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**(54) A hearing instrument with off-line speech messages**

Hörgerät mit Offline-Sprachnachrichten

Instrument auditif pour messages vocaux hors ligne

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## Description

**[0001]** A new hearing instrument is provided with capability of presenting speech messages, such as calendar reminders, tweets, sms-messages, notifications, etc., e.g., from a user's time management and communication systems at selected points in time.

**[0002]** Personal time management may be performed with a computer, e.g. using an email system with electronic calendar, to-do-lists, and notes to manage daily activities and communications. Communication may also be performed via electronic social and professional networks.

**[0003]** In some cases, a user recording an event or a task to be performed also records a reminder to be displayed to the user in advance to remind the user of the upcoming event or the task to be performed. Likewise, notifications may be displayed on a computer indicating incoming communication, such as receipt of a new email or updates in the social or professional networks, etc.

**[0004]** Notifications and reminders typically include a sound to make the user aware of the reminder or notification. Having heard the sound, the user typically has to consult a display on a computer, tablet computer, smart phone, or mobile phone, in order to know what event or task, a particular reminder or notification relates to.

**[0005]** In the event that the user is wearing a hearing instrument, e.g. a hearing aid, the user may miss one or more notifications and/or reminders.

**[0006]** US 2005/0251224 A1 discloses a hearing system for a person, comprising input means for providing electrical signals produced from sound, signal processing means for processing said electrical signals for producing audio signals, means for storing digital text received from a source of digital text, means for converting digital text from said text storing means into audio signals, and output transducer means for converting audio signals into a stimulation of said person's hearing.

**[0007]** US 2012/215532 A1 discloses providing individualized consistent speech patterns to a user of a hearing assistance system. More specifically, a method performed by a portable computing device for providing consistent speech is described. In one embodiment, the portable computing device includes an audio processing component coupled with an audio input device. The method can be performed by carrying out the following operations: receiving human speech at the audio input device, converting the human speech to text, converting the text directly to a consistent speech using a text to speech protocol, and passing the consistent speech to an output device.

**[0008]** New methods of communicating a message according to claims 15 and 16, respectively, are provided.

**[0009]** New hearing instrument systems according to claims 7 and 8, respectively, are also provided.

**[0010]** The device may comprise the text-to-speech processor configured for conversion of the message into the corresponding speech message, and the central

processor may be configured for controlling the transmission of the corresponding speech message to the hearing instrument.

**[0011]** Alternatively, the hearing instrument may comprise the text-to-speech processor.

**[0012]** Through the Wide-Area-Network, e.g. the Internet, the device has access to electronic time management and communication tools used by the user for communication and for storage of time management and communication information relating to the user. The tools and the stored information typically reside on a remote server accessed through the Wide-Area-Network. A plurality of the devices with interfaces to the Wide-Area-Network may access the tools through the Wide-Area-Network and may store the information relating to the user.

**[0013]** The device may access the Wide-Area-Network through a mobile telephone network, such as GSM, IS-95, UMTS, CDMA-2000, etc.

**[0014]** Each of the devices may be synchronized with the remote server when connected with the remote server through the Wide-Area-Network, e.g. according to a user defined schedule, so that the information stored in the device is consistent with the information stored in the remote server, i.e. during synchronization, the information in the remote server is updated with possible changes entered into the device by the user subsequent to the previous synchronization, e.g. the user may have entered new information, such as a new meeting in the calendar, during a period of time, when the device was not connected to the remote server; and the information in the device is also updated with possible changes entered into the remote server subsequent to the previous synchronization, e.g. another person may have send an invitation to a new meeting to the user.

**[0015]** The tools may include electronic calendar system(s), email system(s), such as Microsoft Outlook Express, Lotus notes, Windows Mail, Mozilla Thunderbird, Postbox, Apple Mail, Opera Mail, KMail, Hotmail, Yahoo, Gmail, AOL, etc, social network(s), professional network(s), such as Facebook®, LinkedIn®, Google+, tumblr, Twitter, MySpace, etc, RSS/Atom feeder(s), such as Bloglines, Feedly, Google Reader, My Yahoo!, NewsBlur, Netvibes, etc, news feeder(s), etc, well-known for management of daily activities and communications.

**[0016]** The information may include tasks to be performed, calendar dates, such as birthdays, anniversaries, appointments, meetings, etc, contacts, websites of interest, etc.

**[0017]** The device may reside in, and may share resources with, any type of computer, tablet PC, PDA, mobile phone, smart phone, etc.

**[0018]** The device may comprise the text-to-speech processor configured to generate a corresponding speech message, such as a spoken reminder, from the information that is stored and updated using the tools. The corresponding speech message may be stored as digital audio samples in an audio file in a memory in the

device for subsequent transmission to the hearing instrument, e.g. upon detection of connection with the hearing instrument, possibly together with timing information, such as a date and time of day, or corresponding to a specific date and time of day, e.g. the number of seconds, minutes, hours and/or days in advance of term expiry of the recorded event or task, the reminder should be presented to the user, e.g. 3 days before a recorded birthday, or defined by the number of seconds, minutes, hours and/or days that have to elapse from data entry until presentation of the speech message to the user, etc, constituting the selected time for play back of the corresponding speech message to the user. In this way, a text-to-speech processor is not required in the hearing instrument.

**[0019]** Alternatively, the hearing instrument may comprise the text-to-speech processor. The message may be converted to the corresponding speech message at the time of play back of the corresponding speech message to the user; or, the message may be converted to the corresponding speech message at the time of receipt of the message by the hearing instrument, and the audio samples may be stored in a memory in the hearing instrument for play back at the selected time.

**[0020]** The device may be synchronized with the remote server when connected with the remote server through the Wide-Area-Network, e.g. according to a user defined schedule.

**[0021]** Typically, when the user records or edits an event that requires attention or a task to be performed, the tools provide the option of specifying a reminder to be sent to the user in advance. Typically, the user may select that the reminder is forwarded as an SMS and/or an email and/or displayed in a pop-up window on a computer and/or forwarded as a corresponding speech message to the hearing instrument.

**[0022]** Further, the user may select how long time in advance, e.g. seconds, minutes, hours and/or days, the reminder is to be presented to the user, e.g. by specifying the number of seconds, minutes, hours and/or days before the term of the recorded event or task, the reminder has to be presented to the user, e.g. 3 days before a recorded birthday, or by specifying the actual date and time of day, the reminder has to be presented to the user, or by specifying the number of seconds, minutes, hours and/or days that have to elapse from data entry until presentation of the reminder to the user, etc.

**[0023]** Typically, the tools also provide notifications to the user of incoming communication, such as receipt of a new email, SMS, instant message, traffic announcement, etc, or receipt of updates in social or professional networks, such as Facebook, Twitter, LinkedIn, etc, RSS/Atom feeds, etc.

**[0024]** The message may include such notifications.

**[0025]** The message may also include the new incoming information, e.g. an email, an SMS, a post in social or professional network, a blog post, an RSS/Atom feed, a news feed, an instant message, etc.

**[0026]** Thus, examples of corresponding speech mes-

sages include reminders on, e.g. meetings, birthdays, social gatherings, journeys, to-do items, etc, and notifications on, e.g., tweets, emails, news, traffic updates, social network updates, web page updates, etc, and communication, e.g. an email, an SMS, a post in social or professional network, a blog post, an RSS/Atom feed, a news feed, an instant message, etc.

**[0027]** Some corresponding speech messages may be played back immediately upon receipt by the hearing instrument.

**[0028]** Corresponding speech messages to be played back immediately may be transmitted to the hearing instrument together with timing information equal to zero.

**[0029]** The corresponding speech message may be accompanied by a notification jingle, such as a personalized notification jingle.

**[0030]** The message, or the corresponding speech message, may be removed automatically from the memory of the hearing instrument after play back in order to make the part of the memory occupied by the message, or corresponding speech message, available to a new message, or corresponding speech message.

**[0031]** Alternatively, the message, or the corresponding speech message, may be kept in memory of the hearing instrument after play back in order to make it available for subsequent repeated play back.

**[0032]** Typically, the user may access the tools and the stored information from any type of computer or device that is connected to the Wide-Area-Network by logging-in to a specific account, e.g. with a username and a password.

**[0033]** When logged-in to the account in question, the user may authenticate other devices to access the tools and the stored information without further authentication.

**[0034]** In order for the device to be authenticated and allowed access to the tools and the stored information, the user may have to log onto the corresponding accounts from the device.

**[0035]** The hearing instrument has an interface for reception of the message, or the corresponding speech message, from the device, and a memory for storage of the message, or the corresponding speech message.

**[0036]** The message processor is configured for, at the selected time, control play back of the corresponding speech message by transmission of the corresponding speech message to an output transducer for conversion of the corresponding speech message into an acoustic output signal for transmission towards an eardrum of the user of the hearing instrument.

**[0037]** The hearing instrument may be a hearing aid, such as a BTE, RIE, ITE, ITC, or CIC, etc, hearing aid including a binaural hearing aid; or, the hearing instrument may be a headset, headphone, earphone, ear defender, or earmuff, etc, such as an Ear-Hook, In-Ear, On-Ear, Over-the-Ear, Behind-the-Neck, Helmet, or Headguard, etc.

**[0038]** For example, the new hearing instrument system is a new hearing aid system with a new hearing aid

having

**[0039]** a microphone for provision of an audio input signal in response to sound signals received at the first microphone,

**[0040]** a hearing loss processor that is configured to process the audio input signal in accordance with a pre-determined signal processing algorithm to generate a hearing loss compensated audio signal,

**[0041]** a receiver for conversion of the hearing loss compensated audio signal to an acoustic output signal,

**[0042]** an interface for reception of the message, e.g. as audio samples of a corresponding speech message, from the device,

the memory for storage of the message, and wherein

**[0043]** the message processor configured for, at the selected time, play back the message as the corresponding speech message by transmitting audio samples of the corresponding speech message to a D/A converter for conversion into an analogue audio signal output to the receiver for converting the analogue audio signal into an acoustic signal for transmission towards the eardrum of the user of the hearing aid system.

**[0044]** The hearing instrument, such as the hearing aid, may have a timer providing information on date and time of day, and the message processor may be configured for transmitting the message at a selected date and time of day.

**[0045]** The timer may be synchronized with the device, e.g. whenever data, such as the message, is transmitted to the hearing instrument.

**[0046]** The new hearing instrument system takes advantage of the fact that a user of the hearing instrument system, especially a hearing aid user, already wears the hearing instrument and therefore, the user is able to listen to corresponding speech messages without having to perform additional tasks, such as mounting a headphone or headset on his or her head, bringing a telephone to the ear, and/or looking at a screen and/or select information to be displayed and/or played back, and/or looking at a dashboard of a car and/or select information to be displayed and/or played back, etc.

**[0047]** The hearing instrument may have a wireless interface, for reception of data transmitted by the device, including messages or corresponding speech messages or distinct sounds, such as short single note tones, or distinct sequences of notes, such as notification jingles, such as a personalized notification jingles, and possibly the selected time, i.e. timing information specifying when the hearing instrument is controlled to play back the corresponding speech message.

**[0048]** The hearing instrument may have a wired interface for reception of data transmitted by the device, including messages or corresponding speech messages or distinct sounds, such as short single note tones, or distinct sequences of notes, such as notification jingles, such as a personalized notification jingles, and possibly

the selected time, i.e. timing information specifying when the hearing instrument is controlled to play back the corresponding speech message. The wired interface may, e.g., be used during possible docking of the hearing instrument, e.g. docking for recharging of the hearing instrument.

