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(54) **System comprising a digital tachograph and a data download key**

(57) It is the aim of the invention to provide a system for consistent and secure storage of data stored on the storage device of the digital tachograph that will reliable work under rough environmental circumstances and will, in an enhanced manner, provide to the different data requesters data required by them.

This problem is solved, according to the invention, by a system comprising a digital tachograph and a data download key to be connected to said digital tachograph;

- a) said digital tachograph comprising a first data storage device and at least a first interface;
- b) at least one of said digital tachograph and said data download key comprising a controller unit for providing data stored on said first data storage device to said first interface;
- c) said data download key comprising a first key da-

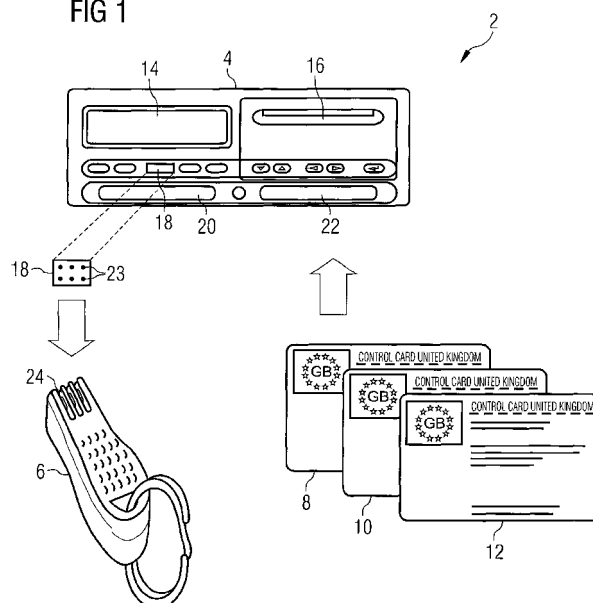
ta storage device and at least a first key interface to be connected to said first interface;

d) at least one of said digital tachograph and said data download key comprising a data type preselect unit allowing to enter a data type preselect key; and

e) said controller unit hosting a program arranging the transfer of said data stored on said first data storage device to the first key data storage device according to the preselected data type.

This system allows for the download of data stored on the storage device of the digital tachograph to the external data download key which may be operated as a master or a slave with respect to where the controller unit is assigned to. Additionally, due to the entered data type preselect key, only an authorized data type preselect key will lead to the transfer of data according to the preselected data type.

FIG 1



Description

[0001] The invention relates to a system comprising a digital tachograph and a data download key to be connected to said digital tachograph. Further, the invention relates to a data download key.

[0002] In most parts of the industrial countries, the police authorities require, due to national law provisions, that the operating time and the driving speed of commercial lorries and busses be stored in an appropriate storage means. This is to allow the police authorities to check whether the national law provisions regarding speed limitations and social provisions, i.e. the limitation of the working time of the driver, have been properly observed. For this reason, to date the above vehicles have included an analogous tachograph that records by means of a stylus the operating time and the driving speed on a paper disc which may be mounted inside a tachograph printer.

[0003] In the course of the establishment of digital tachographs within the European Union, as is currently scheduled for the first quarter 2004, a tremendous change with respect to the handling of the driver and vehicle data will occur. The digital tachograph will digitally store the driver and vehicle data to a common storage device which is part of the digital tachograph itself. It could be easily understood that the data digitally stored in the storage device has to be read out for different purposes, including for: police authorities, maintenance facilities, transport or haulage companies, etc. who will need to evaluate the stored data to fulfill their particular tasks. Additionally, the provisions of the European directive EC/2135/98 will require a periodically performed download of the stored data in a consistent and confident manner and in accordance with EC regulations.

[0004] At least for the above reasons, it is the aims of the present invention to provide a system for a consistent and secure storage of data stored in the storage device of a digital tachograph such that the storage will be reliable under rough environmental circumstances and in an enhanced manner so as to further make the data suitably available to different authorities and parties.

