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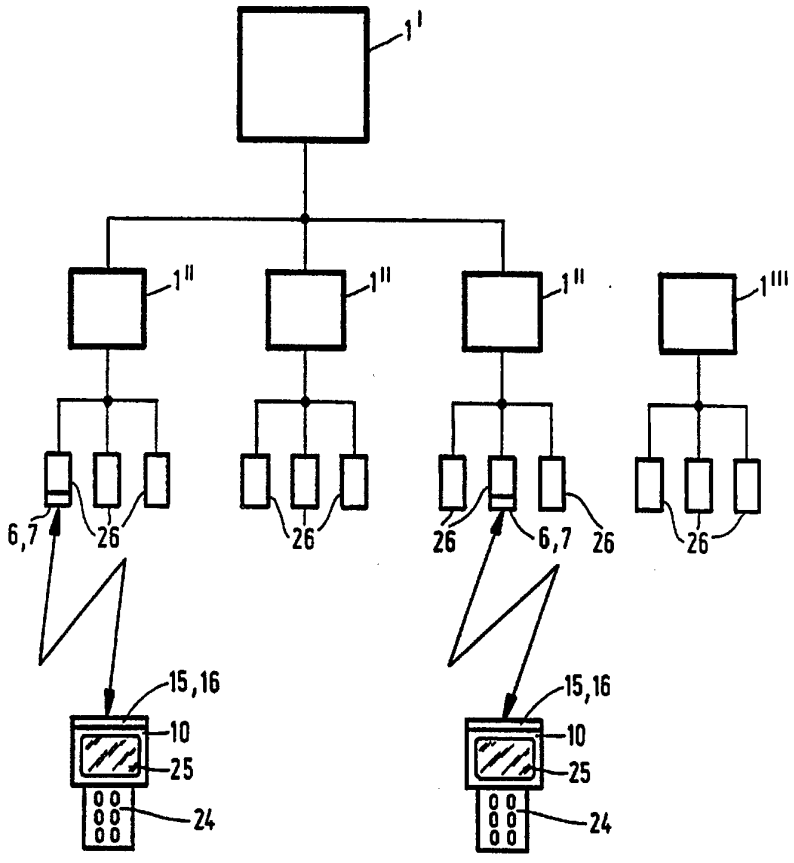
(54) Title: A COMMUNICATION SYSTEM FOR SUPPLYING INFORMATION ON OBJECTS ON DISPLAY BY MEANS OF HAND-HELD DEVICES

(57) Abstract

The invention presents a communication system for supplying information, for example on objects on display, to users who are each provided with a hand-held transceiver, which communicates with a central unit, in which digital information is stored in blocks, which can be selected individually at the request of each individual transceiver and then be transferred to and stored in the requesting transceiver, and whereby the stored and selected information blocks are converted into audible and visible information in the transceiver at the user's command. When such a system is used compression of transferred and stored information results in a minimal transmission time and a minimal storage requirement. Communication preferably takes place wirelessly by means of infrared radiation within an area of action. Furthermore a stand-alone device is described, with which information blocks can likewise be converted into audible sound and visible video.



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A COMMUNICATION SYSTEM FOR SUPPLYING INFORMATION ON OBJECTS ON DISPLAY BY MEANS OF HAND HELD DEVICES

The present invention relates to a communication system for supplying information.

The present invention furthermore relates to a system, as well as to a transceiver, a central unit and a node for use in the system, with which information can be supplied.

Supplying information is in this case more particularly about known systems for supplying auditive information. At present various systems are known for supplying information, for example in museums, at exhibitions, manifestations or fairs, on that which is to be seen, heard or experienced there.

Known systems provide information centrally by means of a cassette recorder to a transmitter, and from there this information is transferred to several receivers, where the said information can be simultaneously heard by the possessor of the receiver. Another known possibility is to provide each user with his own cassette recorder, so that the user can select the recorded information by starting, stopping and winding on or rewinding as desired, and tune in to that which can be seen or heard at that particular location.

The disadvantage of both known systems, however, is that it is not possible for each individual user to select information separately in a simple manner and then put the information in that order in which the visitor in question views the manifestation. With the known systems such as the system disclosed in WO 92/11626 preferably compressed audio information can be selected and the available information can be attuned to the user's actual information requirements. However applying several hand-held

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transceivers on a larger scale simultaneously is hardly possible in the known system due to mutual disturbances experienced.