**[0049]** When the hearing instrument is within receiving range of the device transmitter, and the communication link between the hearing instrument and the device is established, the communication link may be used to synchronize the hearing instrument with the device, e.g. a timer of the hearing instrument may be synchronized with a timer of the device, and any new message; or, new messages to be presented to the user within a certain time period, e.g. within the next 24 hours, within the next week, within the next month, etc., may be transferred to the hearing instrument together with possible timing information on respective dates and times for play back of the corresponding speech messages to the user. Synchronizing data for a limited time period lowers the memory requirements of the hearing instrument. Alternatively, the amount of available memory may be calculated and a corresponding number of new messages may be transferred to the hearing instrument together with possible timing information on respective dates and times for play back of the corresponding speech messages to the user. In this way, the available memory is used to store as many messages as possible.

**[0050]** The user may use a user interface of the device to input time management and/or communication information to the tools as is well-known in the art.

**[0051]** The device may comprise the user interface, or part of the user interface, of the hearing instrument.

**[0052]** The hearing instrument may have a user interface, e.g. one or more push buttons, and/or one or more dials as is well-known from conventional hearing instruments.

**[0053]** The hearing instrument system may have a user interface configured for reception of spoken user commands to control operation of the hearing instrument system.

**[0054]** The user may use the user interface of the hearing instrument to command the hearing instrument to sequentially play back the messages currently stored in the memory of the hearing instrument, e.g. in ascending or descending order of time of receipt, in ascending or descending order of time to be played back, etc, e.g. specified by the user using the user interface of the hearing instrument and/or previously specified by the user during access to the tools.

**[0055]** The user may delete messages stored in the memory, using the user interface of the hearing instrument and/or the device.

**[0056]** The user may select a new time for the message to be played back using the user interface of the hearing instrument and/or the device. The new time may substitute or be added to the previous time for the message to be played back, e.g. also specified by the user using the

user interface of the hearing instrument and/or the device.

**[0057]** The user may delete the time for the message to be played back without deleting the message itself from the memory of the hearing instrument using the user interface of the hearing instrument and/or the device.

**[0058]** The user may select to mute all or selected received messages using the user interface of the hearing instrument and/or the device. Subsequently, the user may select to unmute all or selected received messages using the user interface of the hearing instrument and/or the device.

**[0059]** The selected time may be a time for playing back the corresponding speech message as previously specified by the user during recording or editing of the event or task in question and transmitted to the hearing instrument together with the message for storage in the hearing instrument.

**[0060]** The corresponding speech message may be played back at more than one selected times, each of which may be transmitted to the hearing instrument together with the message in question for storage in the hearing instrument.

**[0061]** Preferably, the corresponding speech message is digitized in the device into digital audio samples that is transmitted to the hearing instrument and stored in an audio file in the memory of the hearing instrument, whereby the corresponding speech message is stored in the hearing instrument in the form of an audio file. At play back, the digital audio samples of the audio file is converted to an analogue audio signal in a digital-to-analogue converter of the hearing instrument and the analogue audio signal is input to an output transducer, such as a loudspeaker (termed a receiver in a hearing aid), for conversion into a corresponding acoustic speech message that is transmitted towards the eardrum of the user.

**[0062]** In this way, the user is relieved from the task of consulting other equipment to check on reminders and updates; rather, the user need not change anything or take any particular actions in order to be able to receive corresponding speech messages.

**[0063]** The transmission of messages from the device to the hearing instrument need not take place at the time at which the hearing instrument plays the corresponding speech message back. Rather, the transmission may occur anytime before the time of play back, e.g. a reminder may be transmitted to the hearing instrument together with the selected time for play back of the reminder, upon recording or editing of the reminder; whenever the hearing instrument is within receiving range of the transmitter of the device and a communication link between the device and the hearing instrument has been performed.

**[0064]** The data rate of the transmission may be slow, since the message is not streamed; rather, the data is stored in a memory in the hearing instrument for later play back. Thus, data transmission may be performed whenever data transmission resources are available.

Thus, there is no need for the device to be in contact with the hearing instrument at the precise time of play back of the corresponding speech message, e.g. reminding the user of something.

**[0065]** In this way, the communication link, e.g. the wireless communication link, between the device and the hearing instrument need not be particularly fast or particularly reliable. For example, the link data rate need not be fast enough to transmit audio in real-time. Still, the corresponding speech messages may be played back to the user as high quality audio, since the corresponding speech messages may be transmitted to the user at a data rate much higher than the data rate of the communication link.

**[0066]** Thus, data transmission between the device and the hearing instrument may be performed slowly, whenever the communication link is available, and the data transmission is robust to possible communication drop outs, e.g. due to noise.

**[0067]** Since the data rate is not critical, and since data transmission may be interrupted and resumed without interfering with the desired timing of corresponding speech message play back to the user, the transmission from the device to the hearing instrument may be performed in the background without interfering with the other desired functions of the hearing instrument.

**[0068]** Processing, including signal processing, message processing, and corresponding speech message processing, in the new hearing instrument may be performed by dedicated hardware or may be performed in a signal processor, or performed in a combination of dedicated hardware and one or more signal processors.

**[0069]** As used herein, the terms "processor", "central processor", "message processor", "signal processor", "controller", "system", etc., are intended to refer to CPU-related entities, either hardware, a combination of hardware and software, software, or software in execution.

**[0070]** For example, a "processor", "signal processor", "controller", "system", etc., may be, but is not limited to being, a process running on a processor, a processor, an object, an executable file, a thread of execution, and/or a program.

**[0071]** By way of illustration, the terms "processor", "central processor", "message processor", "signal processor", "controller", "system", etc., designate both an application running on a processor and a hardware processor. One or more "processors", "central processors", "message processors", "signal processors", "controllers", "systems" and the like, or any combination hereof, may reside within a process and/or thread of execution, and one or more "processors", "central processors", "message processors", "signal processors", "controllers", "systems", etc., or any combination hereof, may be localized in one hardware processor, possibly in combination with other hardware circuitry, and/or distributed between two or more hardware processors, possibly in combination with other hardware circuitry.

**[0072]** A hearing instrument is provided, configured for

use with a device, the hearing instrument includes: an interface for reception of a message and/or a speech message from the device, wherein the speech message is a converted form of the message and is generated using a text-to-speech processor; a memory for storage of the message and/or the speech message, and a message processor configured for, at a selected time, outputting audio samples of the speech message for transmission to a user of the hearing instrument.

**[0073]** Optionally, the hearing instrument further includes the text-to-speech processor; wherein the interface is configured for reception of the message, not the speech message; and wherein the text-to-speech processor of the hearing instrument is configured to convert the message to the speech message.

**[0074]** Optionally, the hearing instrument comprises a hearing aid.

**[0075]** Optionally, the hearing instrument comprises a timer that is synchronized with a timer of the device, and wherein the message processor is configured for automatically outputting the audio samples at the selected time as determined with the timer.

**[0076]** Optionally, the interface is also for reception of information regarding the selected time from the device.

**[0077]** Optionally, the hearing instrument is a part of a hearing instrument system that includes the device.

**[0078]** Optionally, the text-to-speech processor is a part of the device, and wherein the interface of the hearing instrument is configured for reception of the speech message, not the message, from the device after the text-to-speech processor of the device has converted the message to the speech message.

**[0079]** Optionally, the device is configured to transmit the message and/or the speech message to the hearing instrument upon detection of a connection with the hearing instrument.

**[0080]** Optionally, the device comprises: a first interface that is configured for connection with a Wide-Area-Network, a second interface configured for connection with the hearing instrument, and a central processor configured for controlling reception of information relating to the user through the Wide-Area-Network, and transmission of the message and/or the speech message to the hearing instrument based on the information.

**[0081]** Optionally, the selected time is included in the information.

**[0082]** Optionally, a duration of the transmission of the message to the hearing instrument is longer than a duration of the transmission of the audio samples of the speech message to the user.

**[0083]** Optionally, the hearing instrument system further includes a user interface configured to receive a user command to sequentially output two or more messages stored in the memory of the hearing instrument for transmission to a user of the hearing instrument system.

**[0084]** Optionally, the hearing instrument system further includes a user interface configured to receive a user command to delete a selected message in the memory

of the hearing instrument.

**[0085]** Optionally, the hearing instrument system further includes a user interface configured to receive a user command to repeat transmission of a selected message.

**[0086]** Optionally, the hearing instrument system further includes a user interface configured to receive a user command to mute a selected message.

**[0087]** A device for use with a hearing instrument includes: a first interface that is configured for reception of information relating to a user through a Wide-Area-Network, the information comprising timing information; a second interface configured for connection with the hearing instrument; and a processor configured to control the second interface to output a message and/or a speech message to the hearing instrument based on the timing information, wherein the speech message is a converted form of the message and is generated using a text-to-speech processor.

**[0088]** A method of communicating a message includes: retrieving the message from a device with access to a Wide-Area-Network; converting the message into a corresponding speech message; storing the message and/or the corresponding speech message in a memory of a hearing instrument together with timing information, and outputting the corresponding speech message for a human at a date and time as defined by the timing information.

**[0089]** Optionally, the hearing instrument system further includes the speech message, not the message, is stored in the memory of the hearing instrument.

**[0090]** Other and further aspects and features will be evident from reading the following detailed description of the embodiments.

**[0091]** The drawings illustrate the design and utility of embodiments, in which similar elements are referred to by common reference numerals. These drawings are not necessarily drawn to scale. In order to better appreciate how the above-recited and other advantages and objects are obtained, a more particular description of the embodiments will be rendered, which are illustrated in the accompanying drawings. These drawings depict only typical embodiments and are not therefore to be considered limiting of its scope.

Fig. 1 schematically illustrates electronic circuitry of the new hearing instrument,

Fig. 2 schematically illustrates another electronic circuitry of the new hearing instrument, and

Fig. 3 schematically illustrates the new hearing instrument system.

**[0092]** Various exemplary embodiments are described hereinafter with reference to the figures. It should be noted that the figures are not drawn to scale and that elements of similar structures or functions are represented by like reference numerals throughout the figures. It

should also be noted that the figures are only intended to facilitate the description of the embodiments. They are not intended as an exhaustive description of the claimed invention or as a limitation on the scope of the claimed invention. In addition, an illustrated embodiment needs not have all the aspects or advantages shown. An aspect or an advantage described in conjunction with a particular embodiment is not necessarily limited to that embodiment and can be practiced in any other embodiments even if not so illustrated, or not so explicitly described.

**[0093]** The new method, hearing instrument, and hearing instrument system will now be described more fully hereinafter with reference to the accompanying drawings, in which various examples of the new method, hearing instrument, and hearing instrument system are illustrated. The new method, hearing instrument, and hearing instrument system according to the appended claims may, however, be embodied in different forms and should not be construed as limited to the examples set forth herein.

**[0094]** Fig. 1 schematically illustrates exemplary hearing aid circuitry 10 of the new hearing instrument. The illustrated new hearing aid circuitry 10 may form part of any type of hearing aid of a suitable mechanical design, e.g. to be worn in the ear canal, or partly in the ear canal, behind the ear or in the concha, such as the well-known types: BTE, ITE, ITC, CIC, etc.

**[0095]** The illustrated hearing aid circuitry 10 comprises a front microphone 12 and a rear microphone 14 for conversion of an acoustic sound signal from the surroundings into corresponding microphone audio signals 16, 18 output by the microphones 14, 16. The microphone audio signals 16, 18 are digitized in respective A/D converters 20, 22 for conversion of the respective microphone audio signals 16, 18 into respective digital microphone audio signals 24, 26 that are optionally pre-filtered (pre-filters not shown) and combined in signal combiner 28, for example for formation of a digital microphone audio signal 30 with directionality as is well-known in the art of hearing aids. The digital microphone audio signal 30 is input to the mixer 32 configured to output a weighted sum 34 of signals input to the mixer 32. The mixer output 34 is input to a hearing loss processor 36 configured to generate a hearing loss compensated output signal 38 based on the mixer output 34. The hearing loss compensated output signal 38 is input to a receiver 40 for conversion into acoustic sound for transmission towards an eardrum (not shown) of a user of the hearing aid.

