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(71) Applicant *(for all designated States except US)*: AUSTEL LICENSING GMBH [AT/AT]; Franz-Josef-Strasse 33, A-5020 Salzburg (AT).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: SAVERY, Winsor, T. [US/US]; 300 Corporate Center Drive, Manalapan, NJ 07726 (US). DE BRUN, Cathal [IE/IE]; 21 B Ferrycarrig Park, Cookock, Dublin 17 (IE). LAMAH, Ahmad [LB/IE]; Ballsbridge, 39 The Sweepstakes, Ballsbridge Road, Dublin 4 (IE).

(74) Agent: PATENTBÜRO BÜCHEL & PARTNER AG; Letzanaweg 25, FL-9495 Triesen (LI).

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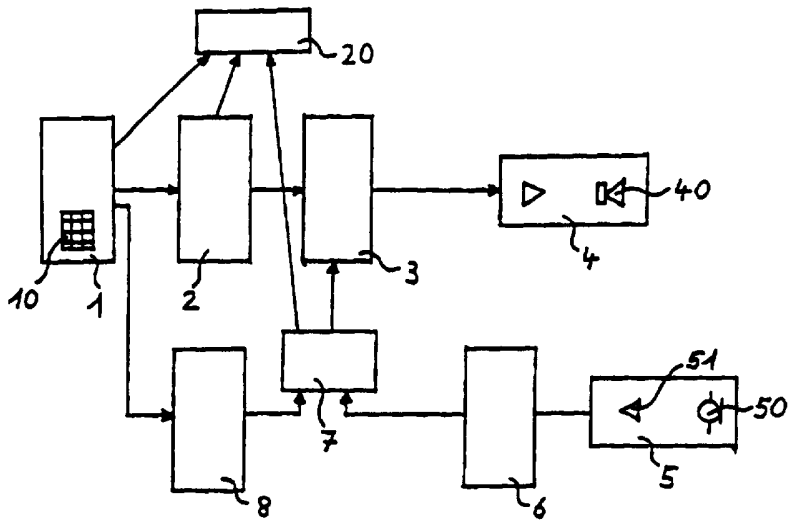

(57) Abstract

A device (200) for automatically dialling telephone numbers contains at least one memory (2; 7) for storing telephone numbers and corresponding dialling codes and/or telephone card numbers, input means (1) for putting in a given dialling code corresponding to a given telephone number and/or an individual password, a translation means for converting the input dialling code into the corresponding telephone number, a tone generator (4; 505) for transforming telephone numbers into a sequence of sound signals corresponding to the dial tones for the digits of the telephone numbers, acoustic output means (4) for amplifying the dial tones and for putting out the dial tones via a sound converter (40), which sound converter (40) can be coupled acoustically to a microphone part (33) of a telephone and acoustic input means (5) with a microphone (59) and preferably an acoustic amplifier (51) for transmitting a sound information in form of an electric signal to a detector (6) connected to the memory (7) in order to react automatically on a registered telephone-network signal.

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PROCESS FOR AUTOMATICALLY DIALLING TELEPHONE NUMBERS AND A DEVICE TO REALISE THE PROCESS

The invention relates to a process for automatically dialling telephone numbers in accordance with the preamble of claim 1 as well as to a device in accordance with the preamble of claim 4.

If it is intended to establish a connection to a certain subscriber on a conventional telephone set, the telephone number must be put IN via the keys of the set. This is usually a time-consuming and, particularly in the case of telephone boxes or mobile telephones, tedious process because a telephone number usually first has to be searched for in a telephone directory and read from the directory before the number, which may be up to more than 15 digits, can be put in. If an incorrect digit is put in by mistake, the dialling procedure must be terminated and repeated; furthermore, in some cases, it is even necessary to look up the forgotten telephone number again in the telephone directory.

In addition to general service for telephone communication, a variety of special telephone services are available to the public. In order to use such special telephone services, it is necessary to transmit an access code of a telephone company beneath various dial data, such as, for example, a target telephone number.

Conventional automatic dialling units have special service number functions, but very often they are not able to handle these functions properly and, above all, automatically.

For example, in calling card dialling service, a telephone company offers a kind of a credit card, called "calling card", to a customer. On each calling card, a card number is

stored which is related to the telephone number of the customer. Through such a calling card service, the customer can make telephone calls from a public telephone not using coins but automatically charged to the customer's bank account.

