(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 037 420 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
18.03.2009 Bulletin 2009/12

(51) Int Cl.:
G07C 5/00 *(2006.01)*

(21) Application number: **07425768.4**

(22) Date of filing: **03.12.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK RS

(30) Priority: **14.09.2007 IT TO20070647**

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(54) **A connector device for transferring data recorded by a digital tachograph**

(57) The device comprises an electrical cable covered with a sheath (41), with a plug (43) for electrical connection to a socket located on an accessible face of a tachograph (10), a connector (45) for connection to an electronic processing and transmission controller (20), and two pins (46) fixed to the sheath (41) and spaced apart from the plug (43). The pins (46) can be connected to corresponding connection points on the tachograph in such a way as to keep the cable tidily adjacent to the front face of the tachograph without covering its controls or display units.

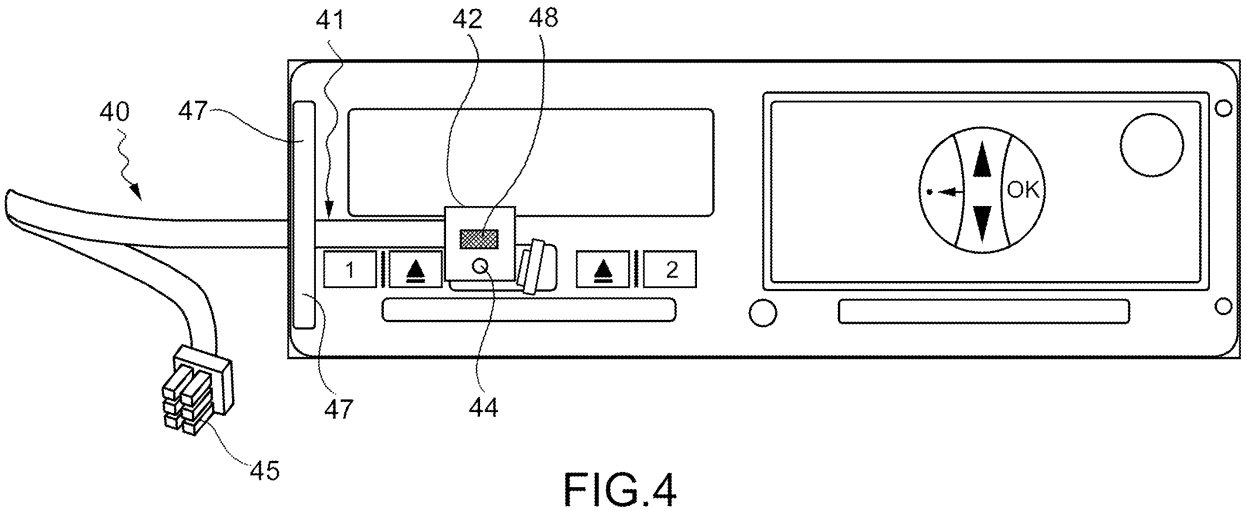


FIG.4

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Description

[0001] The invention relates to the field of digital tachographs which are mounted on vehicles such as trucks, articulated vehicles and buses to record the drivers' driving time. When connected securely via an encrypted line to the movement sensor of the vehicle, the digital tachograph records in its memory the data relating to the use of the vehicle over a period of one year. In particular, it acquires the identity of the driver or drivers, the driving times and rest times, and the driving modes (individually or in teams). A tachograph also records the vehicle identification data, the distance travelled, anomalies in operation, faults, and the speed maintained in the last 24 hours of operation of the vehicle.

[0002] Before the diffusion of digital tachographs, data acquired by analogue tachographs were recorded in the form of traces on paper media (discs) which had to be stored for several years so that they would be available to the authorities (Ministry of Labour and Social Policy) who were entitled to examine them.

[0003] With the present digital tachographs, the data relating to the vehicle driving activities are digitized, and the files containing these data are stored on data processing media, preferably on a computer; copies of back-ups must also be provided. According to the Ministerial Decree of March 30, 2006 (implementing European Regulation EC 561/2006/DM on the procedures for storing and transferring data recorded by digital tachographs), the data must be stored and copied by a tachograph to the computer at least once every three months. The data recorded on a removable smart card owned by the driver (the "driver card") must also be copied at least once every 21 days. The tachograph also records the driver's activities on this card, as well as in its own internal memory. The files downloaded to the computer are encrypted, electronically signed, and stored for at least one year, and are made available to the authorities. At the present time, data are downloaded from a digital tachograph by connecting a portable terminal to the tachograph and then downloading the data from the latter to the data processing medium. A further smart card (the "company card") has to be used to enable the data to be downloaded from the tachograph.