**[0096]** The illustrated hearing aid circuitry 10 is further configured to receive audio signals from various devices capable of audio streaming, such as smart phones, mobile phones, radios, media players, companion microphones, broadcasting systems, such as in a public place, e.g. in a church, an auditorium, a theatre, a cinema, etc., public address systems, such as in a railway station, an airport, a shopping mall, etc., etc.

**[0097]** In the illustrated example, digital audio, including audio samples of speech messages, are transmitted

wirelessly to the hearing aid, e.g. from a smart phone, and received by the hearing aid antenna 42 connected to a radio receiver 44. The radio receiver 44 retrieves the audio samples 46 from the received radio signal, and the time and date at which the audio samples of the speech message is to be played back to the user, possible transmitter identifiers, and possible network control signals, etc. The audio samples of the speech message are stored in an audio file in the memory 48 together with the time and date, at which the audio file, i.e. the speech message, has to be played back to the user.

**[0098]** At the time and date at which the corresponding speech message is to be played back to the user, the message processor 54 controls retrieval of the audio samples from the memory 48 and forwarding of the audio samples 50 to the mixer 32. The message processor 54 also sets the weights 52 with which the digital microphone audio signal 30 and the audio samples 50 are added together in the mixer 32 to form the weighted output sum 34.

**[0099]** The weights may be set so that the audio file is played back to the user while other signals input to the mixer are attenuated during play back of the audio file. Alternatively, all or some of the other signals may be muted during play back of the audio file. The user may enter a command through a user interface of the hearing aid of a type well-known in the art, controlling whether the other signals are muted or attenuated.

**[0100]** The hearing aid may store more than one speech message with identical or similar time and dates to be played back; i.e. one or more speech messages may be going to be played back during ongoing play back of another speech message, whereby play back of more than one speech message may overlap fully or partly in time.

**[0101]** Such a situation may be handled in various ways. For example, the hearing aid may simultaneously play back more than one speech message; i.e. one or more messages may be played back during ongoing play back of another speech message, whereby more than one speech message may be played back simultaneously or partly simultaneously. In the mixer 32, each speech message is treated as a separate input to the mixer 32 added to the output of the mixer with its own weights, whereby the speech messages are transmitted to the user with substantially unchanged respective times for play back.

**[0102]** Alternatively, the speech messages may have assigned priorities and may be transmitted to the hearing aid together with information on the priority, e.g. an integer, e.g. larger than or equal to 1, e.g. the lower the integer, the higher the priority. Alarm messages may for example have the highest priority, while traffic announcements may have the second highest priority, and possible other communications may have the lowest priority. Such messages may then be played back sequentially in the order of priority one at the time without overlaps.

**[0103]** The hearing aid may be configured to always

mute one or more other signals received by the hearing aid during transmission of a speech message of highest priority towards the eardrum of the user of the hearing aid.

**[0104]** Fig. 2 schematically illustrates another exemplary hearing aid circuitry 10 of the new hearing instrument system that is identical to the hearing aid circuitry 10 of Fig. 1 and operates in a similar way except for the fact that the hearing aid circuitry 10 includes the text-to-speech processor 56 that is configured to convert messages received from the device into the speech messages that is played back to the user at the selected time previously specified during recording or editing of the information on which the message is based. In the illustrated circuitry 10 of the hearing aid, the message is converted into a speech message at receipt of the message, and the speech message is stored in an audio file in the memory 48. In another circuitry (not shown), the message is converted into a corresponding speech message at the selected time, i.e. at the time for play back to the user. Thus, the message is stored in the memory 48 and converted into a corresponding speech message immediately upon retrieval of the message.

**[0105]** In the illustrated circuitry 10, the text-to-speech processor 56 is configured to generate a speech message, such as a spoken reminder, from the text message received from the device, and the generated digital audio samples 58 are stored in an audio file in the memory 48 in the hearing aid for subsequent transmission to the mixer 32 at the selected time also received from the device and stored in the memory 48.

**[0106]** Fig. 3 schematically illustrates electronic circuitry 100 of the device of the hearing aid system, which is a smart phone.

**[0107]** The device has a user interface 120, namely a touch screen 120 as is well-known from conventional smart phones, for user control and adjustment of the device and possibly the hearing aid (not shown) interconnected with the device.

**[0108]** The user may use the user interface 120 of the smart phone 100 to input information to the tools (not shown) in a way well-known in the art.

**[0109]** The smart phone 100 may further transmit speech messages output by the text-to-speech processor 116 to the hearing aid through the audio interface 114.

**[0110]** In addition, the microphone of the hearing aid may be used for reception of spoken user commands that are transmitted to the device for reception at the interface 114 and input to the unit 118 for speech recognition and decoding of the spoken commands and outputting the decoded spoken commands as control inputs to a central processor 110. The central processor 110 controls the hearing aid system to perform actions in accordance with the received spoken commands.

**[0111]** The central processor 110 also controls an Internet interface 112 configured for connection with the Internet, e.g. a Wireless Local Area Network interface, a GSM interface 122, etc., and a wired audio and data interface 114, preferably a low power wireless interface,

such as the Bluetooth Low Energy wireless interface, configured for connection with the hearing aid for transmission and reception of audio samples and other data to and from the hearing aid.

**[0112]** Through the Internet, the device has access to electronic time management and communication tools used by the user for communication and for storage of time management and communication information relating to the user.

**[0113]** The tools may include electronic calendar system(s), email system(s), such as Microsoft Outlook Express, Lotus notes, Windows Mail, Mozilla Thunderbird, Postbox, Apple Mail, Opera Mail, KMail, Hotmail, Yahoo, Gmail, AOL, etc, social network(s), professional network(s), such as Facebook®, LinkedIn®, Google+, tumblr, Twitter, MySpace, etc, RSS/Atom feeder(s), such as Bloglines, Feedly, Google Reader, My Yahoo!, NewsBlur, Netvibes, etc, news feeder(s), etc, well-known for management of daily activities and communications.

**[0114]** Reminders, notifications, and received communication may include tasks to be performed, reminders of calendar dates, such as birthdays, anniversaries, appointments, meetings, etc, notifications on receipt of new SMS or new email, new Facebook update, new tweet, new RSS feed, new traffic announcement, etc, and/or the actual item notified, e.g. the SMS itself.

**[0115]** The central processor 110 is configured to access the tools for electronic time management and communication facilitating use of the hearing instrument system to manage daily activities and communication through the Wide-Area-Network. A hearing aid app (not shown) executed by the central processor 110 instructs the smart phone to forward reminders and updates and received communication from the tools to the hearing aid as speech messages in accordance with settings previously made by the user and recorded with the tools.

**[0116]** The device comprises the text-to-speech processor 116 configured for conversion of messages, such as reminders or notifications or received communication etc, into speech messages for transmission to the hearing aid.

**[0117]** The user may have a plurality of devices with internet interfaces providing access to the tools and information relating to the user, and some or all of such devices may have the text-to-speech processor 116 and the interface 114 to the hearing aid and may constitute the device disclosed above.

**[0118]** The speech message is transmitted to the hearing aid together with timing information on the date and time of day of play back of the speech message. Speech messages that are desired to play back without delay after receipt by the hearing aid may have zeroes in the transmitted date field.

**[0119]** Typically, when the user accesses the tools in order to record or edit an event that requires attention or a task to be performed, the user has the option of specifying a message, namely a reminder, to be sent to the user in advance. Typically, the user may select that the

reminder is forwarded as an SMS and/or an email and/or displayed in a pop-up window on a computer and/or is forwarded to the hearing aid as a speech message.

**[0120]** Further, the user may select the time of presentation of the reminder to the user in several ways. For example, the user may specify the date and time of day for presentation of the reminder to the user, or the user may specify the number of seconds, minutes, hours and/or days in advance of term expiry of the recorded event or task, the reminder should be presented to the user, e.g. 3 days before a recorded birthday, or the user may specify the number of seconds, minutes, hours and/or days to elapse from data entry until presentation of the reminder to the user, etc.

**[0121]** Typically, the user also receives messages in the form of notifications on incoming communication, such as receipt of a new email, SMS, instant message, etc, or receipt of updates in social or professional networks, such as Facebook, Twitter, LinkedIn, etc, RSS/Atom feeds

**[0122]** The message may also include received information, e.g. an email, an SMS, a post in social or professional network, a blog post, an RSS/Atom feed, a news feed, an instant message, etc.

**[0123]** Thus, examples of speech messages include reminders on, e.g. meetings, birthdays, social gatherings, journeys, to-do items, etc, and notifications on, e.g., tweets, emails, news, traffic updates, social network updates, web page updates, etc, and communication, e.g. an email, an SMS, a post in social or professional network, a blog post, an RSS/Atom feed, a news feed, an instant message, etc.

**[0124]** The speech message may be accompanied by a distinct sound, such as short single note tone, or a distinct sequence of notes, such as a notification jingle, such as a personalized notification jingle.

**[0125]** Fig. 4 schematically illustrates a new hearing aid system and its operation. In the illustrated example, the Wide-Area-Network is the Internet 200, and the hearing aid system comprises the device 100, namely a smart phone 100 operating as explained with reference to Fig. 3, and the hearing aid 10, namely a BTE hearing aid 10 operating as explained with reference to Figs. 1 and 2.

**[0126]** The hearing aid 10 is configured for reception of a speech message 80 from the smart phone 100.

**[0127]** In one example, the speech message 80 is a reminder of a meeting taking place at the same day at 10 o'clock. The user recorded the meeting in his electronic calendar a week before, and the user also set a reminder to alert the user 15 minutes before start of the meeting, i.e. at 9.45 a.m. the same day. The user recorded the meeting with a computer at work without an interface to the hearing aid 10. However, the user has set the smart phone 100 to synchronize with the electronic calendar every half hour, whenever the smart phone is connected to the Internet through a WiFi network, and since the working place has a WiFi, the smart phone 100 was synchronized with the calendar server shortly after entry

of the new meeting. The user has also set the smart phone 100 to send reminders to the hearing aid 100 within 24 hours of the time at which the reminders have to be played back by the hearing aid 10. The hearing aid 10 and the smart phone 100 establish a mutual communication link whenever they are within coverage of their radio transmitters. Since the user usually carries the smart phone 100 and the hearing aid 10 simultaneously, the communication link between them is usually in operation and thus, approximately at 10 am the day before the day of the meeting, the reminder is transferred as a speech message 80 to the hearing aid 10. The user set the reminder to be played back to the user 15 minutes before start of the meeting. Thus, at 9.45 am, the hearing aid 10 plays back the message *"remember meeting with CEO in room 1A at 10 am"* to the user. If the user presses a button (not visible) on the BTE housing within 15 seconds after termination of play back, the reminder is deleted from the memory of the hearing aid, and if not, the reminder is played back again 5 minutes before start of the meeting and subsequently deleted from the memory of the hearing aid.

**[0128]** The spoken reminder 80 is converted from a text reminder received by the smart phone 100 from the electronic calendar system through the Internet 200. The conversion to the spoken reminder takes place in a text-to-speech processor 116 in the smart phone 100. The text-to-speech processor 116 provides the spoken reminder as digital audio samples that is transmitted to the hearing aid 10 and stored in an audio file in the memory of the hearing aid. At play back, the digital audio samples of the audio file is converted to an analogue audio signal in a digital-to-analogue converter of the hearing aid and the analogue audio signal is input to a receiver of the hearing aid 10 that outputs the acoustic speech message to the user.