The customer dials his calling card number, has to wait for a special telephone signal, dials a target telephone number, has to wait twice for a special telephone signal and then he normally has to dial a special access code. If an incorrect digit is put in by mistake, the dialling procedure must be terminated and repeated!

It is therefore the object of the invention to provide a system and a means with which these dialling procedures can be simplified and made automatically, also in the case of a mobile telephone or a set in telephone boxes or the like.

This is achieved through realisation of the characterising features of claim 1 and claim 4 respectively.

Further alternative and/or advantageous embodiments are described in the dependant claims.

The present system for automatically dialling telephone numbers is able to detect telephone-network signals and react on said signals in order to automate the whole dialling procedure, even in case of additional target telephone numbers or access codes.

To achieve the said advantages, acoustic input means with a microphone and preferably an amplifier for transmitting sound information are equipped with a detector connected to a memory.

Furthermore, a signal, that comes in from the telephone-network via the acoustic input means and which is detected

through the acoustic detector, leads to automatic utilisation of a country dependant or a position dependant dialling operation mode. For example dial pulse operation mode or multifrequency tone dial operation mode is possible.

Thus, dialling procedures can be automated by using the inventive dialling process.

The invention is described by means of drawings in an exemplary way:

Fig.1 shows a block diagram of an automatic dialling system according to the invention;
Fig.2 shows an extended block diagram of an automatic dialling system including acoustic input means and evaluation means according to the invention;
Fig.3 shows a possible design of an automatic dialling unit according to the invention;
Fig.4 shows a detailed block diagram with regard to the embodiment of Fig.3;
Fig 5 shows a block diagram of an automatic dialling unit with additional units and
Fig. 6a to 6c show automatic dialling units with additional units.

Fig.1 shows a block diagram of an automatic dialling process according to the invention. After input of a personal access code to an access guard 90, the automatic dialling unit 200 is ready to use. With either a short code or a dialling menu 91, preferably like those of an electronic telephone book, the user has to choose his target telephone data by keyboard 10 (Fig.2) or with another input facility.

The chosen telephone number and perhaps additional data is then transformed according to the detected dialling operation mode 92.

First, output of the target telephone number takes place 93, then, if needed, the required access code is put out 94 via the output means 4 (Fig.2)

Between each of these said steps a detector 6 is able to detect telephone-network signals via an input means 5. Thus, the whole dialling procedure can be carried out in one step.

An extended block diagram of an automatic dialling system including acoustic input means and evaluation means according to the invention of the automatic dialling unit is shown in Fig.2.

Acoustic input means 5 with microphone 50 and microphone amplifier 51 transmit the sound information output via the receiver of the handset in the form of an electric signal to a detector 6 in which the request code for input of a telephone card number is read from a memory 7 and fed via the tone generator 3 and the output means 4 into the telephone network.

In this context it is particularly important that, clearance of the output of the telephone card number from the further memory 7 by the password evaluation circuit 8 is not possible until a valid password has been put in.

In a further possible mode of operation, a certain pre-set call back number is automatically called at the press of a key after determination of the telephone number. When the receiver is picked up and replaced by the user, the previously determined subscriber number can be automatically dialled by automatic evaluation of the dial tone through the detector 6.

Input means 1, preferably equipped with a keyboard 10 or with another input facility (touch screen, pin panel), permits the input of an abbreviated dialling code which may

be formed, for example, by an abbreviated dialling number, name, an abbreviation, an entry in a menu tree, etc. The input abbreviated dialling code is converted by storage and translation means 2 into the telephone number corresponding to the abbreviated dialling code and is transformed in the tone generator 3 into a coded sequence of sound signals which correspond to the dial tones for the digits of the telephone number. The dial tones are amplified in acoustic output means 4 and are put out via a sound converter 40. The sound converter is coupled acoustically to the handset 31 (Fig.3) during the dialling procedure, so that the tone signals output in this manner can be picked up with the microphone part of the telephone handset and act as dial tones. Furthermore, it is possible to provide a display unit 20 on which the abbreviated dialling information and/or the telephone number may be displayed. As an extension, a start signal which can be put in via a start key 30 may act on the other function blocks in order to start the generation or output of the dial tones.

Further modes of operation of the automatic dialling unit envisage that information stored in the memory 2 can be called up by a telephone subscriber via the input means 1 and shown on the display, and that this information - at least in part - can be put in by the user via the input means and are then permanently stored in the memory. To ensure that the data are not lost even on failure of the operating voltage, at least one part of the memory 2 is in the form of a non-volatile memory, for example an electrically alterable ROM (EAROM), or the entire unit is supplied via a dual power supply, for example a battery combined with solar cells.