[0004] It should be borne in mind that the transfer of data from the tachograph to the computer requires specialized knowledge of the use of electronic equipment, as does the creation of back-up copies (required by the law). Since the data downloading time is rather long, these operations require a significant amount of work, estimated to take about 15 minutes (during which time the vehicle must be stationary) every 90 days. The drivers must also attend the business at least once every 21 days for the downloading of their driver cards. It takes each driver about 10 minutes to carry out this operation. For a transport company which has more than a hundred vehicles and the same number of drivers, the time spent on these operations represents a high cost.

[0005] It should also be borne in mind that, although large transport companies may also be highly computerized, and therefore capable of carrying out these operations with qualified personnel, small businesses (owner-drivers) are computerized to a small extent or not at all.

[0006] A general object of the invention is to make the transfer of data recorded by a digital tachograph more efficient, in order to overcome the drawbacks described above. Another object of the invention is to facilitate compliance with the law relating to the use of tachographs. A further object of the invention is to be applicable to existing digital tachographs without the need to modify them.

[0007] These and other objects and advantages, which will be made clearer below, are achieved according to the invention by a connection device and by a system as defined in the attached claims.

[0008] A preferred, but non-limiting, embodiment of the invention will now be described; reference will be made to the attached drawings, in which:

Figures 1, 2 and 3 are, respectively, a front view, a view from above, and a side view of a connection device according to the present invention in a disconnected condition;

Figure 4 is a schematic illustration of the connection device of Figures 1-3 connected to a tachograph;

Figure 5 shows schematically the transmission of data from a controller mounted on the vehicle provided with the tachograph to a server of a data collection centre.

[0009] With initial reference to Figures 4 and 5, the invention proposes the use of an electronic processing and transmission controller 20 which, when installed on a vehicle provided with a digital tachograph 10, interfaces directly with the latter and, with a minimum of intervention by the vehicle's operator, automatically informs it at specified intervals that the data must be copied from the tachograph, formats the data received from the tachograph, and transmits them in wireless mode to a server 31 of a data collection centre 30 where these data are reprocessed and stored so as to be available whenever the authorities have to carry out checks.

[0010] This electronic controller 20 is positioned outside the tachograph, since the law prohibits the direct modification of these instruments by, for example, adding a microprocessor or an antenna for wireless transmission inside the instruments.

[0011] The features of the construction and operation of a digital tachograph are not relevant for the purposes of the understanding of the invention, and therefore they will not be described in detail here. It is sufficient to point out that the tachograph 10 is of the general type discussed in the introductory part of the description, designed to receive smart cards and provided with a socket for data downloading.

[0012] Figures 1, 2 and 3 show a connection device

40 according to the invention, designed to provide a direct connection between the tachograph 10 and the data download/transmission controller 20. This connection device 40 comprises a cable covered with a sheath 41 of plastics material which can be fixed to an accessible side of a tachograph 10, preferably on its front. The connection device 40 includes a block 42 of plastics material which has, on one side, an electrical connecting plug 43 (with 6 pins) which can be connected to a corresponding socket (not shown) provided on the front of the tachograph for the downloading of data stored in the tachograph memory and/or in a driver card which can be inserted into the tachograph. On the opposite side of the block 42, in other words on the side which faces the user or driver in the mounted condition, there is provided an indicator lamp means 44, preferably an LED. At its end opposite the end with the plug 43, the cable carries an isolating connector 45 which enables the data received from the tachograph 10 to be transferred to the transmission controller 20.

[0013] Two projecting pins 46 of plastics material are formed at the free ends of two branches 47 formed in one piece with the sheath 41. The pins 46 serve as locking means to improve the mechanical connection of the connection device 40 to the tachograph, and are engaged in corresponding holes (not shown) provided on the front of the tachograph. The pins are spaced apart from each other and from the electrical connecting plug 43 in such a way as to keep the cable attached to the front surface of the tachograph, without overlapping or obscuring or in any way interfering with the controls (keys) or the display unit or the card insertion slot.

[0014] The pins 46 are placed in a position which is suitably selected to retain an intermediate portion of the sheath 41 between the ends 42 and 45, adjacent to the front surface of the tachograph. In this portion, the sheath 41 preferably has a flattened cross section.