**[0129]** The user interface 120 of the smart phone 100 also constitutes a user interface of the time management and communication tools used by the user as is well-known in the art. The user interface 120 of the smart phone 100 also constitutes a user interface of the hearing aid as is well-known in the art.

**[0130]** In addition, the user interface 120 of the smart phone 100 is also used for user entry of conditions specifying when a speech message in the memory of the hearing aid is to be deleted, e.g. upon play back, upon second play back, upon receipt of a specific user entry, etc.

**[0131]** The user interface 120 of the smart phone 100 is also used to set volume levels of play back of the speech messages and the volume of reproduced sounds received by the microphone(s) of the hearing aid and possible other audio sources, such as media players, TV, radio, hearing loops, etc, of the hearing aid.

**[0132]** Other equipment than the smart phone 100 may also constitute the device. For example, the user may have a computer at home connected to the Internet with an interface to the hearing aid 10. Through the Internet, the home computer, like the smart phone, has access to

the electronic time management and communication tools used by the user for communication and for storage of time management and communication information relating to the user, and like the smart phone 100, the computer regularly may regularly synchronize with the information handled by the tools as is well-known in the art. The tools may include electronic calendar system(s), email system(s), such as Microsoft Outlook Express, Lotus notes, Windows Mail, Mozilla Thunderbird, Postbox, Apple Mail, Opera Mail, KMail, Hotmail, Yahoo, Gmail, AOL, etc, social network(s), professional network(s), such as Facebook®, LinkedIn®, Google+, tumblr, Twitter, MySpace, etc, RSS/Atom feeder(s), such as Bloglines, Feedly, Google Reader, My Yahoo!, NewsBlur, Netvibes, etc, news feeder(s), etc, well-known for management of daily activities and communications.

**[0133]** The information may include tasks to be performed, calendar dates, such as birthdays, anniversaries, appointments, meetings, etc, contacts, websites of interest, etc.

**[0134]** Similar to the smart phone 100, the hearing aid 10 and the home computer establish a mutual communication link whenever they are within coverage of their respective radio transmitters, and whenever the communication link is established, the home computer transfers speech messages to the hearing aid 10.

**[0135]** Thus, the hearing aid 10 may receive speech messages from any device with which the communication link can be established.

**[0136]** The speech messages may also be notifications on incoming communication, such as receipt of a new email, SMS, instant message, traffic update, or updates in social or professional networks, such as Facebook, Twitter, LinkedIn, etc, RSS/Atom feeds. The speech message may also include the received information, e.g. an email, an SMS, a post in social or professional network, a tweet, a blog post, an RSS/Atom feed, a news feed, an instant message, etc.

**[0137]** Thus, examples of speech messages include reminders on, e.g. meetings, birthdays, social gatherings, journeys, to-do items, etc, and notifications on, e.g., tweets, emails, news, social network updates, web page updates, etc, and communication, e.g. an email, an SMS, a post in social or professional network, a blog post, an RSS/Atom feed, a news feed, an instant message, etc.

**[0138]** Some speech messages may be played back immediately upon receipt by the hearing aid.

**[0139]** Speech messages to be played back immediately may be transmitted to the hearing aid together with a time and date to be played back equal to zero.

**[0140]** The speech message may be accompanied by a notification jingle, such as a personalized notification jingle.

**[0141]** The speech message, or the message, may be automatically removed from the memory of the hearing aid after play back in order to make the part of the memory occupied by the, possibly spoken, message available to a new, possibly spoken, message.

**[0142]** Typically, the user may access the tools and the stored information from any computer that is connected to the Wide-Area-Network by logging-in to a specific account, e.g. with a username and a password.

5 **[0143]** The user may authenticate other devices to access the tools and the stored information when logged-in to the account in question.

10 **[0144]** In order for the device to be authenticated and allowed access to the tools and the stored information and to receive information from the tools, the user may have to log onto the corresponding accounts from the device.

15 **[0145]** The hearing aid may have a timer providing information on date and time of day, and the message processor may be configured for transmitting the audio file at a selected date and time of day.

**[0146]** The timer may be synchronized with the device, e.g. whenever data is transmitted to the hearing aid.

20 **[0147]** The new hearing aid system takes advantage of the fact that a user of the hearing aid system, especially a hearing aid user, already wears the hearing aid and therefore, the user is able to listen to played back speech messages without having to perform additional tasks, such as mounting a headphone or headset on his or her head, bringing a telephone to the ear, looking at a screen and select information to be displayed and/or played back, looking at a dashboard of a car and select information to be displayed and/or played back, etc.

25 **[0148]** The hearing aid may have a wireless interface for reception of data transmitted from the device, including speech messages and possibly the selected time, i.e. timing information specifying when the hearing aid is controlled to play back the speech message.

30 **[0149]** The user may use a user interface of the hearing aid to command the hearing aid to sequentially play back the messages of the audio files currently stored in the memory of the hearing aid, e.g. in ascending or descending order of time of receipt, in ascending or descending order of time to be played back, etc, e.g. also specified by the user using the user interface.

35 **[0150]** The user may select a new time for the message to be played back using the user interface. For example, tapping a push button twice may cause the speech message to be played back again 5 minutes later.

40 **[0151]** Thus, the selected time may be a time for playing back the message as previously specified by the user during recording or editing of the event or task in question and transmitted to the hearing aid for storage together with the message in the hearing aid.

45 **[0152]** The speech message may be played back at more than one selected times, each of which may be transmitted to the hearing aid for storage with the message in question.

50 **[0153]** With the illustrated hearing aid system, the user is relieved from the task of consulting other equipment for updates on upcoming events and incoming communication; rather, the user need not change anything or take any particular actions in order to be able to receive

speech messages.

**[0154]** The transmission of messages from the smart phone 100 to the hearing aid 10 need not take place at the time at which the hearing aid plays the speech message back. Rather, the transmission may occur anytime before the time of play back, e.g. a reminder may be transmitted to the hearing aid together with the time for play back of the reminder, upon recording or editing of the reminder; whenever the hearing aid is within receiving range of the transmitter of the device.

**[0155]** The data rate of the transmission may be slow, since the message samples is not used for streaming; rather, the data is stored in a memory in the hearing aid for later play back. Thus, data transmission may be performed whenever data transmission resources are available. Thus, there is no need for the device to be in contact with the hearing aid at the precise time of speech message play back, e.g. reminding the user of something.

**[0156]** In this way, the communication link, e.g. the wireless communication link, need not be particularly fast or particularly reliable. For example, the link data rate need not be fast enough to transmit audio in real-time. Still, the speech messages may be played back to the user as high quality audio, since the speech messages may be read out of the memory of the hearing aid at a data rate much higher than the data rate of the communication link.

**[0157]** Data transmission to the hearing aid may be performed, slowly, when the communication link is available, and the data transmission is robust to possible communication drop outs, e.g. due to noise.

**[0158]** Since the data rate is not critical, and since data transmission may be interrupted and resumed without interfering with the desired timing of speech message play back to the user, the synchronization may be performed in the background without interfering with the other desired functions of the hearing aid.

**[0159]** Although particular embodiments have been shown and described, it will be understood that they are not intended to limit the claimed inventions, and it will be obvious to those skilled in the art that various changes and modifications may be made without departing from the scope of the claimed inventions. The specification and drawings are, accordingly, to be regarded in an illustrative rather than restrictive sense. The claimed inventions are intended to cover alternatives and modifications.

**[0160]** The scope of the present invention is defined by the appendant claims. Any embodiment, which does not fall under the scope of any of the appendant claims, is an example, which may be useful to understand the invention, but which does not form part of the present invention.

## Claims

1. A hearing instrument (10) comprising

an interface (44) for reception of a message from a device (100),  
a text-to-speech processor (56) configured for conversion of the message into audio samples (46) of a corresponding speech message,  
a memory (48) for storage of the message and/or the speech message, and  
a message processor (54) configured for, at a selected time, transmitting the audio samples (50) of the speech message to the user of the hearing instrument (10),

### characterized in that

the interface (44) of the hearing instrument is for reception of information regarding the selected time from the device (100).

2. A hearing instrument (10) comprising

an interface (44) for reception of audio samples (46) of a speech message (80) from a device (100), wherein the speech message (80) is a converted form of a message and is generated using a text-to-speech processor (116) of the device (100),  
a memory (48) for storage of the speech message (80, 46), and  
a message processor (54) configured for, at a selected time, transmitting the audio samples (50) of the speech message (80) to the user of the hearing instrument (10),

### characterized in that

the interface (44) of the hearing instrument is for reception of information regarding the selected time from the device (100).

3. The hearing instrument according to claim 1 or 2, wherein the hearing instrument (10) comprises a hearing aid (10).
4. The hearing instrument according to any of the previous claims, wherein the hearing instrument (10) comprises a timer that is synchronized with a timer of the device (100), and wherein the message processor (54) is configured for automatically outputting the audio samples (46) at the selected time as determined with the timer.

5. A device (100) comprising

a second interface (114) configured for connection with a hearing instrument (10), and  
a text-to-speech processor (116) configured for conversion of a message based on information relating to a user of the hearing instrument (10) into audio samples (46) of a corresponding speech message (80), and

a central processor (110),

the device (100) being configured for transmission of the speech message (80) to the hearing instrument (10),

**characterized in that**

the device comprises a first interface (112, 122) configured for connection with a Wide-Area-Network (200),

the central processor (110) being configured for controlling reception of the information relating to the user of the hearing instrument (10) through the Wide-Area-Network (200),

a selected time specifying when the hearing instrument is controlled to play back the corresponding speech message is included in the information relating to the user of the hearing instrument (10), and **in that**

the device (100) being configured for transmission of the selected time to the hearing instrument (10).

**6. A device (100) comprising**

a second interface (114) configured for connection with a hearing instrument (10), and

a central processor (110),

the device (100) being configured for transmission of a message based on information relating to the user of the hearing instrument (10) to the hearing instrument (10),

**characterized in that**

the device comprises a first interface (112, 122) configured for connection with a Wide-Area-Network (200),

the central processor (110) being configured for controlling reception of the information relating to the user of the hearing instrument (10) through the Wide-Area-Network (200),

a selected time specifying when the hearing instrument is controlled to play back a speech message corresponding to the message is included in the information relating to the user of the hearing instrument (10), and **in that**

the device (100) being configured for transmission of the selected time to the hearing instrument (10).

**7. A hearing instrument system comprising the hearing instrument (10) according to claim 1 or any of the claims 3-4 when dependent on claim 1, and the device (100), wherein the device (100) comprises**

a first interface (112, 122) configured for connection with a Wide-Area-Network (200),

a second interface (114) configured for connection with the hearing instrument (10), and

a central processor (110) configured for controlling reception of information relating to the user

of the hearing instrument (10) through the Wide-Area-Network (200),

wherein the device (100) is configured for transmission of the message (80) to the hearing instrument (10), and wherein the message is based on the information relating to the user of the hearing instrument (10), and wherein the selected time is included in the information relating to the user of the hearing instrument (10), and wherein the device (100) is configured for transmission of the information regarding the selected time to the hearing instrument (10).

**8. A hearing instrument system comprising the hearing instrument (10) according to claim 2 or any of the claims 3-4 when dependent on claim 2, and the device (100), wherein the device (100) comprises**

a first interface (112, 122) configured for connection with a Wide-Area-Network (200),

a second interface (114) configured for connection with the hearing instrument (10),

the text-to-speech processor (116) being configured for conversion of the message into the audio samples (46) of the speech message (80), wherein the speech message (80) corresponds to the message, and

a central processor (110) configured for controlling reception of information relating to the user of the hearing instrument (10) through the Wide-Area-Network (200),

wherein the device (100) is configured for transmission of the speech message (80) to the hearing instrument (10), and wherein the message is based on the information relating to the user of the hearing instrument (10), and wherein the selected time is included in the information relating to the user of the hearing instrument (10), and wherein the device (100) is configured for transmission of the information regarding the selected time to the hearing instrument (10).