A telephone card number can be read from a further memory 7 and, if required, fed via the tone generator 3 and the output means 4 into the telephone network. The design according to the invention may furthermore have a card key

34, which, when pressed, starts the output of the telephone card number.

To prevent further misuse of this means, a password evaluation circuit 8 may be provided which permits the output of the telephone card number, for example, only after input of a personal password via the input means 1.

Since the telephone calling card number is allocated separately for each card and only once, for cost reasons the memory 7 is advantageously in the form of an OTPROM [one time programmable ROM] and is programmed only on personalization of the card.

Fig.3 shows a possible design of a means according to the invention: an elongated housing 200 which is easy to grip and is roughly comparable with that of a remote control unit as normally used in video and audio technology has on its front panel: an input keyboard 10, a display unit 20, a loudspeaker 40 and a microphone 50. The loudspeaker may be arranged so that it emits in an upward direction or to the side; accordingly, it would be necessary to approach the microphone part 33 of the telephone handset 31 at the front or the side of the means 200 during the dialling procedure. The start key 30 and the calling card number key 34 are mounted in a very user-friendly manner at the front or on one side of the housing.

Fig.4 shows the detailed view of an automatic dialling unit according to the invention. A keyboard 10 is connected via input lines IN1, and a display unit 20 via output OUT1, to a microcomputer system 500 with CPU 501, read-only memory ROM 502 and working RAM 503, of which at least one part is in the form of a non-volatile memory NVRAM 504. The microcomputer furthermore has at least one tone-generator unit 505 whose outputs TOUT are connected to inputs of the acoustic output means 4.

If an abbreviated dialling code is put in via the keyboard 10, it being possible for the inputs to be supported by user dialogue via the display unit 20 (for example by selection from a menu tree), the telephone number corresponding to the abbreviated dialling code is read from the non-volatile memory 504, the procedure being controlled by the program stored in the read-only memory.

After input of a start command via the keyboard 10, the tone-generator unit 505 is driven by the CPU so that the signals corresponding to the telephone number are generated in succession for the dial tones and can be tapped at the output lines TOUT.

The sound signals which represent a telephone card number can be generated and put out in an identical manner. For this purpose the detector 6 detects the telephone-network signals between and/or before the dialling stops during the dialling procedure.

Clearly, there is neither a request for a user input nor the need to wait during the dialling procedure, both steps being dependent on a signal generated by the telephone-network.

The first input of the abbreviated dialling codes and of the telephone numbers corresponding to them in the memory and changes to the stored data can also be effectuated by means of a special input mode via the keyboard 10. The first initialisation is rendered substantially more conveniently by providing a serial interface 507 with input/output lines SERIO, via which the telephone directory information can be loaded, for example from a PC, and can be changed. In a further embodiment, the keyboard and the display unit may be combined to form a PEN display operated with a pin or with fingers.

If the program stored in the ROM 502 is of a suitable form, the use of the automatic dialling unit as a pocket calculator is also possible, and the numerical values and the arithmetic operation can be put in via the keyboard 10 and the results can be displayed on the display unit 20.

Fig. 5 shows a block diagram of an automatic dialling unit with additional units by including an acoustic input means 5 and evaluation means 6, 506.

The interface part 601 of an automatic dialling unit, which is brought into acoustic contact with the telephone receiver during the dialling procedure, can be connected to a computer 600 via an input/output interface IO 603. The interface part has the acoustic output means 4 and an interface logic unit 602, by means of which the connection of the sound output signals TOUT to the computer 600 is controlled.

The interface IO 603 between interface part 601 and computer 600 is preferably in the form of a serial interface. It is also possible for the interface unit to be particularly simply supplied with power via additional supply lines UBAT and via the interface. Many commercial computers are already equipped with an optical interface having an infrared transmitter/receiver 701: in this case, it is possible for the operation of the interface unit 601, whose interface logic unit has been extended by the addition of an infrared transmitter/receiver 702, to be initiated by the computer. The interface unit can be placed, plugged or otherwise fastened on the receiver.

Fig.6a to 6c show possible designs in this context as additional units for a handhold computer.

The embodiments are shown as units in combination with a computer, preferably a notebook, PDA (Personal Digital

Assistant), PIP (Personal Information Processor), PEN Computer or the like.