[0015] As shown in Figure 4, the connection device 40 is connected to the front of the tachograph, in such a way that all the keys and the display which is used for displaying the information for the driver remain uncovered and accessible.

[0016] The controller 20 is designed to make the LED 44 flash according to a specified code (the "blink code") to provide information to the driver, for example to warn him that the data must be downloaded from the tachograph memory or from the driver card. Periodically, when the time for the downloading of the data from the driver card or from the tachograph memory is approaching, the LED 44 flashes to warn the driver that he must carry out this operation, which requires the insertion of the "company card" into the tachograph.

[0017] Preferably, the controller is designed so that it also causes data to be downloaded from the tachograph in response to a command received from a microswitch or an optional push-button control 48 (see Figure 4) positioned, for example, on the block 42. Thus the driver can force the downloading of the data before the specified time, on any suitable occasion.

[0018] As will be appreciated, the connection device 40 ensures that the data are copied from the tachograph 10 to the controller 20 without any loss of time. An important benefit is provided by the fact that the connection device does not stop the operation of the tachograph; the driver can operate the keys of the tachograph entirely as normal, for example in order to record his driving time, his stop time and his rest time. Another advantageous fact is that no particular skill or qualification is required to download the data from the tachograph. It is simply necessary to insert the company card which enables the transfer of the data from the tachograph to the controller, followed by the transmission of these data to the server of the data collection centre, preferably by packet-switched communication. When connected, the connection device does not have to be removed again; the connection is advantageously permanent.

[0019] The controller 20 is preferably a GPRS controller provided with a computer unit 100, an antenna 102, a RAM 104, a Flash memory 106, and a port for connection to the tachograph, and it is designed to run specific standard protocols for:

- periodically interrogating the tachograph to determine when data were last downloaded from the tachograph memory and from the driver card inserted into the tachograph,
- sending electrical control signals to the LED 44,
- copying the data from the tachograph memory and/or from the driver card, and
- determining the next data downloading date in accordance with the regulations.

[0020] Preferably, the controller is programmable, for example in order to make checks more frequently or to adjust their frequency in any way (provided that the legal limits are complied with).

[0021] The principle of the invention remaining the same, the forms of embodiment and the details of construction may of course be varied widely with respect to those described and illustrated, which have been given purely by way of non-limiting example, without departing from the scope of the invention as defined in the attached claims. In particular, the shape and positioning of the electrical connecting plug 13 and of the mechanical connecting pins can be varied according to the design of the tachograph.

Claims

1. A connection device for transferring data recorded by a digital tachograph (10), comprising:

   - an electrical cable covered with a sheath (41),
   - at a first end of the cable, first means (43) for electrical connection to a socket located on an

accessible face of a tachograph (10),
- at a second end of the cable, second electrical connection means (45) for connection to an electronic processing and transmission controller (20),
- at least one mechanical connection means (46) connected mechanically to the sheath (41) and spaced apart from the first electrical connection means (43), and connectable to at least one corresponding connection point on the tachograph, in such a way that at least a portion of the cable is kept tidily adjacent to a front face of the tachograph without covering its controls or display units.

2. A connection device according to Claim 1, wherein the sheath (41) has a cross section of flattened shape in order not to project significantly from the front face of the tachograph.

3. A connection device according to Claim 1 or 2, comprising at least two of the said mechanical connection means (46) spaced apart from each other and engageable with corresponding mechanical connection points located on an accessible face of the tachograph.

4. A connection device according to Claim 3, comprising at least two free ends of two branch portions (47) which branch from the sheath (41), the said at least two mechanical connection means comprising at least two pins (46) of plastics material projecting from the said at least two free ends (47).

5. A connection device according to any one of the preceding claims, further comprising an indicator lamp means (44).

6. A connection device according to Claim 5, further comprising a body of plastics material (42), the said indicator lamp means (44) being positioned on said body of plastics material (42).

7. A connection device according to Claim 6, wherein the said first electrical connection means (43) comprise a plug projecting from said body of plastics material (42).

8. A connection device according to any one of the preceding claims, further comprising control means (48) which can be connected to the said controller (20) to enable data to be downloaded from the tachograph (10) voluntarily.

9. A connection device according to Claims 7 and 8, in which the control means comprise a microswitch or a push-button control (48) positioned on the body (42).