The object of the present invention is to provide a full communication system with which at wish audio with or without video information can be selected by a user on an individual basis, which information then becomes available to the user in a personalised way, as well as to provide transducers in such a communication system which is inexpensive to produce, which may for example be used to supply in a limited area of action individually selected information to different visitors of museums, exhibitions, manifestations and fairs, but which may also be used to gather personal orders given by the persons during their shopping.

In order to accomplish that objective the invention presents a communication system at least comprising a central unit with one or more hand-held transceivers, which central unit and transceivers are each provided with communication means for setting up a wireless communication between the central unit and a respective transceiver, the central unit comprises a main memory wherein digital information is stored in information blocks containing audio and/or video data, whereby only a person holding a transceiver within the radius of action of the communication means is capable of requesting the transfer of one or more of the blocks, which blocks are selectable by the person holding the transceiver by means of activating selection means by inputting reference data provided on displayed objects about which said person wants to be informed, whereby after said selection the selection data is transmitted to the central unit on the basis whereof the corresponding selected blocks are being searched for in the main memory of the central unit and sent to the requesting transceiver, whereupon one

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personalised block of the locally available selected blocks is further selected for conversion of its audio and/or video data into audible and/or visible information on a moment and place to be chosen by that person.

The advantage of the communication system according to the invention is that it does not take any complex operations, complex in particular for the average user, to obtain the information that is available on said object on the spot, for example at the location of an object on display. In addition the information is fully personally directed at the user in question, who is able to choose from those information blocks that he wishes to receive and listen to or view at. Because selected information blocks are respectively transferred from the central unit to the respective requesting transceiver, the total communication time is minimal and thus it is possible to provide several transceivers with the information desired practically simultaneously. The system according to the invention is advantageously applicable during shopping such as in a supermarket where ones choice can be selected upon viewing the articles. The corresponding article identification data is then transmitted to the repository to collect the selected articles there. Finally all selected products are brought to a delivery place for payment and distribution to the costumer. Payment could advantageously take place by including a credit card reader in the transceiver, in order to automatically deduct the amount to be paid from the customers account.

A further advantage of the application of the communication system according to the invention is that if pieces are added in a hall or exhibition space, these alterations do not make it necessary to change the digital information stored in the central unit as well. The information on all available objects on display is stored centrally in the central unit, from which those information blocks may be

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selected that correspond with the objects about which the user wishes to receive further information, all this irrespective of the place in for example the museum where the objects are located.

In a further embodiment of the communication system the central unit comprises a main central unit and several spaced apart nodes connected to the central unit, whereby each node is provided with said communication means. The advantage is that such nodes can easily be positioned in sufficient numbers at various locations in an area or a building such that the persons using the system do not have to scramble for information.

In a further method according to the invention the information blocks are stored in the central unit, or the nodes in compressed form and, following that, also transmitted in compressed form to the transceivers in question, as a result of which not only the storage capacity of the memories in the central unit and in each of the transceivers may be minimal, but as a result of which also the communication time, that is the time needed to actually transmit the information blocks from the central unit to a transceiver, is minimal. This advantage applies in particular to compressed video information, because digital video information in general tends to be very bulky.

In a further embodiment of the communication system according to the invention the transceiver is provided with means for indicating that a transceiver in question is within the radius of action of a communication means. The advantage thereof is that a person wishing to collect selected personalised information in his transceiver will not seek to contact his node or central unit in vain because he can easily detect the moment wherein he is within the reach of the communication means.

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A futuristic approach to the communication system according to the invention is provided for in an embodiment wherein the visual data is displayed on a screen in the form of wearable glasses or in the form of a screen incorporated in the glasses or in a helmet. Preferably the glasses is combined or coupled with loudspeaker means in the form of earphones.

In a further elaboration of the communication system the data is provided along two channels, either in stereophonic form, or in mono form wherein the other channel is used for additional information to or from the hand-held device.

By incorporating a hard disk or a read and/or write memory or a compact disc, preferably in the central unit or the node, the amount of memory space which is available for the storage of the memory blocks is almost unlimited. At the same time the quality of in particular the audible information will be very high, since usually very little of the quality is lost in the once-only conversion from digital to analog information.