**9. The hearing instrument system according to any of the claims 7-8, wherein, when dependent on claim 1, the device (100) is configured to transmit the message to the hearing instrument (10) upon detection of a connection with the hearing instrument (10), or wherein, when dependent on claim 2, the device (100) is configured to transmit the speech message (80) to the hearing instrument (10) upon detection of a connection with the hearing instrument (10).**

**10. The hearing instrument system according to any of the claims 7-9, wherein, when dependent on claim 1, a duration of the transmission of the message to the hearing instrument (10) is longer than a duration of the transmission of the audio samples (46) of the**

speech message to the user, or wherein, when dependent on claim 2, a duration of the transmission of the speech message (80) to the hearing instrument (10) is longer than a duration of the transmission of the audio samples (46) of the speech message to the user.

11. The hearing instrument system according to any of the claims 7-10, further comprising a user interface (120) configured to receive a user command to sequentially output two or more messages (80) stored in the memory (48) of the hearing instrument (10) for transmission to a user of the hearing instrument system.

12. The hearing instrument system according to any of the claims 7-11, further comprising a user interface (120) configured to receive a user command to delete a selected message (80) in the memory (48) of the hearing instrument (10).

13. The hearing instrument system according to any of the claims 7-12, further comprising a user interface (120) configured to receive a user command to repeat transmission of a selected message (80).

14. The hearing instrument system according to any of the claims 7-13, further comprising a user interface (120) configured to receive a user command to mute a selected message (80).

15. A method of communicating a message based on information relating to a user of a hearing instrument (10), comprising:

retrieving the information relating to the user of the hearing instrument (10) through a Wide-Area-Network (200) using a device (100) having a first interface (112, 122) configured for connection with the Wide-Area-Network (200), a second interface (114) configured for connection with the hearing instrument (10), and a central processor (110) configured for controlling the retrieval of the information relating to the user of the hearing instrument (10) through the Wide-Area-Network (200);

converting the message into audio samples (46) of a corresponding speech message (80) using a text-to-speech processor (116) of the device (100);

transmitting the speech message (80) to the hearing instrument (10) via an interface (44) of the hearing instrument (10);

storing the speech message (80) in a memory (48) of the hearing instrument (10) together with timing information; and

outputting the speech message (80) for a human at a date and time as defined by the timing in-

formation;

**characterized in that**

the timing information is included in the information relating to the user of the hearing instrument (10), and **in that** the method comprises transmitting the timing information from the device (100) to the hearing instrument (10) via the interface (44) of the hearing instrument (10).

16. A method of communicating a message based on information relating to a user of a hearing instrument (10), comprising:

retrieving the information relating to the user of the hearing instrument (10) through a Wide-Area-Network (200) using a device (100) having a first interface (112, 122) configured for connection with the Wide-Area-Network (200), a second interface (114) configured for connection with the hearing instrument (10), and a central processor (110) configured for controlling the retrieval of the information relating to the user of the hearing instrument (10) through the Wide-Area-Network (200);

transmitting the message to the hearing instrument (10) via an interface (44) of the hearing instrument (10);

converting the message into audio samples (46) of a corresponding speech message (80) using a text-to-speech processor (56) of the hearing instrument (10);

storing the message (80) and/or the speech message (80) in a memory (48) of the hearing instrument (10) together with timing information; and

outputting the speech message (80) for a human at a date and time as defined by the timing information;

**characterized in that**

the timing information is included in the information relating to the user of the hearing instrument (10), and **in that** the method comprises transmitting the timing information from the device (100) to the hearing instrument (10) via the interface (44) of the hearing instrument (10).

17. The method according to claim 15 or 16, wherein the method comprises storing the speech message (80) in the memory (48) of the hearing instrument (10) together with timing information, and wherein outputting the speech message for the human comprises

retrieving, using a message processor (54) of a hearing aid circuitry (10) of the hearing instrument, the audio samples of the speech message from the memory (48) and forwarding the audio samples (50) to a mixer (32) of the hearing aid

circuitry (10), setting, using the message processor (54), weights (52) with which a digital microphone audio signal (30) of the hearing aid circuitry (10) and the audio samples (50) are added together in the mixer (32) to form the mixer output (34) as a weighted output sum, and generating, using a hearing loss processor (36) of the hearing aid circuitry (10), a hearing loss compensated output signal (38) based on the output signal (34) from the mixer (32).

## Patentansprüche

### 1. Hörgerät (10), umfassend

eine Schnittstelle (44) für den Empfang einer Nachricht von einer Vorrichtung (100), einen Sprachausgabeprozessor (56), der ausgelegt ist für die Umsetzung der Nachricht in Hörproben (46) einer entsprechenden Sprachnachricht, einen Speicher (48) für die Ablage der Nachricht und/oder der Sprachnachricht, und einen Nachrichtenprozessor (54), der ausgelegt ist zur Übertragung der Hörproben (50) der Sprachnachricht an den Benutzer des Hörgeräts (10) zu einem ausgewählten Zeitpunkt, **dadurch gekennzeichnet, dass** die Schnittstelle (44) des Hörgeräts zum Empfang von Informationen in Bezug auf den von der Vorrichtung (100) ausgewählten Zeitpunkt dient.

### 2. Hörgerät (10), umfassend

eine Schnittstelle (44) für den Empfang von Hörproben (46) einer Sprachnachricht (80) von einer Vorrichtung (100), wobei die Sprachnachricht (80) eine umgesetzte Form einer Nachricht ist und unter Verwendung eines Sprachausgabeprozessors (116) der Vorrichtung (100) erzeugt wird, einen Speicher (48) für die Ablage der Sprachnachricht (80, 46), und einen Nachrichtenprozessor (54), der ausgelegt ist zur Übertragung der Hörproben (50) der Sprachnachricht (80) an den Benutzer des Hörgeräts (10) zu einem ausgewählten Zeitpunkt, **dadurch gekennzeichnet, dass** die Schnittstelle (44) des Hörgeräts zum Empfang von Informationen in Bezug auf den von der Vorrichtung (100) ausgewählten Zeitpunkt dient.

### 3. Hörgerät nach Anspruch 1 oder 2, wobei das Hörgerät (10) eine Hörhilfe (10) umfasst.

4. Hörgerät nach einem der vorstehenden Ansprüche, wobei das Hörgerät (10) einen Zeitgeber umfasst, der mit einem Zeitgeber der Vorrichtung (100) synchronisiert ist, und wobei der Nachrichtenprozessor (54) ausgelegt ist, um die Hörproben (46) zu dem ausgewählten Zeitpunkt, wie er durch den Zeitgeber bestimmt ist, automatisch auszugeben.

### 5. Vorrichtung (100), umfassend

eine zweite Schnittstelle (114), die ausgelegt ist für die Verbindung mit einem Hörgerät (10), und einen Sprachausgabeprozessor (116), der ausgelegt ist für die Umsetzung auf der Grundlage von Informationen in Bezug auf einen Benutzer des Hörgeräts (10), einer Nachricht in Hörproben (46) einer entsprechenden Sprachnachricht (80), und einen zentralen Prozessor (110), wobei die Vorrichtung (100) ausgelegt ist für die Übertragung der Sprachnachricht (80) an das Hörgerät (10),

#### **dadurch gekennzeichnet, dass**

die Vorrichtung eine erste Schnittstelle (112, 122) umfasst, die ausgelegt ist für die Verbindung mit einem Weitbereichsnetz (200), der zentrale Prozessor (110) ausgelegt ist zum Steuern von Empfang der Informationen in Bezug auf den Benutzer des Hörgeräts (10) über das Weitbereichsnetz (200), ein ausgewählter Zeitpunkt, der spezifiziert, wann das Hörgerät gesteuert wird, um die entsprechende Sprachnachricht wiederzugeben, in den Informationen in Bezug auf den Benutzer des Hörgeräts (10) enthalten ist, und dass die Vorrichtung (100) ausgelegt ist zur Übertragung des ausgewählten Zeitpunkts an das Hörgerät (10).

### 6. Vorrichtung (100), umfassend

eine zweite Schnittstelle (114), die ausgelegt ist für die Verbindung mit einem Hörgerät (10), und einen zentralen Prozessor (110), wobei die Vorrichtung (100) ausgelegt ist für die Übertragung einer Nachricht auf der Grundlage von Informationen in Bezug auf den Benutzer des Hörgeräts (10) an das Hörgerät (10), **dadurch gekennzeichnet, dass** die Vorrichtung eine erste Schnittstelle (112, 122) umfasst, die ausgelegt ist für die Verbindung mit einem Weitbereichsnetz (200), der zentrale Prozessor (110) ausgelegt ist zum Steuern von Empfang der Informationen in Bezug auf den Benutzer des Hörgeräts (10) über das Weitbereichsnetz (200), ein ausgewählter Zeitpunkt, der spezifiziert, wann das Hörgerät gesteuert wird, um eine

Sprachnachricht, die der Nachricht entspricht, wiederzugeben, in den Informationen in Bezug auf den Benutzer des Hörgeräts (10) enthalten ist, und dass die Vorrichtung (100) ausgelegt ist zur Übertragung des ausgewählten Zeitpunkts an das Hörgerät (10).

7. Hörgerätesystem, umfassend das Hörgerät (10) nach Anspruch 1 oder nach einem der Ansprüche 3 - 4, insofern von Anspruch 1 abhängig, und die Vorrichtung (100), wobei die Vorrichtung (100) umfasst:

eine erste Schnittstelle (112, 122), die ausgelegt ist für die Verbindung mit einem Weitbereichsnetz (200),  
eine zweite Schnittstelle (114), die ausgelegt ist für die Verbindung mit dem Hörgerät (10), und einen zentralen Prozessor (110), der ausgelegt ist zum Steuern von Empfang von Informationen in Bezug auf den Benutzer des Hörgeräts (10) über das Weitbereichsnetz (200),  
wobei die Vorrichtung (100) ausgelegt ist zur Übertragung der Nachricht (80) an das Hörgerät (10), und wobei die Nachricht auf der Grundlage von den Informationen in Bezug auf den Benutzer des Hörgeräts (10) ist, und wobei der ausgewählte Zeitpunkt in den Informationen in Bezug auf den Benutzer des Hörgeräts (10) enthalten ist, und wobei die Vorrichtung (100) ausgelegt ist zur Übertragung der Informationen in Bezug auf den ausgewählten Zeitpunkt an das Hörgerät (10).

8. Hörgerätesystem, umfassend das Hörgerät (10) nach Anspruch 2 oder nach einem der Ansprüche 3 - 4, insofern von Anspruch 2 abhängig, und die Vorrichtung (100), wobei die Vorrichtung (100) umfasst

eine erste Schnittstelle (112, 122), die ausgelegt ist für die Verbindung mit einem Weitbereichsnetz (200),  
eine zweite Schnittstelle (114), die ausgelegt ist für die Verbindung mit dem Hörgerät (10), und den Sprachausgabeprozessor (116), der ausgelegt ist für die Umsetzung der Nachricht in die Hörproben (46) der Sprachnachricht (80), wobei die Sprachnachricht (80) der Nachricht entspricht, und  
einen zentralen Prozessor (110), der ausgelegt ist zum Steuern von Empfang von Informationen in Bezug auf den Benutzer des Hörgeräts (10) über das Weitbereichsnetz (200),  
wobei die Vorrichtung (100) ausgelegt ist für die Übertragung der Sprachnachricht (80) an das Hörgerät (10), und wobei die Nachricht auf der Grundlage von den Informationen in Bezug auf den Benutzer des Hörgeräts (10) ist, und wobei der ausgewählte Zeitpunkt in den Informationen

in Bezug auf den Benutzer des Hörgeräts (10) enthalten ist, und wobei die Vorrichtung (100) ausgelegt ist für die Übertragung der Informationen in Bezug auf den ausgewählten Zeitpunkt an das Hörgerät (10).

