone 31 for converting a voice to an analog electric signal. An amplifier 32 amplifies the analog signal transmitted from the microphone 31. A low-pass filter 33 passes only a predetermined low frequency band of the amplified analog signal transmitted from the amplifier 32. An A/D converter 34 converts the analog signal filtered through the low-pass filter 33 to a digital signal. A DSP 35 functions as a data compression means for compressing the digital signal when recording, and as a data decompression means for decompressing the digital signal when reproducing. A system controller 36 performs, in response to the operations of below-mentioned operating buttons and switches, the control of the whole system including the control of the operations of the DSP 35, a memory card controller 37, and a flash memory card 38. The system controller 36 is an element of a file creating means, a file selecting means, an index information recording means, an index information reading means, and a file identification detecting means. The memory card controller 37 functioning as a memory card controlling means controls the flash memory card 38 when a proper address signal is supplied from the system controller 36, to record, in a predetermined format, voice data supplied from the DSP 35 through the system controller 36, or read out the recorded data and supply it to the DSP 35 through the system controller 36. The flash memory card 38 is used as a recording medium, which is, for example, an IC memory. The flash memory card 38 is detachably installed in the voice recording and reproducing apparatus 51 and coupled to the memory card controller 37. A D/A converter 41 converts to an analog signal the digital signal read out from the flash memory card 38 and decompressed by the DSP 35. A band-pass filter 42 cuts off an unnecessary frequency band of the analog signal outputted from the D/A converter 41. An amplifier 32 amplifies the analog signal filtered through the band-pass filter 42. The speaker 44 converts to a voice the amplified analog signal outputted from the amplifier 43. A display 39 displays information, such as an operation mode, a file number or the like, under the control of the system controller 36. An electric power source 40 supplies electric power to the voice recording and reproducing apparatus 51 under the control of the system controller 36. An operating portion 45 is coupled to the system controller 36.

[0070] The operating portion 45 comprises the voice recording button REC for starting the voice recording; the stop button STOP for stopping the voice recording, reproducing or the like; the playing button PLAY for starting the voice reproducing; the fast returning buttonREW for returning the position of the voice recording or reproducing; the fast forwarding button FF for fast forwarding the position of the voice recording or reproducing; the menu button MENU for selecting an optional function in a menu; the up button UP; the down button DOWN; the erasing button ERASE for erasing recorded voice data; and the I mark button I for recording an instruction mark as an index mark for indicating the beginning of a dictation file. The operating portion 45 also comprises the voice actuated recording mode setting switch VCVA for recording only a voice portion to the recording medium by eliminating an unvoice portion; the coding mode switching switch RATE for changing over a data compression method and a bit rate; and the hold mode setting switch HOLD for preventing the buttons from being erroneously operated when no operation is necessary.

[0071] Next, the operation of the voice recording and reproducing apparatus 51 will be described below. Fig. 12 is a flowchart of an operation of the system controller 36.

[0072] When the electric power is supplied from the electric power source 40 to the system controller 36, the system controller 36 starts the operation shown in Fig. 12.

[0073] In step S31, external conditions and an internal memory of the system controller 36 are initialized and the completion of the initialization is displayed on the display 39.

[0074] After the initialization is completed, the operation of the voice recording and reproducing apparatus 51 is stopped in step S32. In step S33, it is determined whether the flash memory card 38 has been installed or not.

[0075] If the flash memory card 38 has not been installed, the process goes back to step S32. If the flash memory card 38 has been installed, the process goes to step S34, in which the file information recorded therein is read out. In step S35, voice files only are counted and their number is displayed on the display 39.

[0076] In order that a file is judged to be a voice file, the following three conditions must be satisfied:

1. The file name has an extension "dss;"
2. A file discrimination signal "dss" is written at a predetermined position in an index information area in which the index information of the file is recorded; and
3. A file number (0001 to 9999) is written at a predetermined position in the index information area.

[0077] Although "dss" is used as the extension of the file name and the file discrimination signal, "dds" also may be used. Further, if "dss" and "dds" are defined by the American Standard Code for Information Interchange (ASCII), it is good for interchangeability.

[0078] Referring to Fig. 13, the operation of judging the above-mentioned three conditions will now be described. Fig. 13 is a flowchart of acquiring file information from the flash memory card 38.

[0079] When the operation is started, in step S51, the
number of voice files is set to zero. In step S52, a voice file information table is initialized.

[0080] Next, in step S53, a file in the flash memory is retrieved. In step S54, it is determined whether a file exists or not. If no file exists, the process is ended.

[0081] If a file exists, in step S55, it is determined whether the extension of the file is "dss" or not. If the extension of the file is not "dss" the process goes back to step S53. If it is "dss" the file discrimination signal is detected in step S56.

[0082] In step S57, it is determined whether the file discrimination signal is "dss" or not. If the file discrimination signal is not "dss" the process goes back to step S53. If it is "dss" the file number is detected in step S58.

[0083] In step S59, it is determined whether the file number is not within the range from 0001 to 9999 or not. If the file number is not within the range, the process returns to step S53. If the file number is within the range, in step S60, the file number is set to the voice file information table, and the process goes back to step S53.

[0084] Referring to Fig. 14, information recorded in the index information area will now be described. Fig. 14 is a conceptual illustration of information recorded in the flash memory card 38.

[0085] As shown in Fig. 14, the recording area of the flash memory card 38 is divided into an index information area having a storage capacity of, for example, 512 bytes, and a voice data area for recording voice data.