Similar advantages as presented above apply to an embodiment in which a hand-held electronic unit or guide comprises a transceiver to be used in the communication system according to the invention, wherein said transceiver is designed as a hand-held transceiver and comprises a processor-controlled central processing unit to which are coupled:

- memory means,
- compression/decompression means coupled to said memory means,
- communication means coupled with the memory means for communication with said central unit, and
- a digital-analog converter coupled to said compression/decompression means and an audio/video circuit connected thereto with audio/video means for converting

the information blocks selected by selection means and stored in said memory means into audible sound and visible data respectively.

More particularly said memory means comprise possibly exchangeable information carriers, which may be detached from said unit or guide, such as: ROM, CD-ROM, CD-Audio, CD-I, hard disk(s), RAM or the like.

The invention and its further concomitant advantages will be explained in more detail hereafter with reference to the accompanying drawings, in which:

- Figure 1 shows a possible embodiment of the central unit according to the invention;
- Figure 2 shows a possible embodiment of a transceiver according to the invention for joint use with the central unit of Figure 1, and
- Figure 3 shows an overall view of the communication system including nodes and information points connected thereto for providing and receiving information on a large scale.

Figure 1 shows a possible embodiment of a central unit 1, which is built up of a processor-controlled central processing unit 2, to which an encoder 4 connected to a clock 3, a power amplifier 5 and a transmitter 6 are successively coupled. Preferably the transmitter 6 is a common infrared transmitter, which is provided with one or more LEDs. A (preferably infrared) receiver 7 is likewise connected to the processor-controlled central processing unit 2 via a preamplifier 8 and a decoder 9.

Figure 2 shows a possible embodiment of a transceiver 10, which together with other transceivers (not shown) and the central unit 1 forms a communication system, with which a method may be used for supplying users of the transceiver

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10 with individually selected audio and/or video information on for example objects on display.

The transceiver 10 comprises a processor-controlled central processing unit 11, with a clock (not shown) and memory means 12 connected to the unit 11, whereby one part of said memory means forms the program memory, whilst another part forms the main memory of the unit 11. Connected to the central processing unit 11 are successively an encoder 13, a power amplifier 14 and a transmitter 15, which is preferably an infrared transmitter. An arrow schematically indicates that the transmitter 15 transmits to the receiver 7 of the central unit 1. On the other hand the central processing unit 11 is coupled to a receiver 16, which is preferably of the infrared type, a preamplifier 17, a signal detector 18, if necessary, and a decoder 19. Digital information blocks fetched from the memory means 12 by the unit 11 are converted into an analogue audio signal in a D-A converter connected to the unit 11, which signal is supplied to audio means such as loudspeakers, earphones or headphones 23 via a volume control 21 and an audio amplifier 22. Said audio means may be incorporated or integrated in a wearable pair of glasses or in a helmet to be described later.

The operation of the communication system built up of one or more transceivers 10 and the central unit 1 is as follows. An information block from the digital information stored in the memory of the central processing unit 2, for example on a CD-ROM, is selected from the memory of the unit 2 and supplied to the encoder 4 when a signal to that effect from the transceiver 10 is received via the transmitter 15 and the receiver 7. In the encoder 4 the information block is prepared for transmission. If desired the information presented is compressed in the encoder 4, in order to shorten the time needed for transferring information from the unit 1 to the transceiver 10. Via the

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amplifier 5 the transmitter 6 is actuated, which beams the digital output signal from the transmitter 6 to the receiver 16 of the transceiver 10. The signal received at the receiver is amplified in the preamplifier 17, and when a signal having sufficient amplitude is detected said signal is decoded in the decoder 19. Then processing of the signal received takes place in the unit 11, whereupon the signal received, which is preferably not decompressed, is stored in the main memory part of the memory means 12. In principle decompression may take place in the decoder 19, as the decompressed signal takes up more memory space than the corresponding signal which is not decompressed, however, it is to be preferred to store the signal in compressed form in the memory means 12. Furthermore a keyboard 24 and a display screen 25, which is for example built up of simple (LCD)diodes, are connected to the unit 11. Preferably the visual data is (also) displayed on the screen in the form of wearable glasses or in the form of a screen incorporated in the glasses or in a helmet. Such screens are similar to screens used for virtual reality applications wherein the screens are used for projecting and imaging visual data thereon.