[0005] The above aims and problems are solved by the invention which comprises a system comprising a digital tachograph and a data download key to be connected to said digital tachograph;

- a) said digital tachograph comprising a first data storage device and at least a first interface;
- b) at least one of said digital tachograph and said data download key comprising a controller unit for providing data stored on said first data storage device to said first interface;
- c) said data download key comprising a first key data storage device and at least a first key interface to be connected to said first interface;
- d) at least one of said digital tachograph and said

data download key comprising a data type preselect unit allowing the entering of a data type preselect key; and

e) said controller unit hosting a program arranging the transfer of said data stored on said first data storage device to the first key data storage device according to the preselected data type.

[0006] The present system allows for the download of data stored in the storage device of the digital tachograph to the external data download key that can be operated as a master or a slave with respect to the location where the controller unit is assigned. If the controller unit is assigned to the data download key, then the controller unit of the data download key will initiate the transfer of the stored data from the first data storage device to the first key data storage device after a proper conjunction of the first interface and the first key data interface is detected by the controller. Additionally, due to the entered data type preselect key, only an authorized data type preselect key will lead to the transfer of data according to the preselected data type.

[0007] To achieve an enhanced simplicity of the system handling, as well as operability under rough environmental circumstances, including larger or elevated amounts of heat, cold, dust, dirt, etc., the system might have the first interface formed as a socket and the second interface formed as a plug or vice versa. For that reason, the data download key might have a cover lid which removably protects its portion where the interface plug is arranged.

[0008] In order to achieve a convenient data transfer rate and in order to avoid an energy source located on the data download key, an advantageous modification of the invention provides for said first and second interface comprising a conjunction of at least three pins; two of said at least three pins providing a power support for said data download key. In practice, it has been determined that a conjunction having six pins represents a suitable connection for the data transfer. In this latter case, the data transfer can be organized according to USB interface provisions.

[0009] For the sake of data security and system trustworthiness, said data type preselect unit can be designed as an authorization module allowing for the entering of an authorization key to determine the range of data to be transferred. This feature can be realized in several different ways, including the authorization module being designed as a 10-digit field for dealing with a well-known pin code authorization procedure. Alternatively, the authorization module may be designed as a card reader unit, and for the different types of required data, different types of authorization cards with the respective keys stored thereon. As an example, there might exist a predefined type of data to be initially allowed to be transferred by a control authority card or by a maintenance company card or a vehicle manufacturer company card, etc. Firstly, these measures provide for

secure access to the data stored in the digital tachograph which is reserved to persons or organizations being properly authorized and, secondly, these measures provide for secure data delivery for the corresponding data demand matches of the predefined role of the data requester.

[0010] Therefore, the transfer of data is performed in a manner such that the range of requested data depends upon the result of an authorization key check performed by the program hosted on the controller unit. Even though the data download key is properly connected to the digital tachograph, via their respective interfaces, the transfer of data will be refused if the authorization key check fails. This measure provides for an additional level of security and consistency of the original data as well as avoids abuse and illegal manipulation of the data.

[0011] According to another additional possible feature of the present invention, said data download key comprises a controller unit controlled by an external data processing device. This feature provides for the opportunity to externally define the mode in which the data download key will operate. As an example, the data download key may operate as a master in controlling the data storage device of the digital tachograph, insofar as the data download key controller of the data download key controller can be initialized and initiate the transfer of data along with the scope of transferred data. On the other hand, the data download key can be assigned by means of an external laptop or the like as a slave, meaning that the data currently downloaded from the digital tachograph is forwarded to another external data storage device such as the hard disk of a computer system operated by the police authorities.

[0012] In order to manage the assignment of the operation mode with the best achievable simplicity, the controller unit of the data download key receives from an external data processing device a message determining the mode of operation of the data download key.

[0013] With respect to the data download key as mentioned before the aims are achieved according to the invention by a data download key for securely receiving preselectable data from a vehicle's digital tachograph, said data download key to be connected to said digital tachograph;

said data download key comprising a first key data storage device and at least a first key interface to be connected to an interface of said digital tachograph;

said data download key hosting a controlling means to transfer the preselected data received from said interface of said digital tachograph to the first key data storage device in order to store the preselected data retrievably.