CLAIMS:

1. A process for automatically dialling telephone numbers with a telephone and a device (200), which device contains
- at least one memory (2;7) for storing telephone numbers and corresponding dialling codes and/or telephone card numbers;
- input means (1) for putting in a given dialling code corresponding to a given telephone number and/or a telephone number;
- a translation means for converting the input dialling code into the corresponding telephone number;
- a tone generator (4; 505) for transforming telephone numbers into a sequence of sound signals corresponding to the dial tones for the digits of the telephone numbers;
- acoustic output means (4) for amplifying the dial tones and for putting out the dial tones via a sound converter (40), which sound converter (40) can be coupled acoustically to a microphone part (33) of the telephone, the process comprising the following steps:
- the stored telephone numbers are chosen via a dialling short code and/or via a dialling menu;
- the chosen and transformed telephone numbers are put out via the acoustic output means (4) to a microphone part (33) of the telephone;
- the telephone card number and/or an access code is put out via the acoustic output means (4),
characterised in that before, between or after one of these steps a detection of acoustic telephone-network signals occurs at least once, by using acoustic input means (5) comprising a microphone (59) and preferably an acoustic amplifier (51) for transmitting a sound information in form of an electric signal to a detector (6) connected to the memory (7).

2. A process according to claim 1, characterised in that a password has to be put in to prevent misuse of the device.

3. A process according to claim 1 or 2, characterised in that the detection of said telephone-network signal occurs
- before the beginning of an output of a telephone number, in order to find out a country dependant signal and/or country dependant dialling methods
- and/or before or after the output of the telephone card number - or another access code - , in order to react automatically to a said telephone-network signal.

4. A process according to any of the preceding claims, characterised in that a signal that incomes from a telephone-network via the acoustic input means (5) and that is detected via the detector (6), leads to an utilisation of a country dependant or a position dependant dialling operation, for example a dial pulse operation or a multifrequency tone dial operation.

5. A device to be used for a process as claimed in any of the preceding claims, comprising
- at least one memory (2;7) for storing telephone numbers and corresponding dialling codes and/or telephone card numbers;
- input means (1) for putting in a given dialling code corresponding to a given telephone number and/or a telephone number;
- a translation means for converting the input dialling code into the corresponding telephone number;
- a tone generator (4; 505) for transforming telephone numbers into a sequence of sound signals corresponding to the dial tones for the digits of the telephone numbers;
- acoustic output means (4) for amplifying the dial tones and for putting out the dial tones via a sound converter (40), which sound converter (40) can be coupled acousti-

cally to a microphone part (33) of a telephone characterised in that acoustic input means (5)are provided comprising a microphone (59) and preferably an acoustic amplifier (51) for transmitting a sound information in form of an electric signal to a detector (6) connected to the memory (7), so that acoustic detection of acoustic telephone-network signals occurs.

6. A device according to claim 5, characterised in that an access guard is provided, for example in form of a password evaluation means, preventing misuse of the device.

7. A device according to claim 5 or 6, characterised in that at least one of the following two features is further provided:

-- at least one part of the memory (2) is in the form of a non-volatile memory (504);

-- a dual power supply.