[0086] The index information area is further divided into areas for recording a system version number, a file discrimination number, a file number, a user identification code, a date and time of the end of recording, recording time, an order of priority, a transfer completion flag, an erroneous elimination preventing flag, I mark addresses Nos. 1 - 16, an extra area, and the like.

[0087] Now, referring to Fig. 12, the operation of the system controller 36 is further described. After the information on the voice files is displayed on the display 39 in step S35, it is determined in step S36 whether any button in the operating portion 45 has been pressed or not.

[0088] If no operating button has been pressed, the process goes back to step S32. If any operating button has been pressed, the process goes to step S37, in which it is determined whether the hold mode setting switch HOLD has been turned on or not.

[0089] If the hold mode setting switch HOLD has been turned on, the process goes back to step S32. If it has been turned off, the process goes to step S38, in which it is determined whether the pressed button is the recording button REC or not. If the recording button REC has been pressed, the process goes to step S39, in which a voice recording process is implemented. In the voice recording process, the DSP 35 is controlled to compress the digital signal transmitted from the A/D converter 34, and the compressed digital signal is recorded in the flash memory card 38 via the memory card controller 37.

[0090] Referring to Figs. 15 and 16, the details of the voice recording process will now be described. Fig. 15 is a flowchart of a part of the recording process, and Fig. 16 is a flowchart of the other part of the recording process.

[0091] When the recording process is started, it is determined in step S61 whether the recording is new or not. If the recording is not new, the designated file is opened in step S62.

[0092] If it is determined in step S61 that the recording is new, the process goes to step S63, in which a new file number is obtained from the file information in the flash memory card 38. In step S64, a user identification code and the file number are combined to create a new file name. In step S65, a discrimination signal (dss) is recorded in the index information area.

[0093] When the new recording is started and the new file is created, it is characteristic that a new file number different from any file number recorded in the memory is selected (usually, the file number is sequentially selected from 0001 to 9999) and recorded in a predetermined place in the index information area.

[0094] Further, in the present embodiment, since the optional menu can be selected by the menu button MENU to set the user identification code of four characters (usually four Latin alphabets), this user identification code is also recorded in a predetermined place in the index information area of the file.

[0095] Then, the file name is created from the user identification code of four characters and the file number of four digits, and the extension of three characters "dss" is added to the file name.

[0096] After step S62 or S65 is completed, in step S66, the recording position is read in. In step S67, it is determined whether the coding mode changing switch RATE has been turned on or not. The coding mode changing switch RATE is to change over two coding methods A and B whose voice data compression methods and bit rates are different from each other.

[0097] If the coding mode changing switch RATE has been turned on, the process proceeds to step S68, in which coding method A is selected. Otherwise, in step S69, coding method B is selected.

[0098] In step S70, it is determined whether the voice actuated recording mode setting switch VCVA has been turned on or not. If it has been turned on, the process proceeds to step S71, in which an instruction to calculate energy is outputted to the DSP 35.

[0099] In step S72, an energy value is inputted from the DSP 35. In step S73, the energy value is compared with a threshold value. If it is equal to or smaller than the threshold value, the process returns to step S67. If the energy value is larger than the threshold value, or if it is determined in step S70 that the voice actuated recording mode setting switch VCVA has been turned off, the process goes to step S74, in which a coding start command is outputted to the DSP 35.
In step S75, a voice data block is inputted. Then, in step S76, the voice data block is transmitted to the memory controller 37. In step S77, the recording position is renewed. In step S78, it is determined whether the stop button STOP has been operated or not.

If the stop button STOP has not been operated, the process goes back to step S67 and continues the voice recording operation. On the other hand, if the stop button has been operated, a coding stop command is transmitted to the DSP 35 in step S79.

In step S80, the index information is renewed. In step S81, the file is closed to finish the process.

Again, returning to Fig. 12, the operation of the system controller is described. If it is determined in step S38 that the recording button has not been operated, it is determined in step S40 whether the playing button PLAY has been pressed or not. If the playing button PLAY has been pressed, a voice reproducing process is implemented in step S41. In the voice reproducing process, the recorded data in the flash memory card 38 are read out through the memory card controller 37 and transmitted to the DSP 35, in which the data are decompressed and transmitted to the D/A converter 41.

If it is determined in step S40 that the playing button PLAY has not been operated, it is determined in step S42 whether the fast forwarding button FF has been operated or not. If the fast forwarding button FF has been operated, a fast forwarding process is executed in step S43. In the fast forwarding process, the operating position is successively fast forwarded at a proper speed (for example, 100 times faster than that of the voice reproduction).

If it is determined in step S42 that the fast forwarding button FF has not been operated, it is determined in step S44 whether the fast returning button REW has been operated or not. If the fast returning button REW has been pressed, a fast returning process is implemented in step S45. In the fast returning process, the operating position is successively shifted in the opposite direction to and at the same speed as that of the fast forwarding.

If it is determined in step S44 that the fast returning button REW has not been operated, it is determined in step S46 whether the erasing button ERASE has been operated or not. If the erasing button ERASE has been pressed, an erasing process is executed in step S47. In the erasing process, the file corresponding to the file number presently displayed on the display 39 is erased.

If it is determined in S46 that the erasing button ERASE has not been operated, it is determined in step S48 whether the menu button MENU has been operated or not. If the menu button MENU has been pressed, a menu changing process is performed in step S49. In the menu changing process, respective options are set based on the instructions by the up button UP and the down button DOWN.