[0014] This data download key is easily transportable and can store the preselected data, i.e. determinable by a preselectable data type, in a manner that an external data processing device can be connected to the first key interface or to an additional interface of the data down-

load key to download the data stored on the first key data storage device.

[0015] As described at initial parts of this description different demanders of data, such as police authorities, maintenance garages etc, may lead to the requirement that predefined data types shall be available allowing to download data from the digital tachograph specified for the respective purpose. In order to achieve this goal said controlling means may host a data control master means to identify one of a predefined number of preselectable data types; said data control master means allow to control the digital tachograph insofar as only said identified preselected data type is to be transferred to said first key data storage mean.

[0016] To assign one of the predefined number of data types a possible mean could be an ID data string stored in a persistent storage element incorporated in the data download key. An apparent drawback of this version is the restricted use of the data download key being allowed to receive and store only this preselected data defined by the ID data string. To allow a more comfortable and flexible use of the data download key, the data control master means may comprise an interface allowing to assign one of the predefined number of data types to the data control master means. A suitable interface could be a bar code reader, a card reader unit, a wireless induction loop receiver or other suitable means being used for the same purpose. Appropriate power supply for those units and/or for the complete data download key is deliverable via the first key interface when connected to the interface of the digital tachograph.

[0017] Examples of the invention are described below in accordance with the drawings which depict:

- 35 Figure 1 a general overview on a system comprising a digital tachograph, a data download key and several authorization key cards;
- 40 Figure 2 a functional diagram of the technical design of the data download key;
- Figure 3 a schematic view of a first data download key; and
- 45 Figure 4 a schematic view of a second data download key.

[0018] Figure 1 depicts a general overview of a system 2 comprising: a digital tachograph 4, a data download key 6, and three different authorization key cards 8, 10, 12. The digital tachograph 4 (which may be considered similar to the "black boxes" used in modern aircrafts) is recording, as shown in a display 14, the driving time, the driving speed and total kilometers of a vehicle (not shown in the drawings) into which the tachograph is appropriately integrated. The integration of the tachograph into and/or with the vehicle is known to one skilled in the art. The data download key 6 comprises a

data storage device 16 and a first, a second, and a third interface 18, 20, and 22 respectively. The first interface 18 is designed as a socket having six pins 23 to which a plug (see the first data download key interface 24) of the data download key 6 can be connected to in order to download data stored on the digital tachograph 4. The second interface 20 is designed as a card reader unit allowing the driver of the vehicle to introduce his personal identification card (such as a driving license assigned for this vehicle or this type of vehicle). The third interface 22 is designed as a card reader unit, and is used as an authorization module into which the different authorization key cards 8, 10, 12 are introduced so as to define the type of data permissible or otherwise made available for downloading. The third interface 24 therefore can be considered with reference to the claim language as a data type preselect unit. In this respect, the different types of authorization key cards 8, 10, and 12 define different types of data profiles to be read out from the data storage device 16 to the data download key 6.

[0019] Figure 2 depicts a functional diagram of the elements comprising data download key 6 (figure 1). The first data download key interface 24 operates as a serial interface according to the RS232 provisions (IEEE 802.11) and uses two of the six pins 23 to receive electrical power from the digital tachograph 4. The interface 24 is controlled by a micro controller (μ C) 37. Micro controller 37 also controls a very simple human machine interface (mmi) 28 comprising two LED lamps on the data download key 26 (see Figure 4) to indicate the status of operation of the data download key 6. Optionally, the mmi 28 may contain a switch to switch the desired operation status from "Slave" to "Master" or vice versa.

[0020] Further, the micro controller 37 controls a second interface 30 and a key data storage device 32 to which the downloaded data is forwarded. In the depicted embodiment, the key data storage device 32 is an external flash memory card 34 inserted into a corresponding slot of the key data storage device 32. Additionally or alternatively, the key data storage device 32 may be designed as an internal flash memory card or a micro disc drive or other suitable means for storing data downloaded from digital tachograph 4. Connected to the first data download key interface 24 is a power supply unit 36 that comprises a DC/DC converter and a power supply circuit.