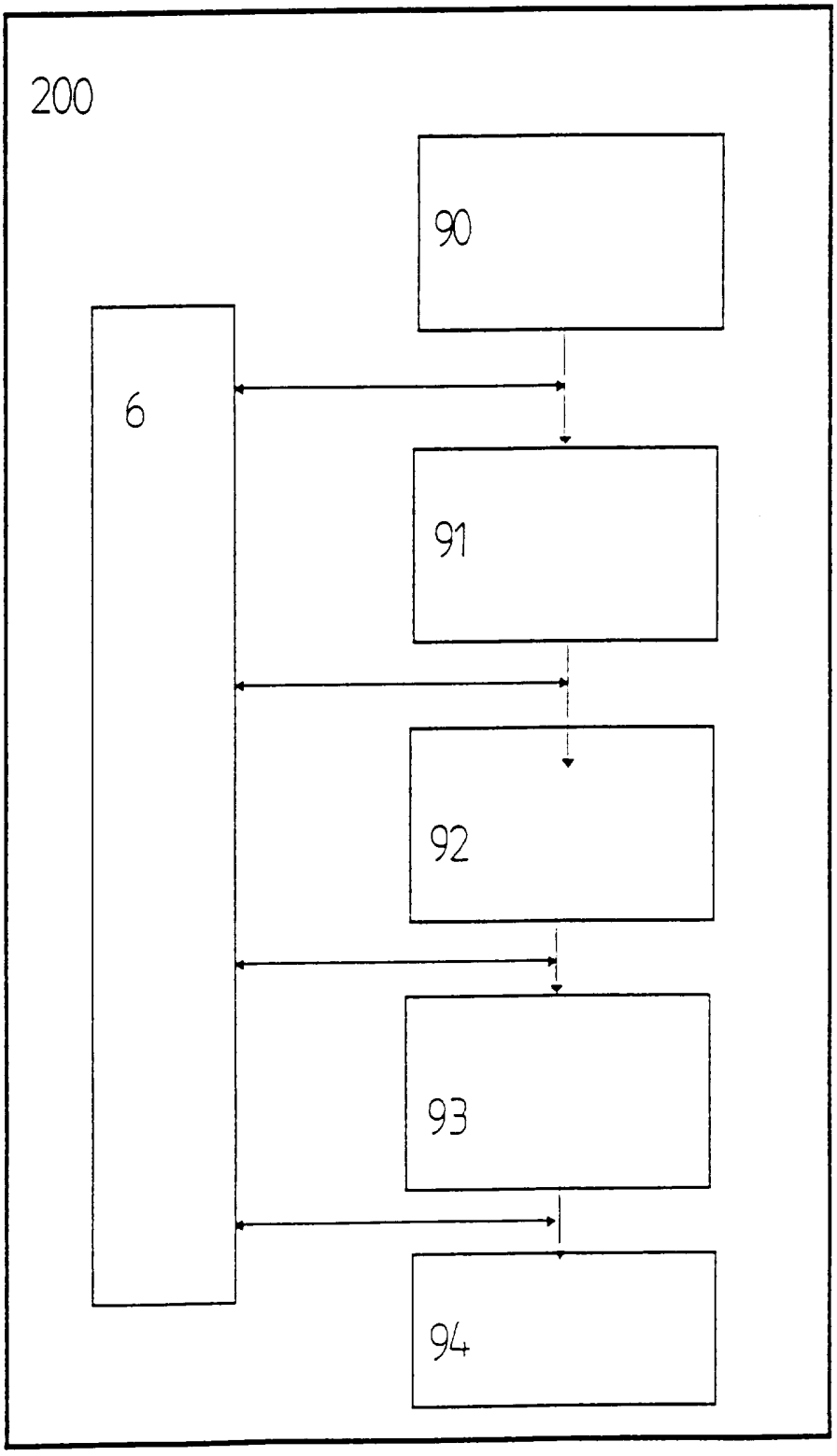
8. A device according to any of claims 5 through 7, characterised in that a display unit (20) is provided for displaying the dialling code and/or the corresponding telephone number whereby probably the input means comprise a keyboard (10) and the display unit (20) in the form of a pen display for being operated by a pen or a finger.

9. A device according to any of claims 6 through 8, characterised in that the evaluation means (8) are provided in the form of a "one time programmable ROM (OTPROM)" for starting or barring the output of the telephone card number after having checked via the memory (7) a personal password input via the input means (1).

10. A device according to any of claims 5 through 9,further comprising a preferably serial interface (507) for

loading or changing telephone directory information, for instance from a PC.

Fig.1.