Specifically, this optional menu is used to set erroneous erase prevention, microphone sensitivity, a user identification code, an order of priority, a clock or the like. When the up button UP and the down button DOWN are pressed without pressing the menu button MENU, the volume of reproduced voice can be adjusted.

When the stop button STOP is pressed, when the flash memory card 38 is removed, or when the present operating position reaches the ending or starting position of the memory, during the operation of step S39, S41, S43 or S45, then the process exits from these steps and goes back to step S32.

Also when the operation of step S47 or S49 has been completed, or when the menu button MENU has been turned off in step S48, the process goes back to step S32.

According to the second embodiment, even if a flash memory card contains different kinds of files, such as voice files and other files, it is easy to discriminate voice files.

Referring to Figs. 17-20, an example not covered by the invention will now be described.

In this example, description of the same parts as those of the second embodiment is omitted and different parts will be mainly explained.

The voice reproducing apparatus is designed, for example, as a desk-top type and has a function such that a secretary or a typist can efficiently document a voice file recorded in a flash memory card 38, for example, by the voice recording and reproducing apparatus 51 of the second embodiment.

The structure of the voice reproducing apparatus is as follows: The flash memory card 38 is detachably coupled to the voice reproducing apparatus. A memory card controller 87 is coupled to the flash memory card 38 for controlling the flash memory card 38 in response to a proper address signal supplied by a system controller 86. A memory 94 is incorporated in the voice reproducing apparatus and functions as a storage medium for storing only a voice file transmitted from the flash memory card 38 through the memory card controller 87 under the control of the system controller 86. In response to the operations of below-mentioned operating buttons and switches, the system controller 86 performs the control of the whole system including the control of the operations of a DSP 35, the memory card controller 87, the flash memory card 38, and the incorporated memory 94. The system controller 86 is an element of a file selecting means, an index information reading means, and a file identification detecting means, a file transfer means, and a file erasing means. The DSP 85 functions as a data decompression means for decompressing data in the voice file transmitted from the incorporated memory 94 under the control of system con-
controller 86 when reproducing. A D/A converter 81 con-
verts to an analog signal the read-out data decom-
presed by the DSP 85. A bandpass filter 82 cuts off an
unnecessary frequency band of the analog signal out-
putted from the D/A converter 81. An amplifier 83 am-
plifies the analog signal filtered through the band-pass
filter 82. A switch 92 selects a device to which the signal
from the amplifier 83 is outputted. A speaker 84 converts
to a voice the signal transmitted via the switch 92. An
earphone jack 93 outputs the signal from the switch 92
to an earphone or the like. A display 89 displays infor-
mation, such as an operation mode, a file number or the
like, under the control of the system controller 86. An
electric power source 90 supplies electric power to the
voice reproducing apparatus under the control of the
system controller 86. An operating portion 91 is coupled
to the system controller 86.

[0117] The operating portion 91 comprises a playing
button PLAY for starting the voice reproducing; a stop
button STOP for stopping the voice reproducing; a fast
returning button REW for returning the position of the
voice reproducing; a fast forwarding button FF for fast
forwarding the position of the voice reproducing; a menu
button MENU for selecting an optional function in a
menu; an up button UP; a down button DOWN; an eras-
ing button ERASE for erasing recorded voice data; and
an index search button SEARCH for searching an index
mark for indicating the beginning of a dictation file.

[0118] Examples of optional functions selected by the
menu button MENU are to set a reproducing speed, a
returning amount in auto-backspacing, a tone of repro-
duced voice, whether to delete a file after transmission
of the file, a typist identification code, and a clock. When
the up button UP or the down button DOWN is operated
without pressing the menu button MENU, the volume
of reproduced voice is adjusted.

[0119] For example, a RAM, a flash memory, a mag-
netic disc (e.g., a hard disc) may be adopted as the in-
corporated memory 94.

[0120] Fig. 18 is a flowchart of an operation of the sys-
 tem controller 86.

[0121] When the electric power is supplied from the
electric power source 90 to the system controller 86, the
system controller starts its operation. In step S91, ex-
ternal conditions and an internal memory of the system
controller 86 are initialized and the completion of the in-
itialization is displayed on the display 89.

[0122] After the initialization is completed, the opera-
tion of the voice reproducing apparatus is stopped in
step S92. In step S93, it is determined whether the flash
memory card 38 has been installed or not.

[0123] If the flash memory card 38 has not been in-
stalled, the process goes back to step S92. If the flash
memory card 38 has been installed, the process goes
to step S94, in which the file information recorded there-
in is read out. In step S95, a voice file is transferred. In
step S96, index information of the file is displayed on
the display 89. At this time, the flash memory card 38
may be removed so that the flash memory card 38 can
be used for next recording without waiting until the doc-
umentation is completed.

[0124] Next, in step S97, it is determined whether any
operating button has been pressed or not. If no operat-
ing button has been pressed, the process goes back to
step S92. If an operating button has been pressed, the
process goes to step S98, in which it is determined
whether the playing button PLAY has been turned on or
not.

[0125] If the playing button PLAY has been pressed,
a voice reproducing process is implemented in step
S99. In the voice reproducing process, the recorded da-
ta in the flash memory card 38 coupled to the memory
card controller 87 are read out and transmitted to the
DSP 85, in which the data are decompressed and trans-
mited to the D/A converter 81.

[0126] If it is determined in step S98 that the playing
button PLAY has not been operated, it is determined in
step S100 whether the fast forwarding button FF has
been operated or not. If the fast forwarding button FF
has been operated, a fast forwarding process is execut-
ed in step S101. In the fast forwarding process, the op-
erating position is successively fast forwarded at a pro-
er speed (for example, 100 times faster than that of the
voice reproduction).