[0021] Via the second interface 30 an external data processing unit (not shown in the drawings), such as a PC or a laptop, may be connected to the data download key 6 to assign the mode of operation to the data download key 6. Additionally, the second interface 30 may be used to download the data stored on the key data storage device 32. Optionally, this data download may be performed via first data download key interface 24, connected to the serial port of the external data processing unit or another external data processing unit. The data download key 6 is in this embodiment operated in slave mode.

[0022] It should be noted that the second data download key interface 30 is not necessarily required, however due to its USB standard this interface allows a data transfer having a satisfying bandwidth.

[0023] The figures 3 and 4 illustrate a schematic view of a first and second data download key 38 and 40 which also provides an initial indication of a the intended aesthetical design of the data download keys 6 (figure 1), 38 and 40. Figures 3a and 4a depict the first data download key interface 24 covered by lid 42 and 44 respectively to protect the interface 24 (figure 1) and the pins 23 in particular, the pin sockets from dust, dirt, and any other rough environmental circumstances or hazards which the data download keys 38 and 40 may encounter when not in use. In the embodiment depicted in figure 3a and 3b, the data download key 38 comprises a USB interface 30 as systematically depicted in Figure 2. For the USB interface 30, another lid similar to lid 42 is available to cover the USB interface 30. For this reason, the data download keys 38 and 40 are sufficiently robust to operate in a garage, vehicle maintenance company, a public transportation vehicle depot, and the like. For downloading the data from the digital tachograph, the data download keys 38 and 40 are inserted with their sting-like portions 46 and 48 respectively into the corresponding slot of the first interface 18 of the digital tachograph 4. Due to the guidance of the sting-like portions 38, 40 achieved by the longitudinal extension, a reliable connection of the first data download key interface 24 with the first interface 18 may be achieved. For the data download key 38, the data storage device 32 is an internal compact flash memory or memory card (34) having a capacity of up to 512 MB which is not shown due to its concealed location under the illustrated housing.

[0024] Another example for the data download key 40 is shown in Figure 4a and 4b and comprises a compact flash memory card as does data storage device 32, (discussed above) however the data storage device 32 in this example is oriented externally to allow the exchangeable replacement of the compact flash memory card 34. Again to protect the sensitive parts of the data download key 40 another lid member 50 is provided to protect the compact flash memory card 34 and the corresponding socket.

List of reference numbers

[0025]

2	system
4	digital tachograph
6	data download key
8, 10, 12	authorization key cards
14	display
16	data storage device
18	first interface
20	second interface
22	third interface

23 pins
 24 first data download key interface
 26 LED lamps
 28 man machine interface (mmi)
 30 second data download key interface, USB 5
 interface
 32 key data storage device
 34 compact flash memory card
 36 power supply unit
 38 first data download key 10
 40 second data download key
 42, 44 cover lid members
 46, 48 sting-like portions
 50 additional cover lid member
 37 micro controller 15