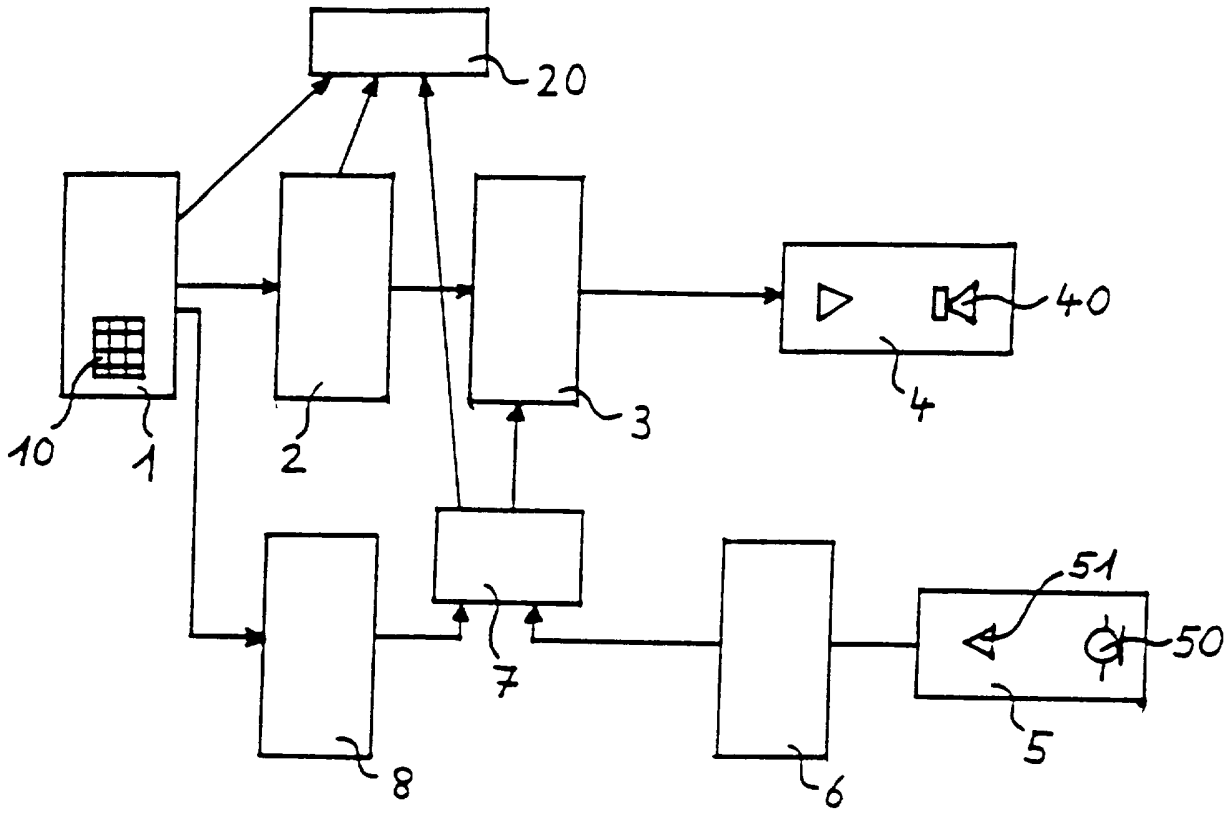


Fig 2.

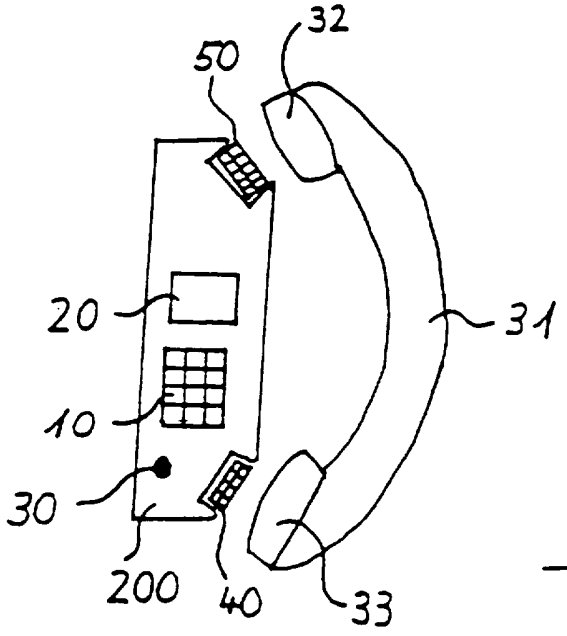
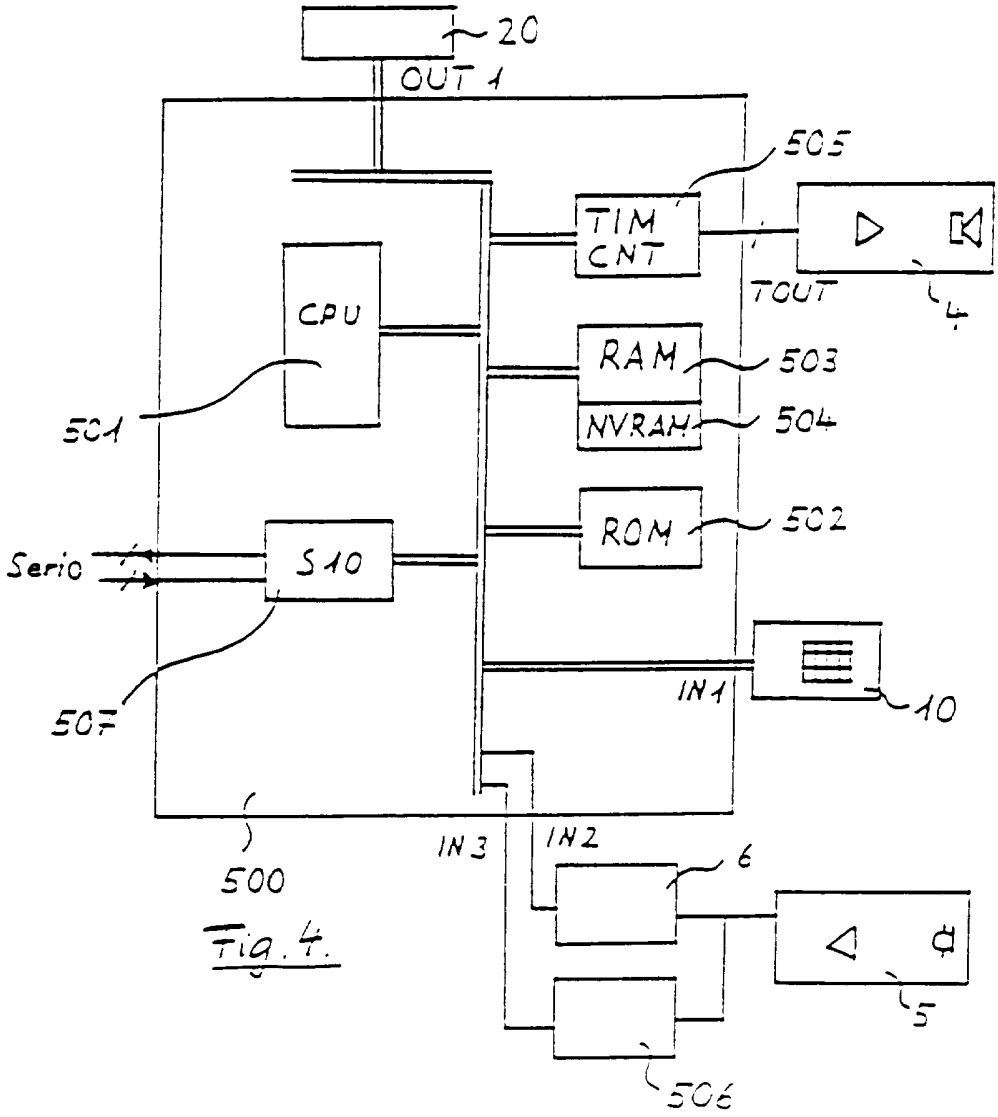