[0127] If it is determined in step S100 that the fast for-
warding button FF has not been operated, it is deter-
mined in step S102 whether the fast returning button
REW has been operated or not. If the fast returning but-
ton REW has been pressed, a fast returning process is
implemented in step S103. In the fast returning process,
the operating position is successively shifted in the op-
posite direction to and at the same speed as that of the
fast forwarding.

[0128] If it is determined in step S102 that the fast re-
turning button REW has not been operated, it is deter-
mined in step S104 whether the erasing button ERASE
has been operated or not. If the erasing button ERASE
has been pressed, an erasing process is executed in step
S105. In the erasing process, the file corresponding
to the file number presently displayed on the display 89
is erased.

[0129] If it is determined in step S104 that the erasing
button ERASE has not been operated, it is determined in
step S106 whether the menu button MENU has been
operated or not. If the menu button MENU has been
pressed, a menu changing process is performed in step
S107. In the menu changing process, respective op-
tions are set based on the instructions by the up button
UP and the down button DOWN of the operating portion
91.

[0130] If it is determined in step S106 that the menu
button MENU has not been operated, it is determined in
step S108 whether the index search button SEARCH
has been operated or not. If the index search button
SEARCH has been pressed, an I mark detecting proc-
ess for detecting an index mark is implemented in step
S109.

[0131] When the stop button STOP is pressed, or when the present operating position reaches the ending or starting position of the memory, during the operation of step S99, S101 or S 103, then the process exits from these steps and goes back to step S92. Since the voice data have already been transmitted to the incorporated memory 94, the flash memory card 38 can be removed at any time.

[0132] Also when the operation of step S105, S107 or S109 has been completed, or when the index search button SEARCH has been turned off in step S 108, the process goes back to step S92.

[0133] Referring to Figs 19 and 20, the details of the voice file transfer process are described. Fig. 19 is a flowchart of a part of the voice file transfer process, and Fig. 20 is a flowchart of another part of the voice file transfer process.

[0134] In step S 111, it is determined whether any voice file has been recorded in the detachable flash memory card 38 coupled to the memory card controller 87. If no voice file has been recorded, an error message is displayed on the display 89 in step S 113 to exit from the voice file transfer process.

[0135] If it is determined in step S 111 that a voice file has been recorded, the process proceeds to step S 112, in which the index information of the file is read out to detect a flag indicating whether the file has already been transferred. In step S 112, based on the flag, it is determined whether there is any file which has not been transferred. If there is no file which has not been transferred, the process goes to step S 115, in which the display 89 displays the message that the file transfer has been completed. Then, this file transfer process is quit.

[0136] On the other hand, if it is determined in step S 114 that there is a file, the process goes to step S 116, in which the file is compared with a file or files recorded in the memory 94 incorporated in the voice reproducing apparatus. In step S 117, it is determined whether the incorporated memory 94 contains a file having the same file name as that of the file which has not been transferred. If such a file does not exist, the process goes to step S 129, in which it is determined whether the incorporated memory 94 has enough space for recording the file. If there is enough space in the memory 94, the file is transferred in step S 130. If there is not enough space in the memory 94, the process returns to step S 113 to display an error message on the display 89.

[0137] If a file having the same file name exists in the incorporated memory 94, contents of the index information of both files are compared to each other in step S 118. That is, the file numbers, the user identification codes, the dates and time of the start of recording, the dates and time of the end of recording, and the recording time of both files are compared to each other.

[0138] Based on the comparison, it is determined in step S 119 whether the file numbers are the same or not. If they are different from each other, the last four characters of the file name of the file in the flash memory card 38 are replaced by its file number in step S 120. Then, the process goes back to the step S 112.

[0139] On the other hand, if the file numbers are the same, it is determined in step S 121 whether the user identification codes are the same or not. If they are different from each other, the first four characters of the file name of the file in the flash memory card 38 are replaced by the user identification code in step S 122.

Then, the process goes back to step S 112.

[0140] If the user identification codes are the same, it is determined in step S 123 whether the dates and time of the start of recording are the same or not. If they are different from each other, the process proceeds to step S 125, in which the file name and the file number of the file in the flash memory card 38 are changed to unique ones which have not been used for the files in the incorporated memory 94. Then, the process goes back to step S 112.

[0141] If the dates and time of the start of recording are the same, it is determined in step S 124 whether the dates and time of the end of recording are the same or not. If they are the same, it is determined in step S 126 whether the recording time of both files is the same or not.

[0142] If the recording time of both files is different from each other, the process proceeds to step S 125. If it is the same, the process goes to step S 128 to turn on the transfer completion flag of the file in the flash memory card 38. Then, the process goes back to step S 112.

[0143] If it is determined in step S 124 that the dates and time of the end of recording are different from each other, it is determined in step S 127 whether the file in the flash memory card 38 is new compared with the file in the incorporated memory 94. If it is not new, the process goes to step S 128. If it is new, the process proceeds to step S 129, in which it is determined whether the remaining space in the incorporated memory 94 is larger than the volume of the file which has not been transferred.

[0144] If it is determined in step S 129 that the remaining space is not larger than the volume of the file, the process goes to step S 113. If it is larger than the volume of the file, the untransferred file having the smallest file number is transferred to the incorporated memory 94 in step S 130. In step S 131, the transfer completion flag of the file in the flash memory card 38 is turned on.