9. Hörgerätesystem nach einem der Ansprüche 7 - 8, wobei, insofern von Anspruch 1 abhängig, die Vorrichtung (100) ausgelegt ist, um die Nachricht an das Hörgerät (10) nach Erkennen einer Verbindung mit dem Hörgerät (10) zu übertragen, oder wobei, insofern von Anspruch 2 abhängig, die Vorrichtung (100) ausgelegt ist, um die Sprachnachricht (80) an das Hörgerät (10) nach Erkennen einer Verbindung mit dem Hörgerät (10) zu übertragen.

10. Hörgerätesystem nach einem der Ansprüche 7 - 9, wobei, insofern von Anspruch 1 abhängig, eine Dauer der Übertragung der Nachricht an das Hörgerät (10) länger ist als eine Dauer der Übertragung der Hörproben (46) der Sprachnachricht an den Benutzer, oder wobei, insofern von Anspruch 2 abhängig, eine Dauer der Übertragung der Sprachnachricht (80) an das Hörgerät (10) länger ist als eine Dauer der Übertragung der Hörproben (46) der Sprachnachricht an den Benutzer.

11. Hörgerätesystem nach einem der Ansprüche 7 - 10, weiter umfassend eine Benutzerschnittstelle (120), die ausgelegt ist, um einen Benutzerbefehl zu empfangen, um nacheinander zwei oder mehrere Nachrichten (80) auszugeben, die im Speicher (48) des Hörgeräts (10) für die Übertragung an einen Benutzer des Hörgerätesystems abgelegt sind.

12. Hörgerätesystem nach einem der Ansprüche 7 - 11, weiter umfassend eine Benutzerschnittstelle (120), die ausgelegt ist, um einen Benutzerbefehl zu empfangen, um eine ausgewählte Nachricht (80) aus dem Speicher (48) des Hörgeräts (10) zu löschen.

13. Hörgerätesystem nach einem der Ansprüche 7 - 12, weiter umfassend eine Benutzerschnittstelle (120), die ausgelegt ist, um einen Benutzerbefehl zu empfangen, um die Übertragung einer ausgewählten Nachricht (80) zu wiederholen.

14. Hörgerätesystem nach einem der Ansprüche 7 - 13, weiter umfassend eine Benutzerschnittstelle (120), die ausgelegt ist, um einen Benutzerbefehl zu empfangen, um eine ausgewählte Nachricht (80) stumm zu schalten.

15. Verfahren zum Kommunizieren einer Nachricht auf der Grundlage von Informationen in Bezug auf einen Benutzer eines Hörgeräts (10), umfassend:

Abrufen der Informationen in Bezug auf den Be-

nutzer des Hörgeräts (10) über ein Weitbereichsnetz (200) unter Verwendung einer Vorrichtung (100), die eine erste Schnittstelle (112, 122) aufweist, die ausgelegt ist für die Verbindung mit dem Weitbereichsnetz (200), eine  
 5 zweite Schnittstelle (114), die ausgelegt ist für die Verbindung mit dem Hörgerät (10), und einen zentralen Prozessor (110), der ausgelegt ist zum Steuern des Abrufs der Informationen in Bezug auf den Benutzer des Hörgeräts (10) über  
 10 das Weitbereichsnetz (200);  
 Umsetzen der Nachricht in Hörproben (46) einer entsprechenden Sprachnachricht (80) unter Verwendung eines Sprachausgabeprozessors (116) der Vorrichtung (100);  
 Übertragen der Sprachnachricht (80) an das Hörgerät (10) über eine Schnittstelle (44) des Hörgeräts (10);  
 20 Ablegen der Sprachnachricht (80) in einem Speicher (48) des Hörgeräts (10) zusammen mit Zeitgeberinformationen; und  
 Ausgeben der Sprachnachricht (80) für einen Menschen an einem Datum und zu einem Zeitpunkt, wie er in den Zeitgeberinformationen definiert ist;  
 25 **dadurch gekennzeichnet, dass**  
 die Zeitgeberinformationen in den Informationen in Bezug auf den Benutzer des Hörgeräts (10) enthalten sind, und dass das Verfahren das Übertragen der Zeitgeberinformationen von der  
 30 Vorrichtung (100) an das Hörgerät (10) über die Schnittstelle (44) des Hörgeräts (10) umfasst.

**16. Verfahren zum Kommunizieren einer Nachricht auf der Grundlage von Informationen in Bezug auf einen Benutzer eines Hörgeräts (10), umfassend:**

Abrufen der Informationen in Bezug auf den Benutzer des Hörgeräts (10) über ein Weitbereichsnetz (200) unter Verwendung einer Vorrichtung (100), die eine erste Schnittstelle (112, 122) aufweist, die ausgelegt ist für die Verbindung mit dem Weitbereichsnetz (200), eine  
 40 zweite Schnittstelle (114), die ausgelegt ist für die Verbindung mit dem Hörgerät (10), und einen zentralen Prozessor (110), der ausgelegt ist zum Steuern des Abrufs der Informationen in Bezug auf den Benutzer des Hörgeräts (10) über das Weitbereichsnetz (200);  
 45 Übertragen der Nachricht an das Hörgerät (10) über eine Schnittstelle (44) des Hörgeräts (10);  
 Umsetzen der Nachricht in Hörproben (46) einer entsprechenden Sprachnachricht (80) unter Verwendung eines Sprachausgabeprozessors (56) des Hörgeräts (10);  
 50 Ablegen der Nachricht (80) und/oder der Sprachnachricht (80) in einem Speicher (48) des Hörgeräts (10) zusammen mit Zeitgeberin-

formationen; und  
 Ausgeben der Sprachnachricht (80) für einen Menschen an einem Datum und zu einem Zeitpunkt, wie er in den Zeitgeberinformationen definiert ist;

**dadurch gekennzeichnet, dass**  
 die Zeitgeberinformationen in den Informationen in Bezug auf den Benutzer des Hörgeräts (10) enthalten sind, und dass das Verfahren das Übertragen der Zeitgeberinformationen von der Vorrichtung (100) an das Hörgerät (10) über die Schnittstelle (44) des Hörgeräts (10) umfasst.

**17. Verfahren nach Anspruch 15 oder 16, wobei das Verfahren umfasst**

Ablegen der Sprachnachricht (80) in dem Speicher (48) des Hörgeräts (10) zusammen mit Zeitgeberinformationen, und wobei das Ausgeben der Sprachnachricht für den Menschen umfasst

Abrufen, unter Verwendung eines Nachrichtenprozessors (54) einer Hörhilfeschaltung (10) des Hörgeräts, der Hörproben der Sprachnachricht aus dem Speicher (48) und  
 Weiterleiten der Hörproben (50) an einen Mischer (32) der Hörhilfeschaltung (10),  
 Einstellen, unter Verwendung des Nachrichtenprozessors (54), von Gewichten (52), mit denen ein digitales Mikrofonaudiosignal (30) der Hörhilfeschaltung (10) und die Hörproben (50) im Mischer (32) zusammengefügt werden, um die Mischerausgabe (34) als gewichtete Ausgabe-  
 summe zu bilden, und  
 Erzeugen, unter Verwendung eines Hörverlustprozessors (36) der Hörhilfeschaltung (10), eines auf Hörverlust kompensiertes Ausgabesignals (38) auf der Grundlage des von dem Mischer (32) ausgegebenen Signals (34).

**Revendications**

**1. Instrument auditif (10) comprenant**

une interface (44) pour la réception d'un message à partir d'un dispositif (100),  
 un processeur texte-parole (56) configuré pour la conversion du message en échantillons audio (46) d'un message vocal correspondant,  
 une mémoire (48) pour le stockage du message et/ou du message vocal, et  
 un processeur de message (54) configuré pour, à un temps sélectionné, transmettre les échantillons audio (50) du message vocal à l'utilisateur de l'instrument auditif (10),

**caractérisé en ce que**

l'interface (44) de l'instrument auditif est desti-

née à la réception d'informations concernant le temps sélectionné à partir du dispositif (100).

## 2. Instrument auditif (10) comprenant

une interface (44) pour la réception d'échantillons audio (46) d'un message vocal (80) à partir d'un dispositif (100), dans lequel le message vocal (80) est une forme convertie d'un message et est généré en utilisant un processeur texte-parole (116) du dispositif (100),  
une mémoire (48) pour le stockage du message vocal (80, 46), et  
un processeur de message (54) configuré pour, à un temps sélectionné, transmettre les échantillons audio (50) du message vocal (80) à l'utilisateur de l'instrument auditif (10),  
**caractérisé en ce que**  
l'interface (44) de l'instrument auditif est destinée à la réception d'informations concernant le temps sélectionné à partir du dispositif (100).

## 3. Instrument auditif selon la revendication 1 ou 2, dans lequel l'instrument auditif (10) comprend une aide auditive (10).

## 4. Instrument auditif selon l'une quelconque des revendications précédentes, dans lequel l'instrument auditif (10) comprend une minuterie qui est synchronisée avec une minuterie du dispositif (100), et dans lequel le processeur de message (54) est configuré pour délivrer automatiquement en sortie les échantillons audio (46) au temps sélectionné tel que déterminé avec la minuterie.

## 5. Dispositif (100) comprenant

une seconde interface (114) configurée pour la connexion à un instrument auditif (10), et  
un processeur texte-parole (116) configuré pour la conversion d'un message basé sur des informations relatives à un utilisateur de l'instrument auditif (10) en échantillons audio (46) d'un message vocal (80) correspondant, et  
un processeur central (110),  
le dispositif (100) étant configuré pour la transmission du message vocal (80) à l'instrument auditif (10),  
**caractérisé en ce que**  
le dispositif comprend une première interface (112, 122) configurée pour la connexion à un réseau étendu (200),  
le processeur central (110) étant configuré pour commander la réception des informations relatives à l'utilisateur de l'instrument auditif (10) par l'intermédiaire du réseau étendu (200),  
un temps sélectionné spécifiant quand l'instrument auditif est commandé pour lire le message

vocal correspondant est inclus dans les informations relatives à l'utilisateur de l'instrument auditif (10), et **en ce que**  
le dispositif (100) étant configuré pour la transmission du temps sélectionné à l'instrument auditif (10).

## 6. Dispositif (100) comprenant

une seconde interface (114) configurée pour la connexion à un instrument auditif (10), et  
un processeur central (110),  
le dispositif (100) étant configuré pour la transmission d'un message basé sur des informations relatives à l'utilisateur de l'instrument auditif (10) à l'instrument auditif (10),  
**caractérisé en ce que**  
le dispositif comprend une première interface (112, 122) configurée pour la connexion à un réseau étendu (200),  
le processeur central (110) étant configuré pour commander la réception des informations relatives à l'utilisateur de l'instrument auditif (10) par l'intermédiaire du réseau étendu (200),  
un temps sélectionné spécifiant quand l'instrument auditif est commandé pour lire un message vocal correspondant au message est inclus dans les informations relatives à l'utilisateur de l'instrument auditif (10), et **en ce que**  
le dispositif (100) étant configuré pour la transmission du temps sélectionné à l'instrument auditif (10).