Fig 3.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4
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503
501
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504
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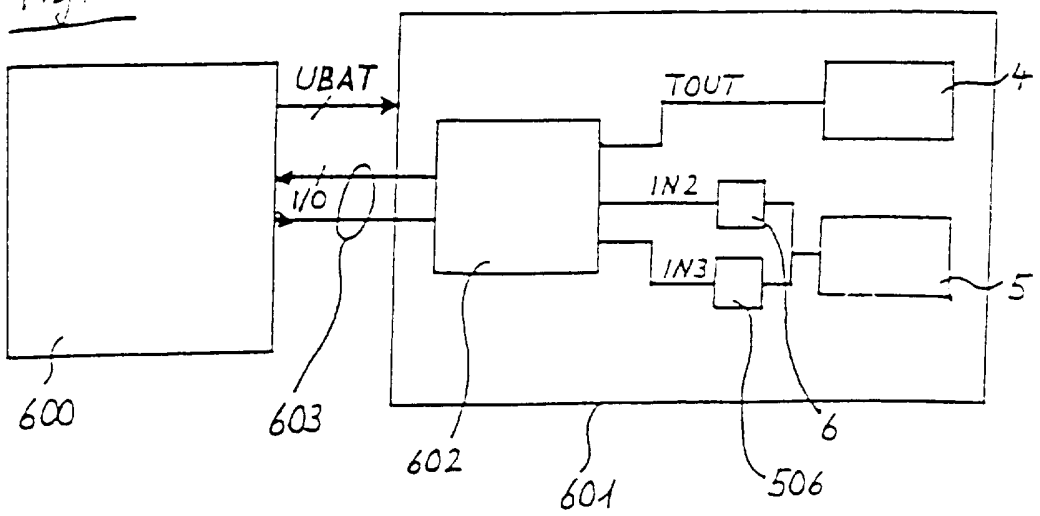
506

Fig. 4.