[0145] By implementing the comparisons described above, a file in the flash memory card 38 is not transferred if its index information is identical to that of a file in the incorporated memory 94, or if the file in the flash memory card 38 is old compared with the file in the incorporated memory 94 having the same file name. On the other hand, if the index information of both files is different in any item, the file name and the file number of the file in the flash memory card 38 are changed so as to be different from those of the file in the incorporated memory 94 and the file is transferred in accordance with
the order of the file numbers. Then, the transfer completion flag recorded in the index information area of the transferred file is turned on.

[0146] Next, in step S132, a erasing mode is detected. In step S133, it is determined whether the erasing mode is an automatic erasing mode or not. If it is not the automatic erasing mode, the process goes to step S112. If it is the automatic erasing mode, it is determined in step S134 whether an erroneous erasure preventing flag has been turned on or not.

[0147] If the erroneous erasion preventing flag has been turned on, an alarm indicating that the erasion cannot be implemented is outputted in step S136 and the process goes to step S 112. On the other hand, if the flag has been turned off, the transferred file in the flash memory card 38 is erased in step S135 and the process goes to step S112.

[0148] It can be selected by the optional menu whether the transferred file in the flash memory card 38 is retained or automatically erased after the transfer process is completed. If the automatic erasure after transfer is selected, the same file will not be recorded in duplicate in the separate memories so that the memory space can be saved.

[0149] The voice reproducing apparatus as an example not covered by the invention has substantially the same advantage as that of the second embodiment. Further, since it can select only the voice files from the flash memory card recording various kinds of files and transfer them to the incorporated memory, an unnecessary file is not transferred to the incorporated memory.

[0150] As many apparently widely different embodiments of the present invention may be made without departing from the scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.

Claims

1. A voice recording and reproducing apparatus for use with a recording medium (10, 38, 94), the apparatus comprising:

- information storage means (8a, 21, 38, 94) storing predetermined information including at least one of information unique to a user and information unique to the voice recording and reproducing apparatus;
- identification code generating means (8, 36, 86) for generating an identification code based on the predetermined information;
- analog-to-digital converting means (4, 34) for converting an analog signal representing an input voice to a digital signal;
- data compressing means (5, 35, 85) for compressing the digital signal to create voice data;
- recording means (8, 36, 86) for recording to the recording medium the voice data and index information of the voice data including the identification code as a voice file, the voice file having a name including a predetermined extension consisting of one to three characters;
- file reading means (8, 36, 86) for reading out, from the recording medium, only a file having a name including the predetermined extension consisting of one to three characters;
- data decompressing means (5, 35, 85) for decompressing the voice data of the file read out by the file reading means (8, 36, 86);
- digital-to-analog converting means (11, 41, 81) for converting the voice data decompressed by the data decompressing means (5, 35, 85) to an analog signal;
- and detecting means (8, 36, 86) for detecting that the index information of the voice data read out by the file reading means (8, 36, 86) includes the identification code.

2. The voice recording and reproducing apparatus of claim 1, further comprising means for setting the information unique to the user (8, 19, 36, 45, 86, 91).

3. The voice recording and reproducing apparatus of claim 1, further comprising file number generating means (8, 36, 86) for generating a unique file number in the recording medium, in which the identification code generating means (8, 36, 86) generates the identification code based on the predetermined information and the file number.

4. The voice recording and reproducing apparatus of claim 3, in which the file number generating means (8, 36, 86) sequentially generates successive file numbers.

5. The voice recording and reproducing apparatus of claim 3, in which the file number generating means (8, 36, 86) sequentially generates random file numbers.

6. The voice recording and reproducing apparatus of claim 1, in which the identification code includes a discrimination signal for indicating that the file is a voice file.

7. The voice recording and reproducing apparatus of claim 1, in which the recording medium is a memory card (10, 38) which can be electrically and mechanically coupled to and removed from the voice recording and reproducing apparatus.

8. The voice recording and reproducing apparatus of claim 1, further comprising file number generating means (8, 36, 86) for generating a unique file
number in the recording medium, in which the index information includes the file number and discrimination signal for indicating that the file is a voice file.

9. The voice recording and reproducing apparatus of claim 8, further comprising detecting means (8, 36, 86) for detecting that index information of the file read out by the file reading means (8, 36, 86) includes a file number and a discrimination signal for indicating that the file is a voice file.

10. A voice recording and reproducing method comprising the steps of:

- storing, in a voice recording apparatus, predetermined information including at least one of information unique to a user and information unique to the voice recording apparatus;
- converting an analog signal representing an input voice to a digital signal; compressing the digital signal to create voice data;
- generating an identification code based on the predetermined information; adding the identification code to an index of the voice data;
- creating a voice file having a name including a predetermined extension consisting of one to three characters;
- recording the voice file to a recording medium;

and when reproducing:

- reading out, from the recording medium, only a file having a name including the predetermined extension;
- decompressing the voice data of the read out file;
- converting the decompressed voice data to an analog signal;
- reproducing a voice from the analog signal;
- and detecting the identification code on the index of the voice data.