The keyboard may be used, for example by inputting a reference code therein, to make a selection from the compressed data stored in blocks in the memory means 12 by means of the reference code stored therein, or the reference code may be used to select an information block present in the memory of the unit 2. Upon selection of one or more memory blocks said blocks are supplied to the D-A converter 20 via the unit 11, in order to convert them into audible sound via the control 21, the amplifier 22 and the headphones 23. Next to a keyboard a code reader such as a barcode reader can be used to read the reference code labelled to an item or product. Entering such code then leads to the providing of product information or product content in word, sound and/or video form. Such as with

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buying products in a supermarket or with buying for example books, household apparatus, or compact discs in a CD shop.

At an earlier stage a signal was supplied to the unit 1, via the transmitter 15 and the receiver 7, such that the information block in the memory of the unit 2 that corresponds with the input reference code could be received at the unit 1 via the transmitter 6 and the receiver 16. Large scale communication systems 1 are usually build up as shown in figure 3 having a master central unit 1' being connected to several sub units or nodes 1''. Each node 1'' is connected with for example 1-6 information points 26 which are at least provided with the communication means 6 and 7. Point 1''' is a remote stand alone unit whose information can be updated manually by connecting that unit (if not already connected) with an external memory whose content is downloaded to said unit.

A program which not only controls the communication between the transceiver 10 and the central unit 1, but which can also carry out a decompression step on the data which are stored in the main memory part of the memory means 12, if desired, may be placed in the program memory of the memory means 12. Of course several communication protocols may be stored as software in the program memory of the memory means 12, which may for example contain an EPROM. It will be apparent that irrespective of the position of the object on display the indication of the corresponding reference code usually placed with that object forms the key to the selection of the information blocks, which are preferably also stored in compressed form in the memory of the unit 2 and which embody the auditive and video information on the object in question. Dependent on the concrete arrangement and design of the unit 1 and the transceiver 10 one or more information blocks may be transferred consecutively from the unit 1 to the requesting transceiver 10.

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Referring to Figure 2, an embodiment of a stand-alone unit 10 will now be explained, which unit is not arranged as a transceiver for communication with the control unit 1 and does not comprise the above-described components 13 - 19. In this embodiment the memory means 12 comprise additional information carriers, such as ROM, CD-ROM, CD-Audio, CD-I, one or more hard disks, etc., which may or may not be exchangeable. Since a RAM memory needs to be refreshed, for example every msec, in order to be able to hold the information contained therein, it is generally a fixed, but possibly expandable memory. By filling each unit 1 with relevant information upon starting to use them, and deactivating the unit 1 when their use is no longer required, the complete RAM memory is available again for being filled with, usually different, information in a next cycle. In each of the aforesaid variants of embodiments selection from the memory means 12 takes place by selection means (not shown). The selected information blocks are respectively converted into audible sound at the end of the series of audio components 20 - 23 or converted to video images to be visualised on said screen(s).

Every transceiver 10 has help functions available and gives his instructions to the person operating the same in a language which may be preset by that person. Where necessary use is made of buttons on the transceiver 10 having multiple at wish programmable functions.

The audio information is preferably in stereo provided to the hearing means 23. In those cases wherein no use is made of the stereo the audio (mono) data can be provided along one channel, whereas the other channel is used for additional e.g. control or help information to or from the hand-held device. The video information may provide for coloured video, especially in those cases wherein the transmission rate from units or nodes to transceivers

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amounts about several Mbytes per second so that waiting times at the information points 26 are minimal.

In special cases a transceiver can be programmed to give instructions on the spot such as in cases wherein an animation or some process can be started. A cursor controlled menu is available thereto. In particular the master unit 1' is equipped with means (not shown) for performing a statistical analysis and performance check on the system.

Apart from including a creditcard reader in the transceiver to make the necessary payments on a pay-desk, provisions can be made for telephone facilities as well. The system as a whole can also be used for a (collective) programmed instruction for works in the field or members to a course, meeting or conference.

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CLAIMS

1. In a communication system at least comprising a central unit with one or more hand-held transceivers, which central unit and transceivers are each provided with communication means for setting up a wireless communication between the central unit and a respective transceiver, the central unit comprises a main memory wherein digital information is stored in information blocks containing audio and/or video data, whereby only a person holding a transceiver within the radius of action of the communication means is capable of requesting the transfer of one or more of the blocks, which blocks are selectable by the person holding the transceiver by means of activating selection means by inputting reference data provided on displayed objects about which said person wants to be informed, whereby after said selection the selection data is transmitted to the central unit on the basis whereof the corresponding selected blocks are being searched for in the main memory of the central unit and sent to the requesting transceiver, whereupon one personalised block of the local available selected blocks is further selected for conversion of its audio and/or video data into audible and/or visible information on a moment and place to be chosen by that person.