Fig. 5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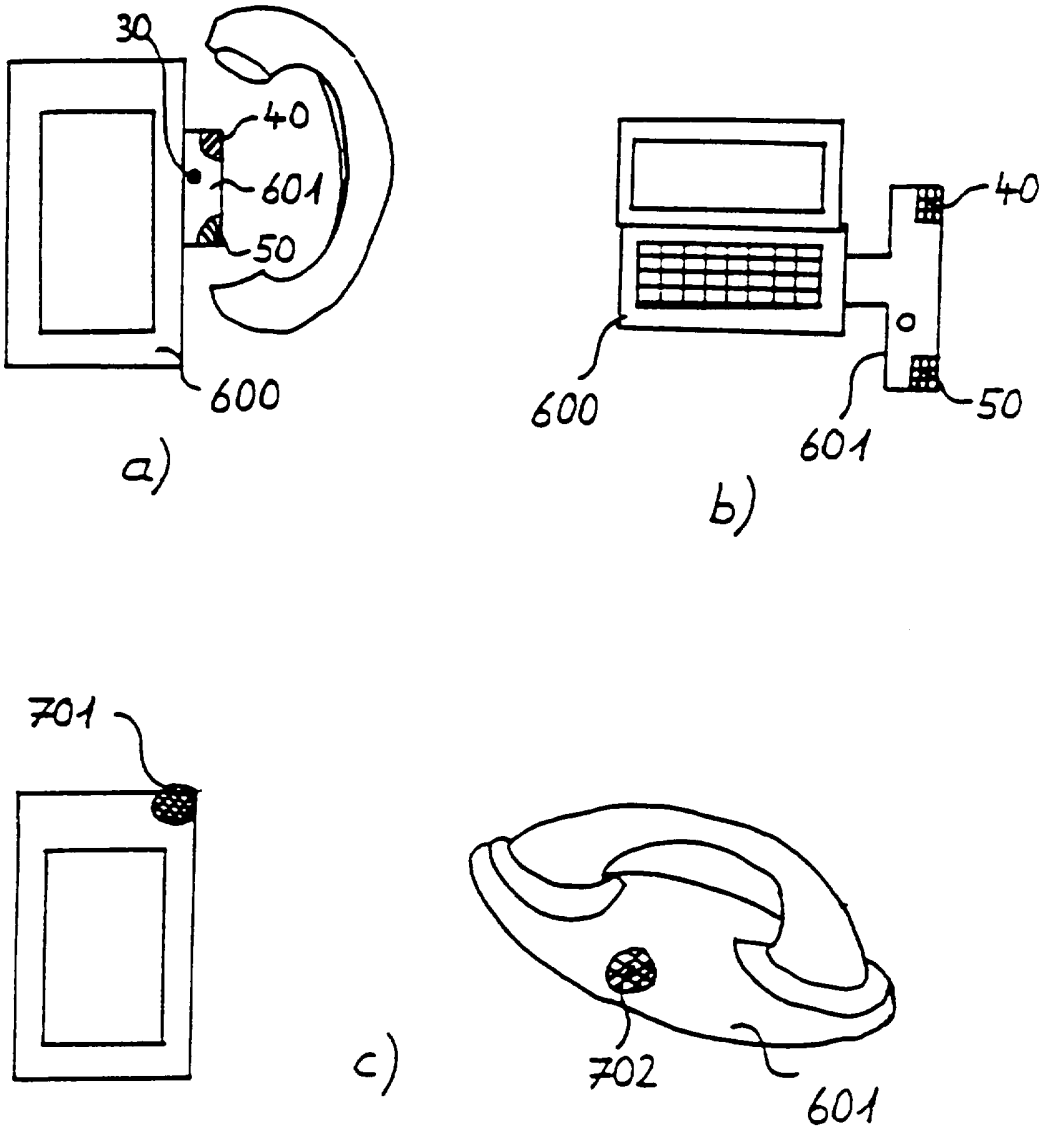

Fig 6.

INTERNATIONAL SEARCH REPORT

Inter onal Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04M1/274

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 H04M

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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X	WO,A,91 07042 (NAT TRANSACTION NETWORK INC) 16 May 1991 see page 4, line 3 - page 5, line 2 see page 7, line 12 - page 17, line 14; figures 1-28	1,2,5-8
Y	WO,A,92 20048 (ELYSIUM AKTIEBOLAG) 12 November 1992 see page 6, line 15 - page 11, line 2; figures 1-5	1,2,5,6
Y	US,A,4 126 768 (GRENZOW ROLLAND L) 21 November 1978 see column 5, line 3 - column 8, line 33; figures 2-5	1,2,5,6

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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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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

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