Patentansprüche

1. Vorrichtung zur Aufnahme und Wiedergabe von Stimmen zur Verwendung mit einem Aufnahmemedium (10, 38, 94), wobei die Vorrichtung aufweist:

- eine Einrichtung zur Speicherung von Informationen (8a, 21, 38, 94), die im voraus festgelegte Informationen speichert mit mindestens einer benutzerspezifischen Information und einer Information, die spezifisch für die Vorrichtung zur Aufnahme und Wiedergabe von Stimmen ist;
- eine Einrichtung zur Erzeugung von Identifikations-Codes (8, 36, 86) für die Erzeugung eines Informations-Codes auf Basis der im voraus festgelegten Informationen;
- eine Analog-Digital-Konvertierungseinrichtung (4, 34) für die Konvertierung eines analogen Signals, das eine Stimmaufnahme wiedergibt, in ein digitales Signal;
- eine Datenkomprimierungseinrichtung (5, 35, 85) für die Komprimierung des digitalen Signals zur Erzeugung von Stimmdaten;
- eine AufnahmeEinrichtung (8, 36, 86) für die Aufnahme der Stimmdaten und von Index-Informationen der Stimmdaten einschließlich des Identifikationscodes auf das Aufnahmemedium in Form einer Stimmen-Datei (1) mit einem Namen, der eine im voraus festgelegte Erweiterung aus einem bis drei Buchstaben enthält;
- eine Datei-LeseEinrichtung (8, 36, 86) für das Auslesen ausschließlich einer Datei, die einen Namen mit der im voraus festgelegten Verlängerung hat, die aus einem bis drei Buchstaben besteht, aus dem Aufnahmemedium;
- eine Datendekomprimierungseinrichtung (5, 35, 85) für die Dekomprimierung der Stimmdaten aus der Datei, die von der Datei-LeseEinrichtung (8, 36, 86) ausgelesen wurde;
- eine Digital-Analog-Konvertierungseinrichtung (11, 41, 81) für die Konvertierung der Stimmdaten, die von der Datendekomprimierungseinrichtung (5, 35, 85) dekomprimiert wurden, in ein analoges Signal; und
- eine Detektionseinrichtung (8, 36, 86) zur Detektion, ob die Index-Informationen der Stimmdaten, die durch die Datei-LeseEinrichtung (8, 36, 86) ausgelesen wurde, den Identifikations-Code enthält.

2. Vorrichtung zur Aufnahme und Wiedergabe von Stimmen gemäß Anspruch 1, die weiterhin eine Einrichtung für die Eingabe der benutzerspezifischen Information (8, 19, 36, 45, 86, 91) aufweist.

3. Vorrichtung zur Aufnahme und Wiedergabe von Stimmen gemäß Anspruch 1, die weiterhin eine Einrichtung zur Generierung von Dateinummern (8, 36, 86) aufweist für die Erzeugung einer spezifischen Dateinummer im Aufnahmemedium, wobei die Einrichtung zur Generierung des Identifikations-Codes (8, 36, 86) den Identifikations-Code auf Basis der im voraus festgelegten Informationen und der Dateinummer generiert.

4. Vorrichtung zur Aufnahme und Wiedergabe von Stimmen gemäß Anspruch 3, wobei die Einrichtung zur Generierung von Dateinummern (8, 36, 86) sequentiell aufeinanderfolgende Dateinummern generiert.
5. Vorrichtung zur Aufnahme und Wiedergabe von Stimmen gemäß Anspruch 3, wobei die Einrichtung zur Generierung von Dateinummern (8, 36, 86) sequentiell zufällige Dateinummern generiert.

6. Vorrichtung zur Aufnahme und Wiedergabe von Stimmen gemäß Anspruch 1, wobei der Identifikations-Code ein Unterscheidungssignal aufweist, das anzeigt, dass die Datei eine Stimmen-Datei ist.

7. Vorrichtung zur Aufnahme und Wiedergabe von Stimmen gemäß Anspruch 1, wobei das Aufnahmemedium eine Speicherkarte (10, 38) ist, die elektrisch und mechanisch an die Vorrichtung zur Aufnahme und Wiedergabe von Stimmen gekoppelt und entfernt werden kann.

8. Vorrichtung zur Aufnahme und Wiedergabe von Stimmen gemäß Anspruch 1, die weiterhin eine Einrichtung zur Generierung von Dateinummern (8, 36, 86) zur Generierung einer spezifischen Dateinummer im Aufnahmemedium aufweist, wonin die Index-Informationen die Dateinummer sowie ein Unterscheidungssignal, das anzeigt, dass die Datei eine Stimmen-Datei ist, enthalten.

9. Vorrichtung zur Aufnahme und Wiedergabe von Stimmen gemäß Anspruch 8, die weiterhin eine De tektionseinrichtung (8, 36, 86) aufweist zur Detektion, ob die Index-Informationen der von der Datei-Leseinrichtung (8, 36, 86) ausgelesenen Datei eine Dateinummer und ein Unterscheidungssignal, das zeigt, dass die Datei eine Stimmen-Datei ist, enthalten.

10. Verfahren zur Aufnahme und Wiedergabe von Stimmen, das die folgenden Schritte aufweist:

   Speicherung von im voraus festgelegten Informationen, die mindestens eine benutzerspezifische Information und eine Information, die spezifisch für die Vorrichtung zur Aufnahme und Wiedergabe von Stimmen, enthalten, in einer Vorrichtung zur Aufnahme von Stimmen; Konvertierung eines analogen Signals, das eine Stimmabnahme wiedergibt, in ein digitales Signal; Komprimierung des digitalen Signals zur Erzeugung von Stimmdaten; Erzeugung eines Identifikations-Codes auf Basis der im voraus festgelegten Informationen; Hinzufügung des Identifikations-Codes zu einem Index der Stimmdaten; Erzeugung einer Stimmen-Datei mit einem Namen, der eine im voraus festgelegte Erweiterung mit einem bis drei Buchstaben enthält; Aufnahme der Stimmen-Datei auf ein Aufnahmemedium; und das bei der Wiedergabe die folgenden Schritte aufweist:

   Auslesen ausschließlich einer Datei mit einem Namen mit der im voraus festgelegten Verlängerung, die aus einem bis drei Buchstaben besteht, aus dem Aufnahmemedium; Dekomprimierung der Stimmdaten aus der ausgelesenen Datei; Konvertierung der dekomprimierten Stimmdaten in ein analoges Signal; Wiedergabe einer Stimme mittels des analogen Signals; und Detektion des Identifikations-Codes aus dem Index der Stimmdaten.