## 7. Système d'instrument auditif comprenant l'instrument auditif (10) selon la revendication 1 ou l'une quelconque des revendications 3 et 4 quand elles dépendent de la revendication 1, et le dispositif (100), dans lequel le dispositif (100) comprend

une première interface (112, 122) configurée pour la connexion à un réseau étendu (200),  
une seconde interface (114) configurée pour la connexion à l'instrument auditif (10), et  
un processeur central (110) configuré pour commander la réception d'informations relatives à l'utilisateur de l'instrument auditif (10) par l'intermédiaire du réseau étendu (200),  
dans lequel le dispositif (100) est configuré pour la transmission du message (80) à l'instrument auditif (10), et dans lequel le message est basé sur les informations relatives à l'utilisateur de l'instrument auditif (10), et dans lequel le temps sélectionné est inclus dans les informations relatives à l'utilisateur de l'instrument auditif (10), et dans lequel le dispositif (100) est configuré pour la transmission des informations concernant le temps sélectionné à l'instrument auditif (10).

8. Système d'instrument auditif comprenant l'instrument auditif (10) selon la revendication 2 ou l'une quelconque des revendications 3 et 4 quand elles dépendent de la revendication 2, et le dispositif (100), dans lequel le dispositif (100) comprend

une première interface (112, 122) configurée pour la connexion à un réseau étendu (200),  
une seconde interface (114) configurée pour la connexion à l'instrument auditif (10),  
le processeur texte-parole (116) étant configuré pour la conversion du message en échantillons audio (46) du message vocal (80), dans lequel le message vocal (80) correspond au message, et

un processeur central (110) configuré pour commander la réception d'informations relatives à l'utilisateur de l'instrument auditif (10) par l'intermédiaire du réseau étendu (200),

dans lequel le dispositif (100) est configuré pour la transmission du message vocal (80) à l'instrument auditif (10), et dans lequel le message est basé sur les informations relatives à l'utilisateur de l'instrument auditif (10), et dans lequel le temps sélectionné est inclus dans les informations relatives à l'utilisateur de l'instrument auditif (10), et dans lequel le dispositif (100) est configuré pour la transmission des informations concernant le temps sélectionné à l'instrument auditif (10).

9. Système d'instrument auditif selon l'une quelconque des revendications 7 à 8, dans lequel, quand elles dépendent de la revendication 1, le dispositif (100) est configuré pour transmettre le message à l'instrument auditif (10) à la détection d'une connexion avec l'instrument auditif (10), ou dans lequel, quand elles dépendent de la revendication 2, le dispositif (100) est configuré pour transmettre le message vocal (80) à l'instrument auditif (10) à la détection d'une connexion avec l'instrument auditif (10).

10. Système d'instrument auditif selon l'une quelconque des revendications 7 à 9, dans lequel, quand elles dépendent de la revendication 1, une durée de la transmission du message à l'instrument auditif (10) est plus longue qu'une durée de la transmission des échantillons audio (46) du message vocal à l'utilisateur, ou dans lequel, quand elles dépendent de la revendication 2, une durée de la transmission du message vocal (80) à l'instrument auditif (10) est plus longue qu'une durée de la transmission des échantillons audio (46) du message vocal à l'utilisateur.

11. Système d'instrument auditif selon l'une quelconque des revendications 7 à 10, comprenant en outre une interface utilisateur (120) configurée pour recevoir

une commande d'utilisateur pour délivrer séquentiellement en sortie au moins deux messages (80) stockés dans la mémoire (48) de l'instrument auditif (10) pour la transmission à un utilisateur du système d'instrument auditif.

12. Système d'instrument auditif selon l'une quelconque des revendications 7 à 11, comprenant en outre une interface utilisateur (120) configurée pour recevoir une commande d'utilisateur pour supprimer un message sélectionné (80) dans la mémoire (48) de l'instrument auditif (10).

13. Système d'instrument auditif selon l'une quelconque des revendications 7 à 12, comprenant en outre une interface utilisateur (120) configurée pour recevoir une commande d'utilisateur pour répéter la transmission d'un message sélectionné (80).

14. Système d'instrument auditif selon l'une quelconque des revendications 7 à 13, comprenant en outre une interface utilisateur (120) configurée pour recevoir une commande d'utilisateur pour mettre en silencieux un message sélectionné (80).

15. Procédé de communication d'un message basé sur des informations relatives à un utilisateur d'un instrument auditif (10), comprenant :

la récupération des informations relatives à l'utilisateur de l'instrument auditif (10) par l'intermédiaire d'un réseau étendu (200) en utilisant un dispositif (100) ayant une première interface (112, 122) configurée pour la connexion au réseau étendu (200), une seconde interface (114) configurée pour la connexion à l'instrument auditif (10), et un processeur central (110) configuré pour commander la récupération des informations relatives à l'utilisateur de l'instrument auditif (10) par l'intermédiaire du réseau étendu (200) ;

la conversion du message en échantillons audio (46) d'un message vocal (80) correspondant en utilisant un processeur texte-parole (116) du dispositif (100) ;

la transmission du message vocal (80) à l'instrument auditif (10) via une interface (44) de l'instrument auditif (10) ;

le stockage du message vocal (80) dans une mémoire (48) de l'instrument auditif (10) conjointement à des informations de synchronisation ; et

la fourniture en sortie du message vocal (80) pour une personne à une heure et une date telles que définies par les informations de synchronisation ;

**caractérisé en ce que**

les informations de synchronisation sont inclu-

- ses dans les informations relatives à l'utilisateur de l'instrument auditif (10), et **en ce que** le procédé comprend la transmission des informations de synchronisation du dispositif (100) à l'instrument auditif (10) via l'interface (44) de l'instrument auditif (10). 5
- 16.** Procédé de communication d'un message basé sur des informations relatives à un utilisateur d'un instrument auditif (10), comprenant : 10
- la récupération des informations relatives à l'utilisateur de l'instrument auditif (10) par l'intermédiaire d'un réseau étendu (200) en utilisant un dispositif (100) ayant une première interface (112, 122) configurée pour la connexion au réseau étendu (200), une seconde interface (114) configurée pour la connexion à l'instrument auditif (10), et un processeur central (110) configuré pour commander la récupération des informations relatives à l'utilisateur de l'instrument auditif (10) par l'intermédiaire du réseau étendu (200) ; 15
- la transmission du message à l'instrument auditif (10) via une interface (44) de l'instrument auditif (10) ; 25
- la conversion du message en échantillons audio (46) d'un message vocal (80) correspondant en utilisant un processeur texte-parole (56) de l'instrument auditif (10) ; 30
- le stockage du message (80) et/ou du message vocal (80) dans une mémoire (48) de l'instrument auditif (10) conjointement à des informations de synchronisation ; et
- la fourniture en sortie du message vocal (80) pour une personne à une heure et une date telles que définies par les informations de synchronisation ; 35
- caractérisé en ce que**
- les informations de synchronisation sont incluses dans les informations relatives à l'utilisateur de l'instrument auditif (10), et **en ce que** le procédé comprend la transmission des informations de synchronisation du dispositif (100) à l'instrument auditif (10) via l'interface (44) de l'instrument auditif (10). 40 45
- 17.** Procédé selon la revendication 15 ou 16, dans lequel le procédé comprend le stockage du message vocal (80) dans la mémoire (48) de l'instrument auditif (10) conjointement à des informations de synchronisation, et dans lequel la fourniture en sortie du message vocal pour la personne comprend 50
- la récupération, en utilisant un processeur de message (54) d'une circuiterie d'aide auditive (10) de l'instrument auditif, des échantillons audio du message vocal à partir de la mémoire 55

(48) et le transfert des échantillons audio (50) à un mélangeur (32) de la circuiterie d'aide auditive (10),

le réglage, en utilisant le processeur de message (54) de poids (52) avec lesquels un signal audio de microphone numérique (30) de la circuiterie d'aide auditive (10) et les échantillons audio (50) sont additionnés ensemble dans le mélangeur (32) pour former la sortie de mélangeur (34) comme une somme de sortie pondérée, et

la génération, en utilisant un processeur de perte auditive (36) de la circuiterie d'aide auditive (10), d'un signal de sortie compensé en perte auditive (38) sur la base du signal de sortie (34) provenant du mélangeur (32).