2. Communication system according to claim 1, wherein the central unit comprises a main central unit and several spaced apart nodes connected to the central unit, whereby each node is provided with said communication means.

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3. Communication system according to claim 1 or 2, whereby said information blocks are stored in the central unit, and/or the nodes, and/or the transceivers in compressed form.

4. Communication system according to one of the claims 1-3, whereby the communication means is infrared communication means.

5. Communication system according to one of the claims 1-4, whereby the transceiver is provided with means for indicating that a transceiver in question is within the radius of action of a communication means.

6. Communication system according to claim 5, whereby the means for indicating are in the form of light emitting means.

7. Communication system according to claim 6, whereby the light emitting means comprises one or more LED's.

8. Communication system according to one of the claims 1-7, whereby the audio data is hearable by means of loudspeaker means and the visual data is displayed on a screen in the transceiver.

9. Communication system according to claim 8, whereby the visual data is displayed on a screen in the form of wearable glasses or in the form of a screen incorporated in the glasses or in a helmet.

10. Communication system according to claim 9, whereby the glasses is combined or coupled with loudspeaker means in the form of headphones or earphones.

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11. Communication system according to one of the claims 1-10, whereby the data is provided along two channels, either in stereophonic form, or in mono form wherein the other channel is used for additional information to or from the hand-held device.

12. A transceiver to be used in the communication system according to one of the claims 1 - 11, said transceiver being designed as a hand-held transceiver and comprising a processor-controlled central processing unit to which are coupled:
- memory means,
- compression/decompression means coupled to said memory means,
- communication means coupled with the memory means for communication with said central unit, and
- a digital-analog converter coupled to said compression/decompression means and an audio/video circuit connected thereto with audio/video means for converting the information blocks selected by selection means and stored in said memory means into audible sound and visible data respectively.

13. A hand-held electronic guide / information detract / ordering system containing a communication system according to one of the claims 1 - 11, wherein said main memory of said transceiver or said central unit or nodes comprises information carriers, such as: ROM, CD-ROM, CD-Audio, CD-I, hard disk(s), RAM or the like, which may or may not be exchangeable and/or erasable.

14. Node suitable for application in a communication system according to one of the claims 2 - 11, whereby the node is in the form of a stand alone device having said communication means and in addition, containing a main memory wherein digital information is stored in

information blocks containing audio and/or video data, which digital information can be updated by means of establishing an external connection with an external information providing unit.

15. A central unit suitable for application in a communication system according to one of the claims 1 - 11, or a node according to claim 14, wherein said main memory includes a hard disk or a read and/or write memory or a compact disc.

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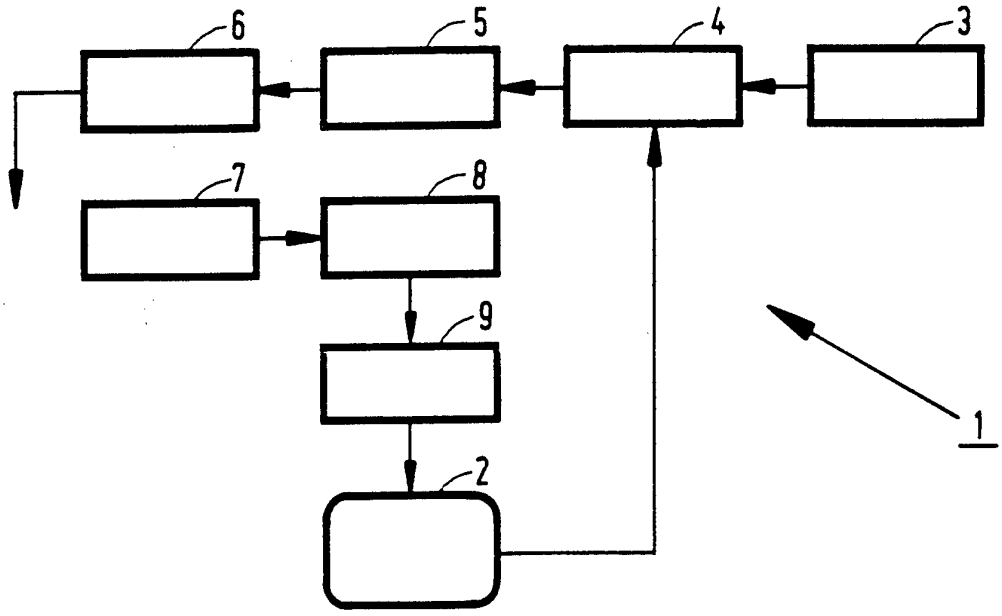
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FIG. 1