Revendications

1. Appareil d'enregistrement et de reproduction de la voix destiné à être utilisé avec un support d'enregistrement (10, 38, 94), l'appareil comprenant :

   un moyen de stockage de l'information (8a, 21, 38, 94) pour le stockage d'informations prédéterminées incluant au moins une information affectée de façon univoque à un utilisateur et une information affectée de façon univoque à l'appareil d'enregistrement et de reproduction de la voix;
   un moyen de génération d'un code d'identification (8, 36, 86) pour générer un code basé sur les informations prédéterminées;
   un moyen de conversion analogique-numérique (4, 34) pour convertir en un signal numérique un signal analogique affecté à une voix enregistrée;
   un moyen de compression de données (5, 35, 85) pour comprimer le signal numérique en vue de créer des données vocales;
   un moyen d'enregistrement (8, 36, 86) pour enregistrer sur le support d'enregistrement les données vocales et les informations d'indexage des données vocales comprenant le code d'identification sous forme de fichier vocal, le fichier vocal ayant un nom comportant une extension prédéfinie de un à trois caractères;
   un moyen de lecture de fichiers (8, 36, 86) pour lire sur le support d'enregistrement uniquement un fichier dont le nom comporte l'extension de un à trois caractères prédéfinie;
   un moyen de décompression de données (5, 35, 85) pour décomprimer les données vocales du fichier lu par le moyen de lecture de fichiers (8, 36, 86);
   un moyen de conversion numérique-analogique (11, 41, 81) pour convertir en un signal ana-
logique les données vocales décompressées par le moyen de décompression de données (5, 35, 85);
ainsi qu’un moyen de détection (8, 36, 86) pour déterminer si l’information d’indexage des données vocales lues par le moyen de lecture de fichiers (8, 36, 86) contient le code d’identification.

2. L’appareil d’enregistrement et de reproduction de la voix de la revendication 1 comportant en outre un moyen permettant de générer l’information affectée de façon univoque à un utilisateur (8, 19, 36, 45, 86, 91).

3. L’appareil d’enregistrement et de reproduction de la voix de la revendication 1 comportant en outre un moyen de génération d’un numéro de fichier (8, 36, 86) pour générer un numéro de fichier univoque sur le support d’enregistrement où le générateur de code d’identification (8, 36, 86) génère le code d’identification à partir de l’information prédéterminée et du numéro de fichier.

4. L’appareil d’enregistrement et de reproduction de la voix de la revendication 3 dont le moyen de génération d’un numéro de fichier (8, 36, 86) générant séquentiellement des numéros de fichiers consécutifs.

5. L’appareil d’enregistrement et de reproduction de la voix de la revendication 3 dont le moyen de génération d’un numéro de fichier (8, 36, 86) générant séquentiellement des numéros de fichiers aléatoires.

6. L’appareil d’enregistrement et de reproduction de la voix de la revendication 1, le code d’identification comportant un signal discriminatoire pour indiquer que le fichier est un fichier vocal.

7. L’appareil d’enregistrement et de reproduction de la voix de la revendication 1 dont le support d’enregistrement est une carte à mémoire (10, 38) pouvant être connectée électriquement et mécaniquement à l’appareil d’enregistrement et de reproduction de la voix et en être retirée.

8. L’appareil d’enregistrement et de reproduction de la voix de la revendication 1 comportant en outre un moyen de génération d’un numéro de fichier (8, 36, 86) pour générer un numéro de fichier univoque sur le support d’enregistrement où l’information d’indexage comprend le numéro de fichier et le signal discriminatoire indiquant que le fichier est un fichier vocal.

9. L’appareil d’enregistrement et de reproduction de la

10. Méthode d’enregistrement et de reproduction de la voix comportant les étapes suivantes :

   stockage dans un appareil d’enregistrement et de reproduction de la voix d’une information prédéterminée incluant au moins une information affectée de façon univoque à un utilisateur et une information affectée de façon univoque à l’appareil d’enregistrement et de reproduction de la voix;
   conversion en un signal numérique d’un signal analogique affecté à une voie enregistrée;
   compression du signal numérique en vue de créer des données vocales;
   génération d’un code d’identification basé sur l’information prédéterminée;
   adjonction du code d’identification à un index des données vocales;
   création d’un fichier vocal portant un nom comportant une extension prédéfinie de un à trois caractères;
   enregistrement de la voix sur un support d’enregistrement;

   et pour la reproduction :

   lecture sur le support d’enregistrement unique-
   ment un fichier dont le nom comporte l’exten-
   sion de un à trois caractères prédéfinie;
   décompression des données vocales du fichier lu;
   conversion des données vocales décompri-
   mées en un signal analogique;
   reproduction de la voix à partir du signal ana-
   logique,
   et détection du code d’identification de l’index des données vocales.
<table>
<thead>
<tr>
<th>VERSION NUMBER OF CONTROL SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME OF MANUFACTURER</td>
</tr>
<tr>
<td>MODEL NAME</td>
</tr>
<tr>
<td>SERIAL NUMBER</td>
</tr>
</tbody>
</table>

: 

Fig. 2
Fig. 3
START

RESET ?