Claims

1. A system (2) for securely transferring preselected data from a vehicle's digital tachograph (4) to a transportable data download key (6, 38, 40) to be connected to said digital tachograph (4), **characterized in that**;
 - a) said digital tachograph (4) comprises a first data storage device (16) and at least one interface (18);
 - b) at least one of said digital tachograph (4) and said data download key (6, 38, 40) comprising a controller unit (37) for providing data stored on said first data storage device (16) to a first of said at least one interface (18);
 - c) said data download key (6, 38, 40) comprising a first key data storage device (32) and at least a first key interface (24) to be connected to said first interface (18);
 - d) at least one of said digital tachograph (4) and said data download key (6, 38, 40) comprising a data type preselect unit (22) facilitating entry of a data type preselect key (8, 10, 12); and
 - e) said controller unit (37) hosting a program facilitating transfer of data stored on said first data storage device (16) to said first key data storage device (32) according to the preselected data type.
2. The system (2) according to claim 1, **characterized in that**, said first of at least one interface (18) is formed as a socket and said first key interface (24) is formed as a plug or vice versa.
3. The system (2) according to claim 1 or 2, **characterized in that**, said first interface (18) and said first key interface (24) comprise a conjunction of at least three pins (23); and two of said at least three pins provide a power support for said data download key (6, 38, 40).
4. The system (2) according to any one of the preceding claims, **characterized in that**, said data type preselect unit is an authorization module (22) facilitating entry of an authorization key (8, 10, 12) to determine a range of data to be transferred.
5. The system (2) according to claim 4, **characterized in that**, said range of said data depends on a result of an authorization key check performed by said program hosted on said controller unit (37).
6. The system (2) according to any of the preceding claims, **characterized in that**, said data download key (6, 38, 40) comprises a controller unit (37) controlled by an external data processing device.
7. The system according to claim 6, **characterized in that**, said controller unit (37) receives from said external data processing device a message determining the mode of operation of said data download key (6, 38, 40).
8. A data download key (6, 38, 40) for securely receiving preselectable data from a vehicle's digital tachograph, data download key (6, 38, 40) to be connected to said digital tachograph (4); said data download key (6, 38, 40) comprising a first key data storage device (32) and at least a first key interface (24) to be connected to an interface of said digital tachograph; said data download key (6, 38, 40) hosting controlling means to transfer the preselected data received from said interface of said digital tachograph to the first key data storage device (32) in order to store the preselected data retrievably.
9. A data download key according to claim 8, **characterized in that** said controlling means hosting a data control master means to identify one of a predefined number of preselectable data types; said data control master means allow to control the digital tachograph insofar as only said identified preselected data type is to be transferred to said first key data storage mean.
10. A data download key according to claim 9, **characterized in that**, said data control master means comprising an interface allowing to assign one of the predefined number of data types to the data control master means.