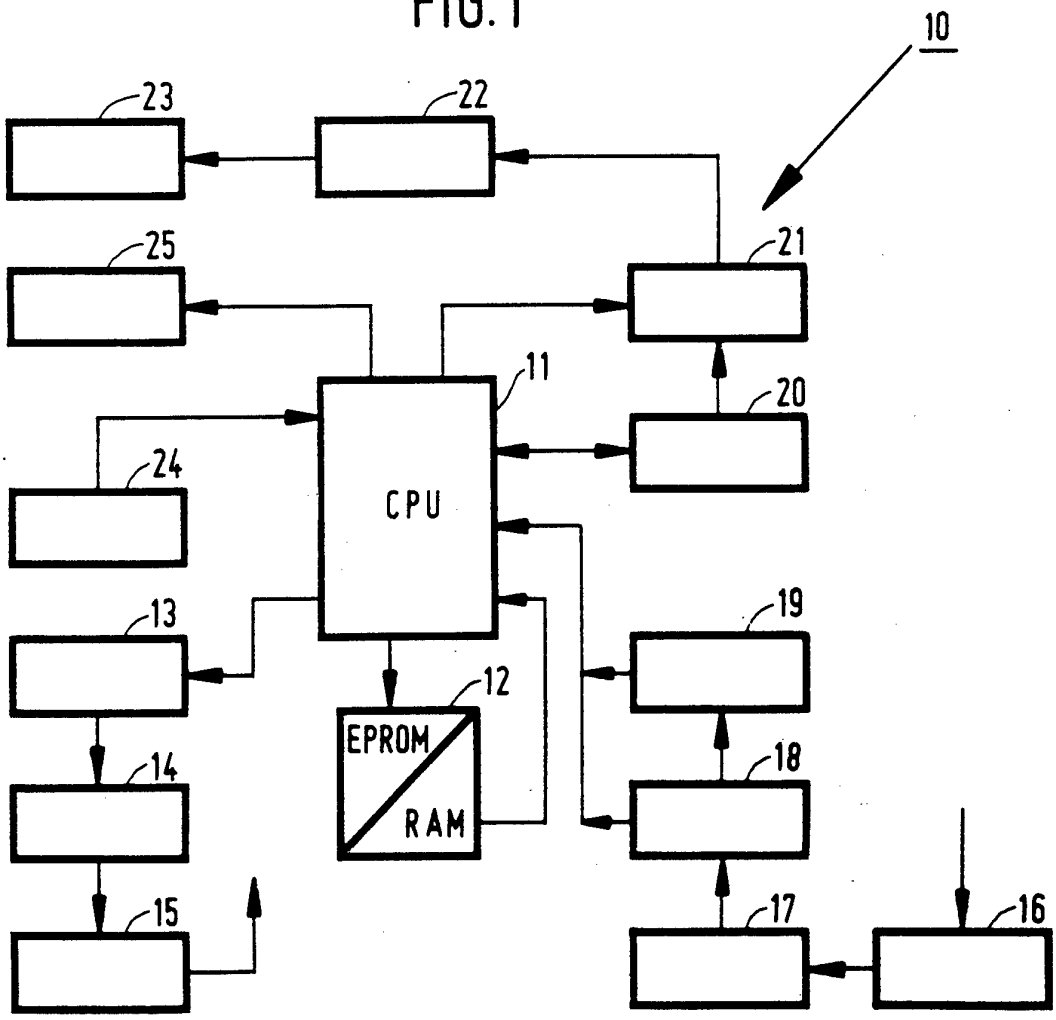
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FIG. 2