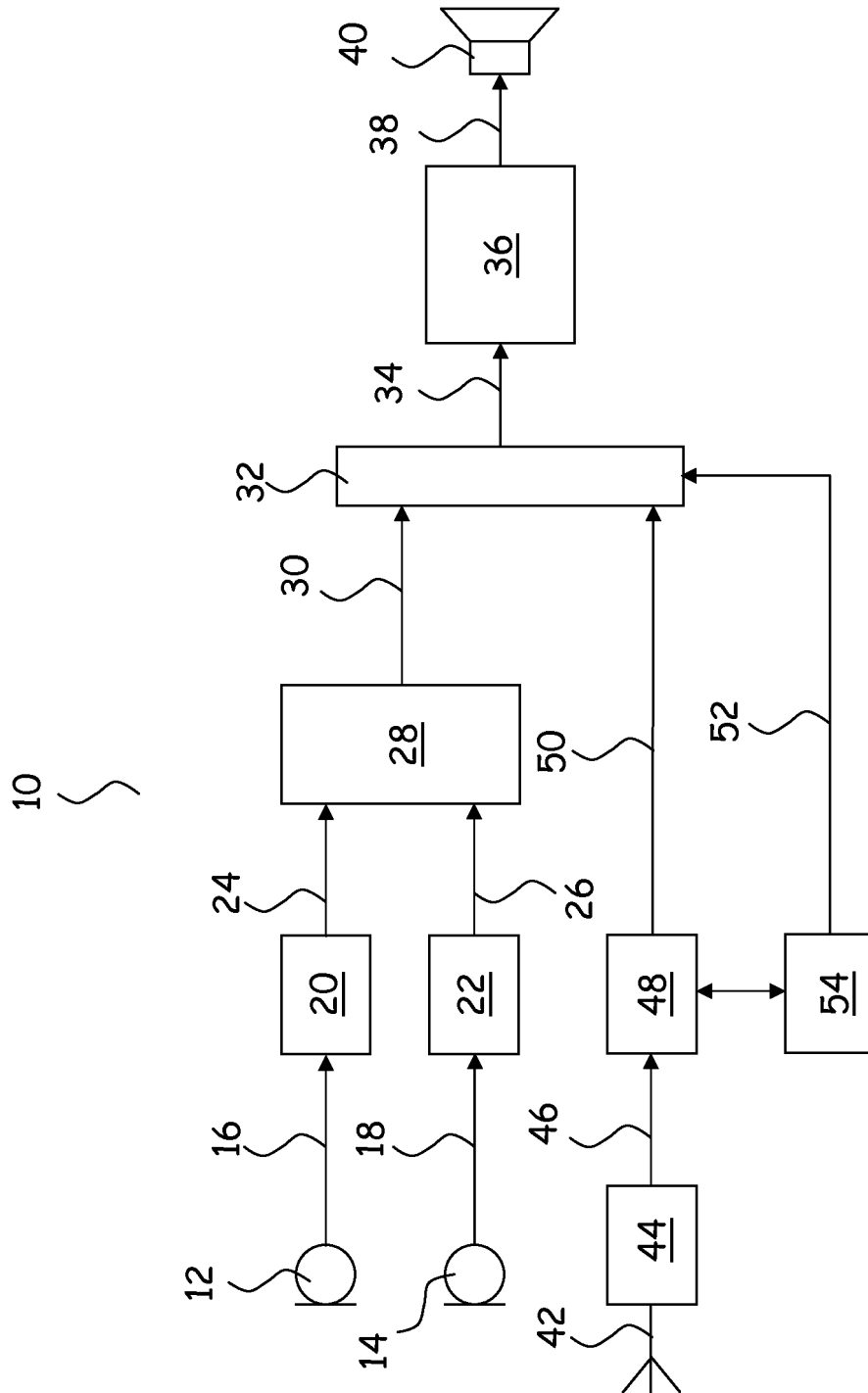


**Fig. 1**

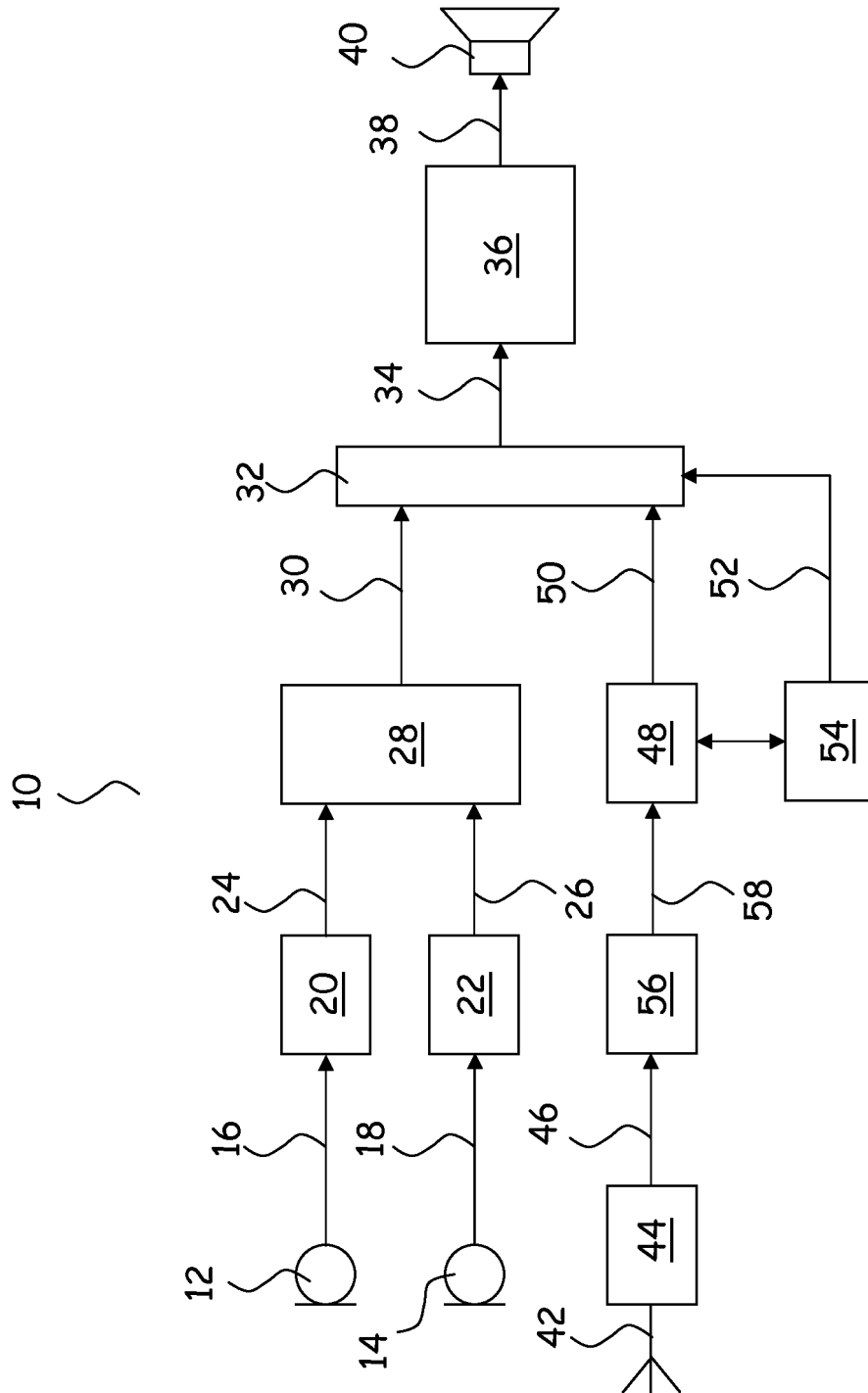


**Fig. 2**

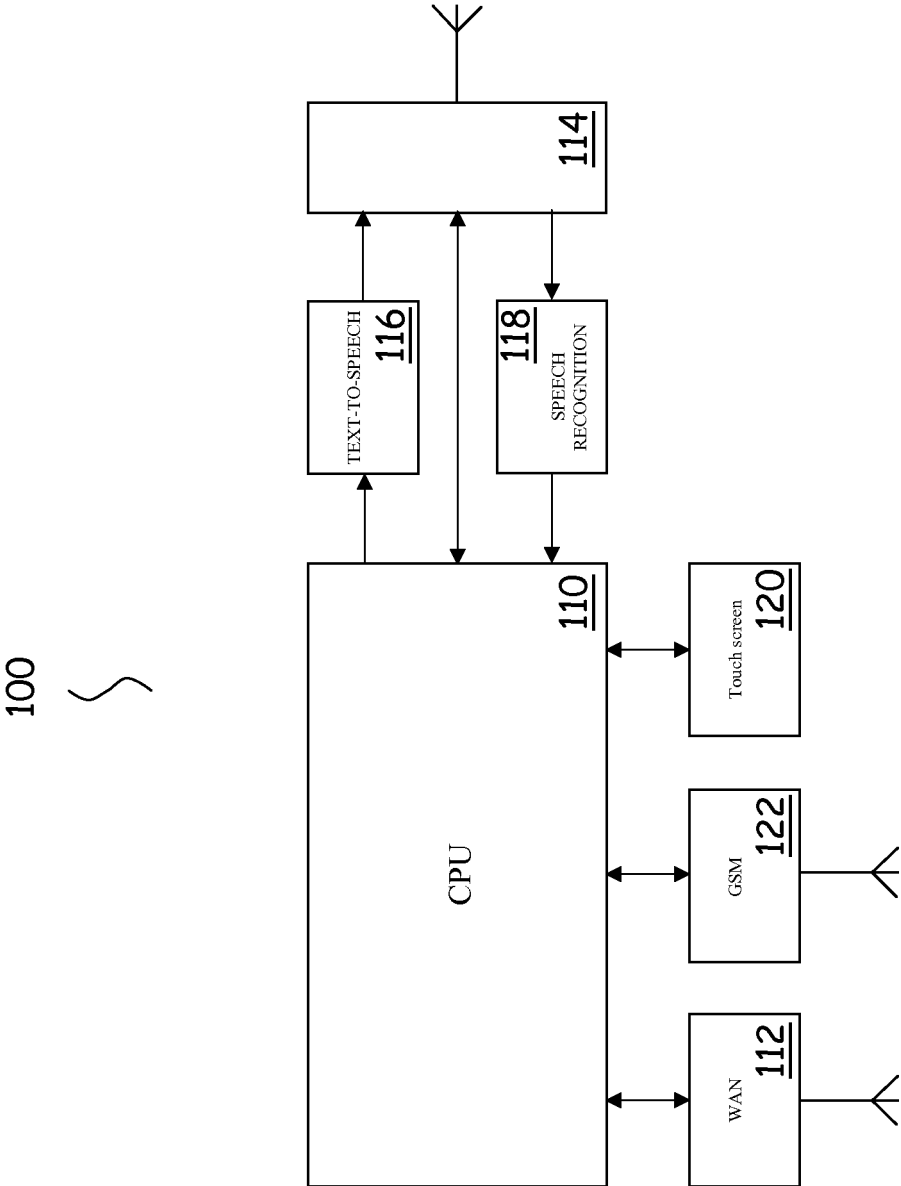


Fig. 3

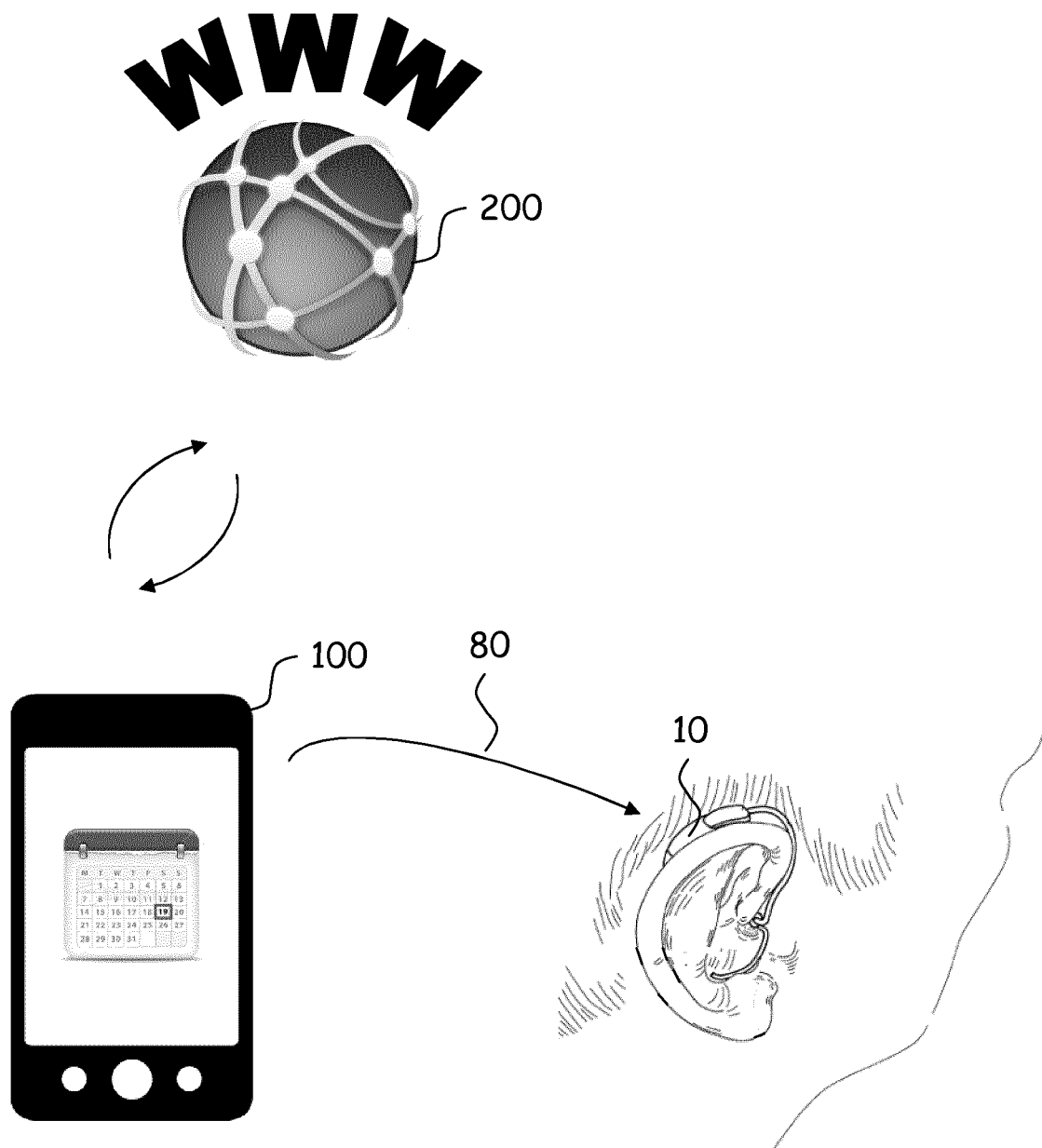


**Fig. 4**

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- US 20050251224 A1 [0006]
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