FIG 1

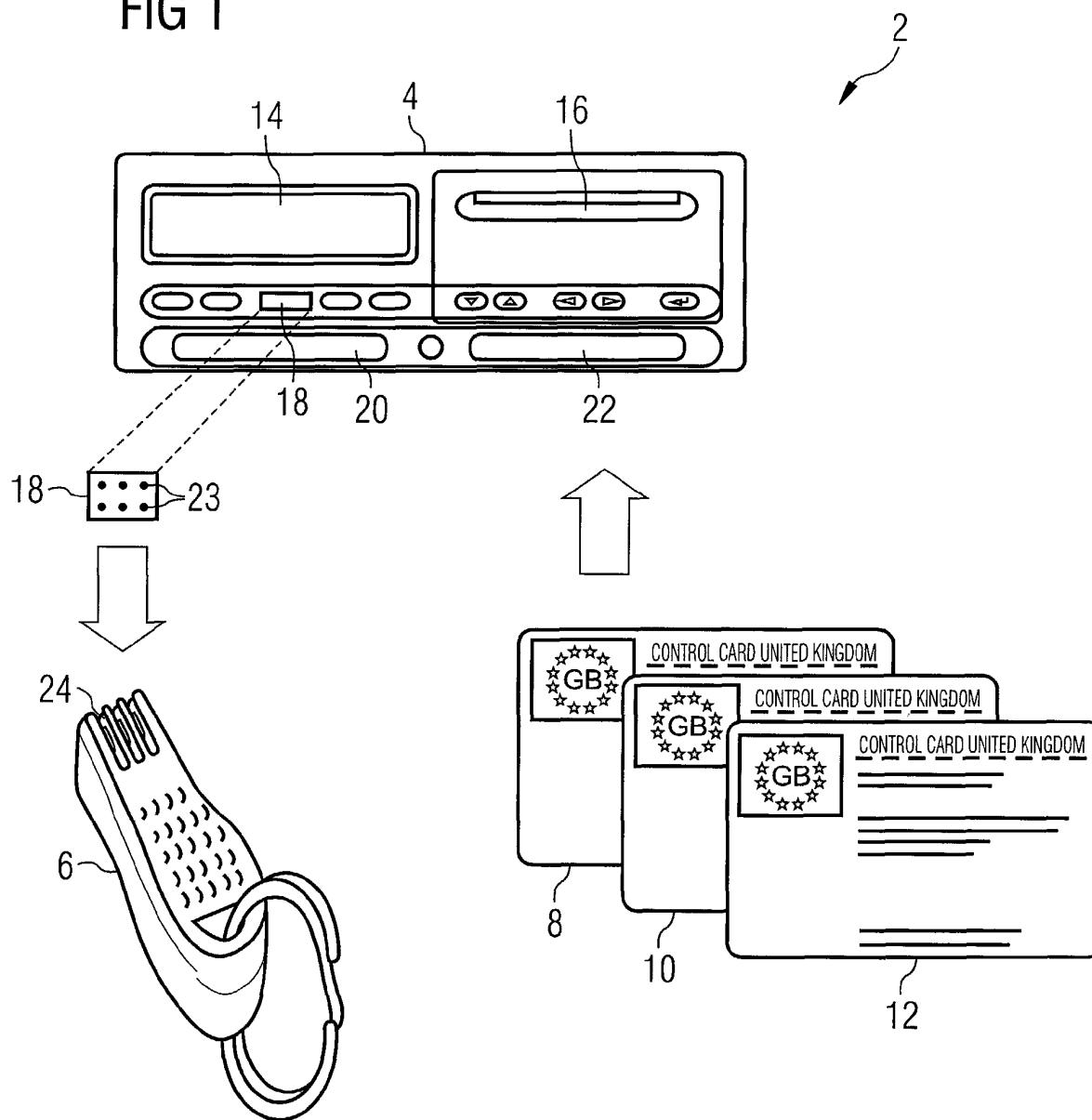


FIG 2

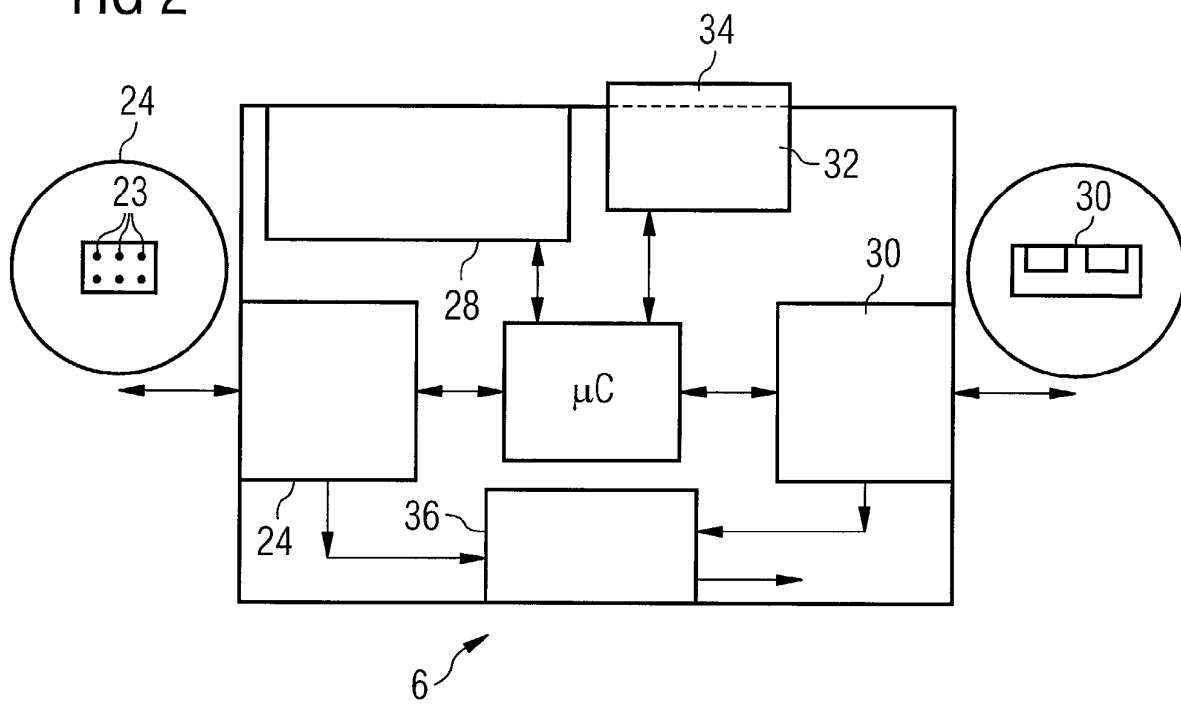


FIG 3A

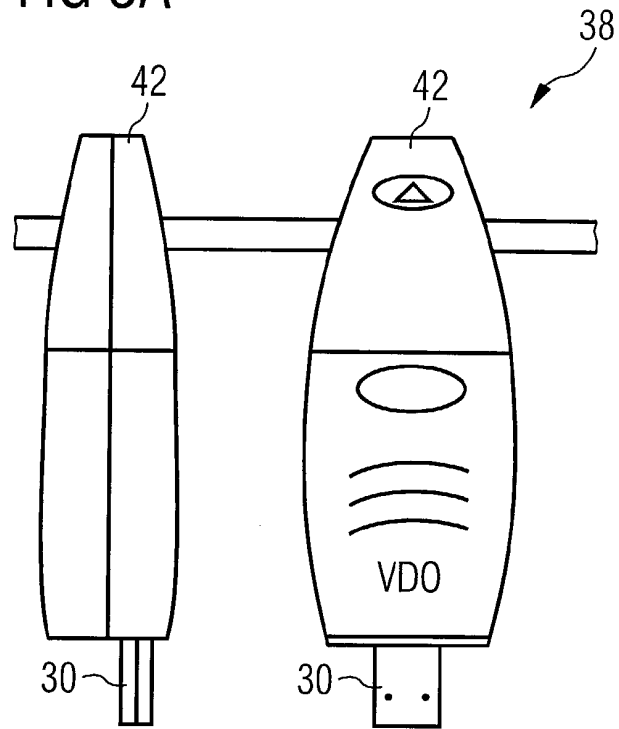


FIG 3B

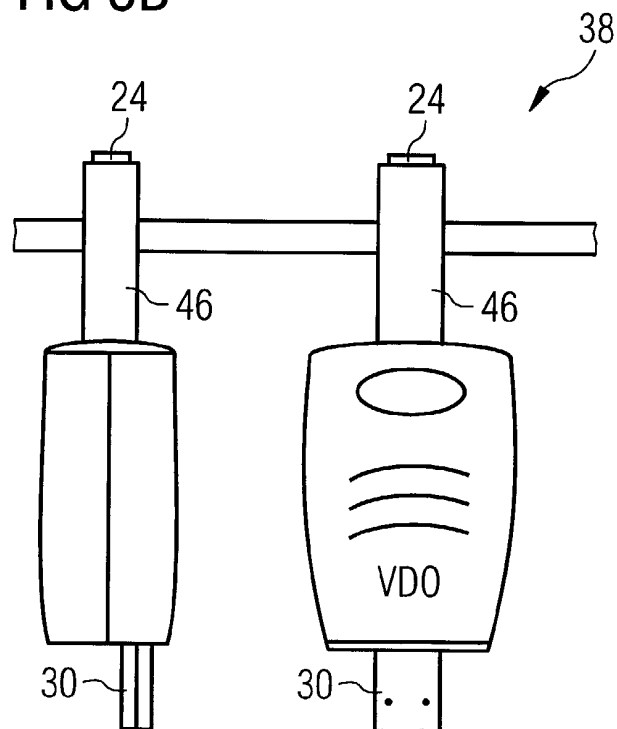


FIG 4A

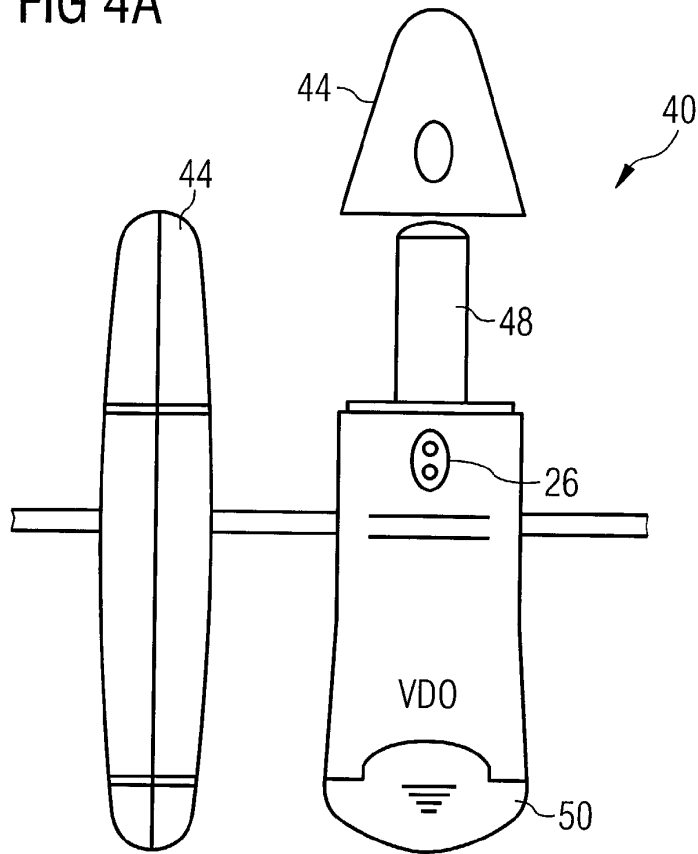
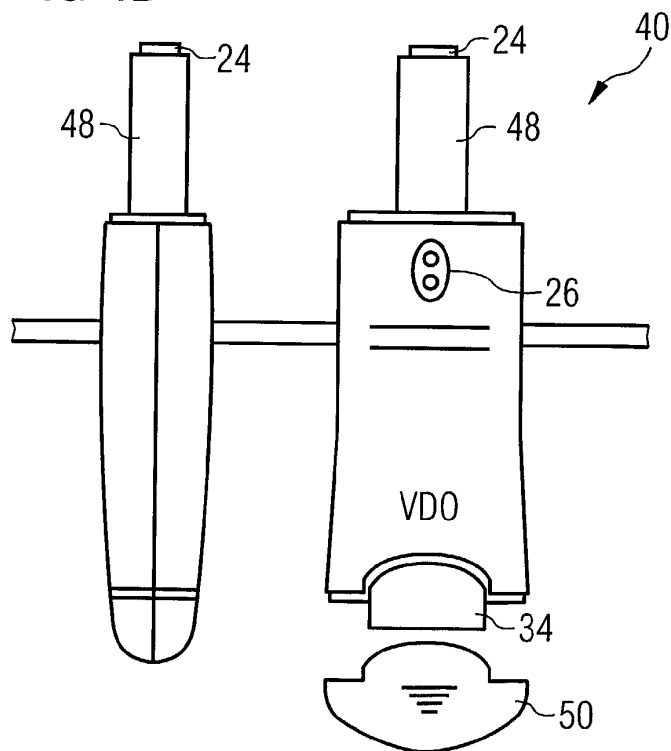


FIG 4B





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 00 0401

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A	DE 32 21 398 A (KIENZLE APPARATE GMBH) 8 December 1983 (1983-12-08) * abstract; figures 1-4 * * page 12, line 4 - page 13, line 35 * * page 15, line 16 - line 23 * -----	1-10	TECHNICAL FIELDS SEARCHED (Int.Cl.7) G07C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29 July 2003	Examiner Buron, E
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 03 00 0401

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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29-07-2003

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