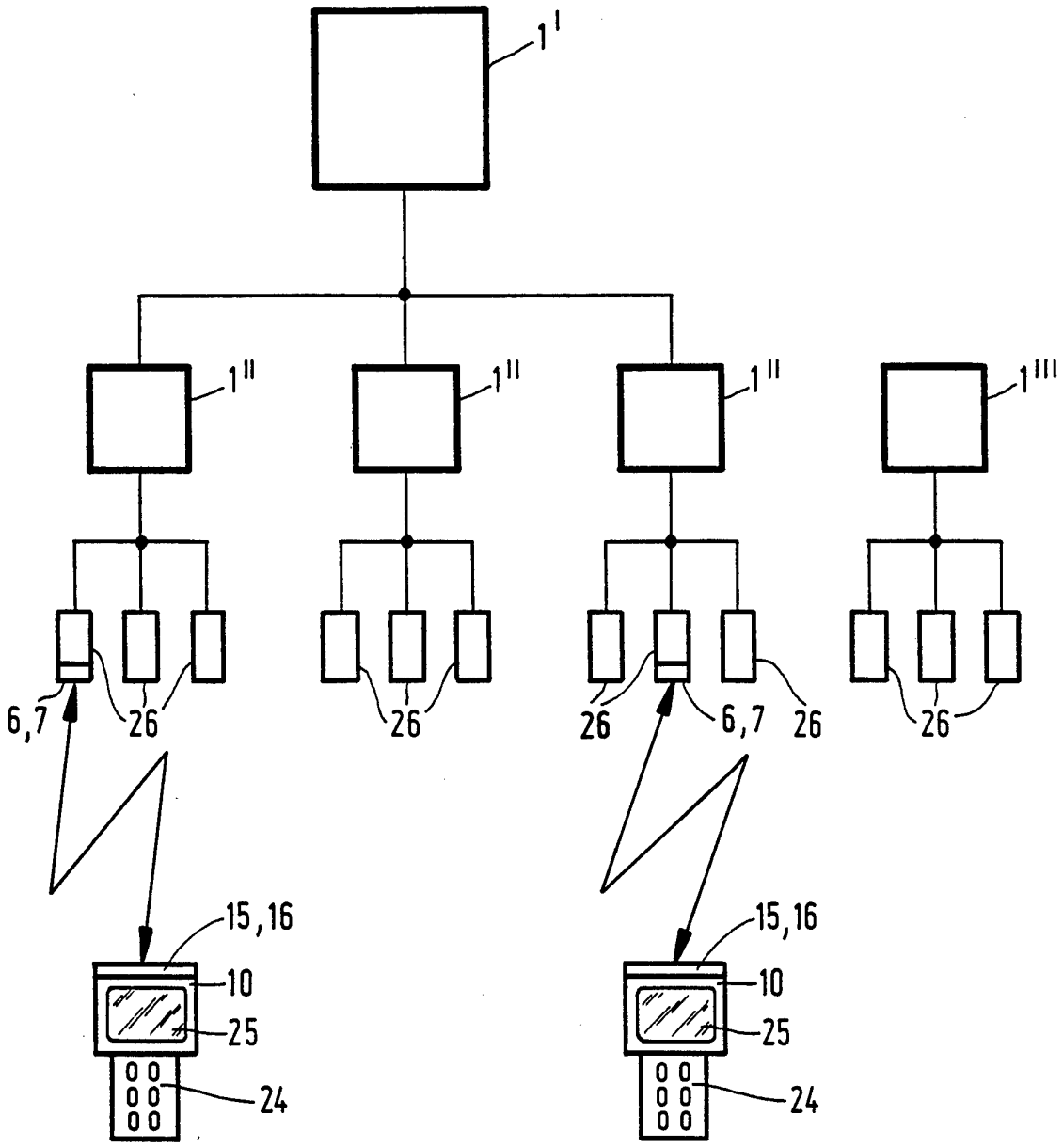

FIG. 3

INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/EP 95/02522

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04R27/00

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04R H04B H04H

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y A	WO,A,94 11967 (WEEKS STEPHEN ;HAYES ROBERT (US)) 26 May 1994 see page 6, line 16 - page 10, line 5; figures	1,12-15 8
A	DE,A,35 35 715 (SENNHEISER ELECTRONIC KG) 9 April 1987 see column 2, line 55 - column 3, line 40; figures	1,10,12

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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1

Date of the actual completion of the international search	Date of mailing of the international search report
27 October 1995	10. 11. 95

Name and mailing address of the ISA	Authorized officer
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter ›nal Application No
PCT/EP 95/02522

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