NO

IS MENU BUTTON PRESSED FOR T SECONDS ?

YES

DISPLAY OF IDENTIFICATION SETTING MENU

IS IDENTIFICATION CODE INPUTTED ?

NO

TIME OUT ?

YES

REGISTRATION OF USER IDENTIFICATION

END

Fig. 4
START

RECORDING MODE?

YES

IS DETECTION COMPLETED?

NO

BEGIN

IS USER IDENTIFICATION REGISTERED?

NO

IDENTIFICATION CODE = FIXED IDENTIFICATION, FILE NO.

YES

IDENTIFICATION CODE = USER IDENTIFICATION, FILE NO.

RECORD OF NEW IDENTIFICATION CODE IN INDEX INFORMATION AREA

END

Fig. 5
ACQUISITION OF FILE INFORMATION FROM FLASH MEMORY CARD

NO. OF VOICE FILE IS SET TO 0

VOICE FILE INFORMATION TABLE IS INITIALIZED

RETRIEVAL OF FILE IN FLASH MEMORY

FILE EXISTS?

NO

EXTENSION OF FILE "dss"?

YES

DETECTION OF FILE DISCRIMINATION SIGNAL

IS FILE DISCRIMINATION SIGNAL "dss"?

NO

YES

DETECTION OF FILE NUMBER

IS RANGE OF FILE NO. FROM 0001 TO 9999?

NO

YES

SET FILE NO. TO VOICE FILE INFORMATION TABLE

RETURN
<table>
<thead>
<tr>
<th>INDEX INFORMATION AREA (512 BYTES)</th>
<th>SYSTEM VERSION NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FILE DISCRIMINATION SIGNAL</td>
</tr>
<tr>
<td></td>
<td>FILE NO.</td>
</tr>
<tr>
<td></td>
<td>USER IDENTIFICATION CODE</td>
</tr>
<tr>
<td></td>
<td>DATE AND TIME OF START OF RECORDING</td>
</tr>
<tr>
<td></td>
<td>DATE AND TIME OF END OF RECORDING</td>
</tr>
<tr>
<td></td>
<td>RECORDING TIME</td>
</tr>
<tr>
<td></td>
<td>ORDER OF PRIORITY</td>
</tr>
<tr>
<td></td>
<td>TRANSFER COMPLETION FLAG</td>
</tr>
<tr>
<td></td>
<td>ERRONEOUS ELIMINATION PREVENTING FLAG</td>
</tr>
<tr>
<td></td>
<td>I MARK ADDRESS NO. 1</td>
</tr>
<tr>
<td></td>
<td>I MARK ADDRESS NO. 2</td>
</tr>
<tr>
<td></td>
<td>I MARK ADDRESS NO. 3</td>
</tr>
<tr>
<td></td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>I MARK ADDRESS NO. 16</td>
</tr>
<tr>
<td></td>
<td>EXTRA AREA</td>
</tr>
</tbody>
</table>

Fig. 14
B

OUTPUT CODING START COMMAND TO DSP

INPUT VOICE DATA BLOCK FROM DSP

TRANSMIT VOICE DATA BLOCK TO MEMORY CARD CONTROLLER

RENEW RECORDING POSITION

STOP?

TRANSMIT CODING STOP COMMAND TO DSP

RENEW INDEX INFORMATION

CLOSE FILE

RETURN

Fig. 16
Fig. 17
Fig. 18
VOICE FILE TRANSFER PROCESS

IS THERE VOICE FILE?

NO

ERROR MESSAGE

YES

DETECT FLAG OF TRANSFERRED FILE

IS THERE UNTRANSFERRED FILE?

NO

DISPLAY OF COMPLETION OF FILE TRANSFER

YES

FILE COMPARISON

SAME FILE NAME EXISTS?

NO

RETURN

YES

COMPARISON OF INDEX INFORMATION

SAME FILE NO ?

NO

SAME USER IDENTIFICATION CODE?

YES

SAME DATE & TIME OF END?

NO

SAME RECORDING TIME?

NO

IS FILE COMPARATIVELY NEW?

YES

TURN ON TRANSFER COMPLETION FLAG

NO

REPLACE LAST 4 CHARACTERS OF FILE NAME

REPLACE FIRST 4 CHARACTERS OF FILE NAME

SAME DATE & TIME OF START?

NO

CHANGE OF FILE NAME & FILE NO. TO UNIQUE ONES

YES

Fig. 19
S129

IS INCORPORATED MEMORY LARGER THAN VOLUME OF FILE?

YES → E

NO →

TRANSFER UNTRANSFERRED FILE HAVING THE SMALLEST FILE NO. TO INCORPORATED MEMORY

S130

TURN ON TRANSFER COMPLETION FLAG OF FILE IN FLASH MEMORY CARD

S131

DETECTION OF ERASING MODE

S132

NO →

IS ERASING MODE AUTOMATIC ERASING MODE?

S133

YES →

IS ERRONEOUS ERASURE PREVENTING FLAG TURNED ON?

S134

YES → ALARM

S136

NO →

ERASE TRANSFERRED FILE IN FLASH MEMORY CARD

S135

Fig. 20