10. A system for transferring data recorded by a digital tachograph (10) comprising a first memory having first data, the system comprising:

- at least one card which can be inserted into the tachograph,
- a connection device (40) according to any one of Claims 5 to 9,
- an electronic processing and transmission controller (20) comprising computer means (100), transmission means (102) and at least a second memory (104) which can be connected to the said transmission means (102), the said transmission means (102) being designed to transmit data in wireless mode to a server (31) of a data collection centre (30), the said controller (20) being designed to be connected by means of the connection device (40) to the digital tachograph (10) and to carry out the following operations:

periodically interrogating the tachograph (10) to determine when the first data were last downloaded from the first memory and from the card,
sending electrical control signals to the indicator lamp means (44) of the connection device (40),
copying the first data from the first memory and/or from the card to the second memory,
transmitting the said first data to the server (31) using the transmission means, and
determining, using the computer means (100), the next date for downloading the data.

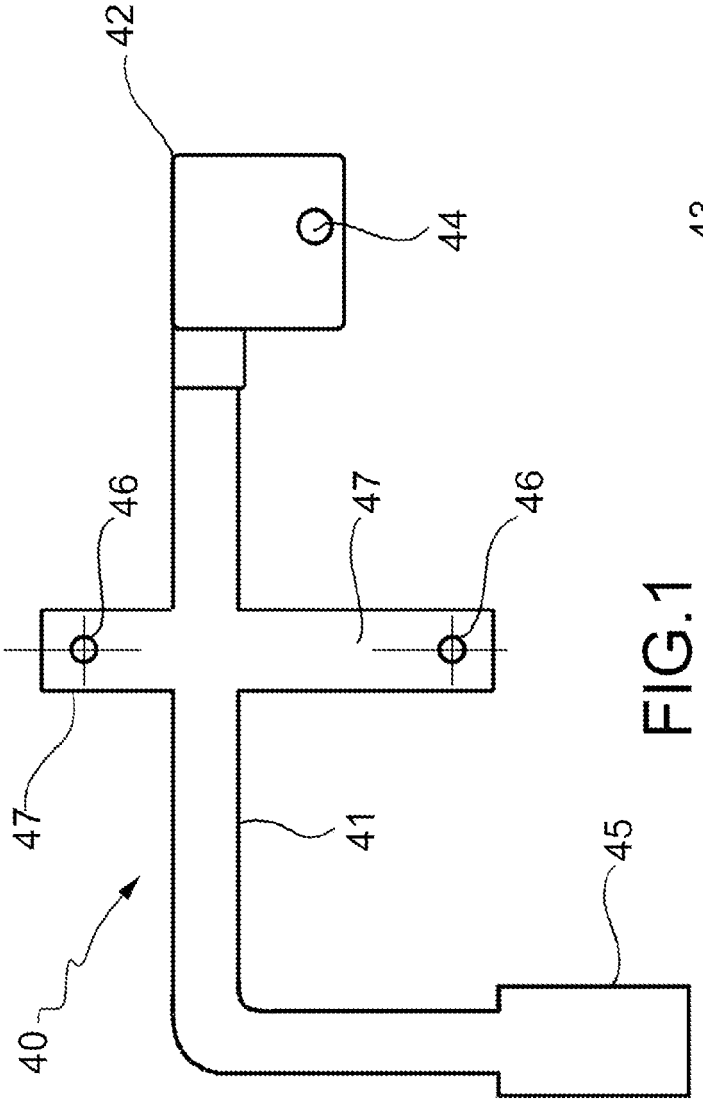


FIG.1

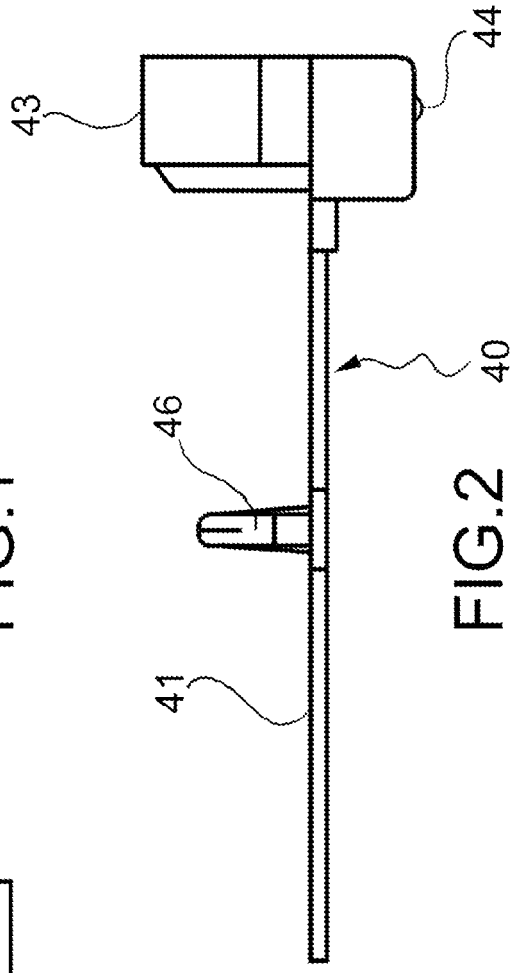


FIG.2

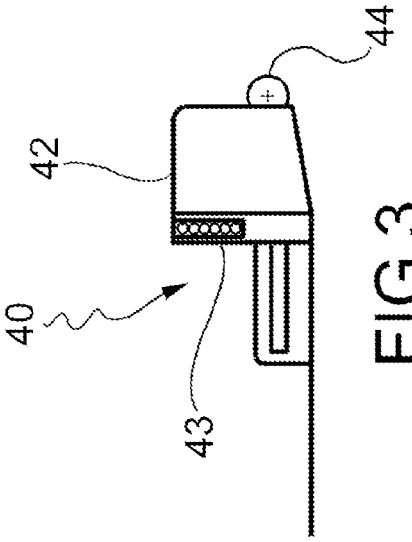


FIG.3

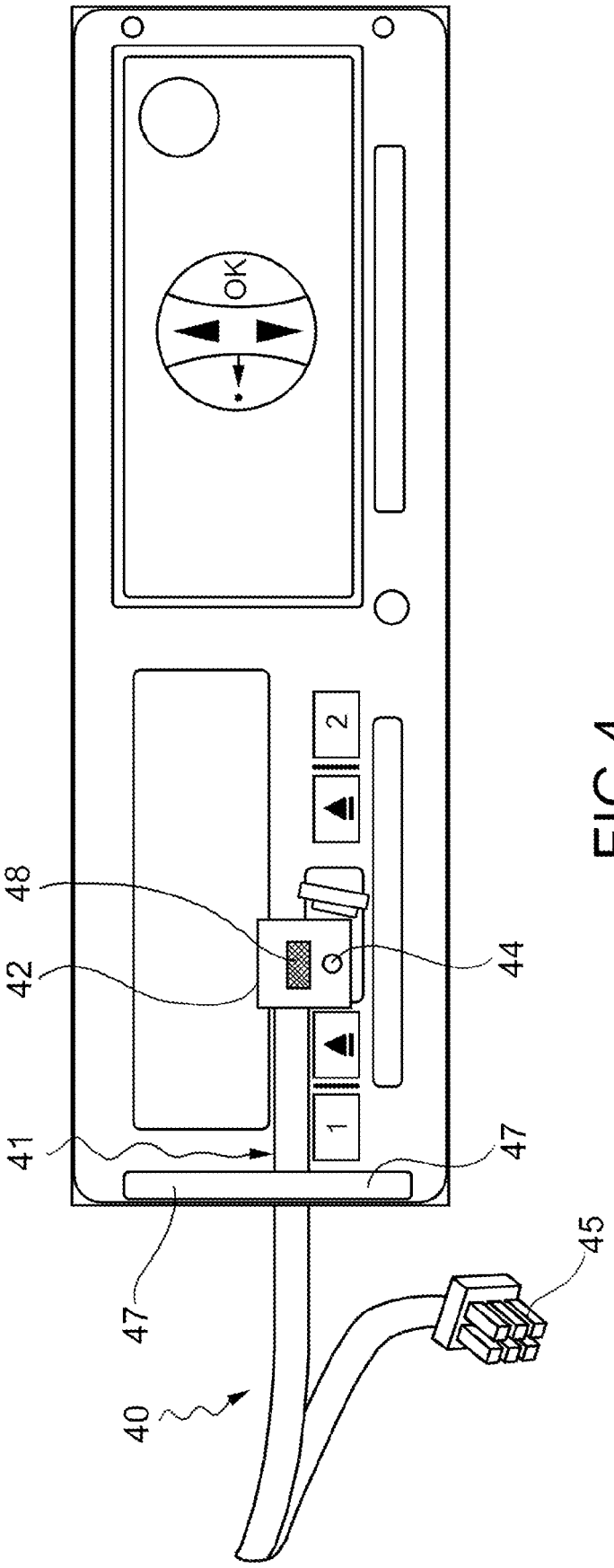


FIG.4

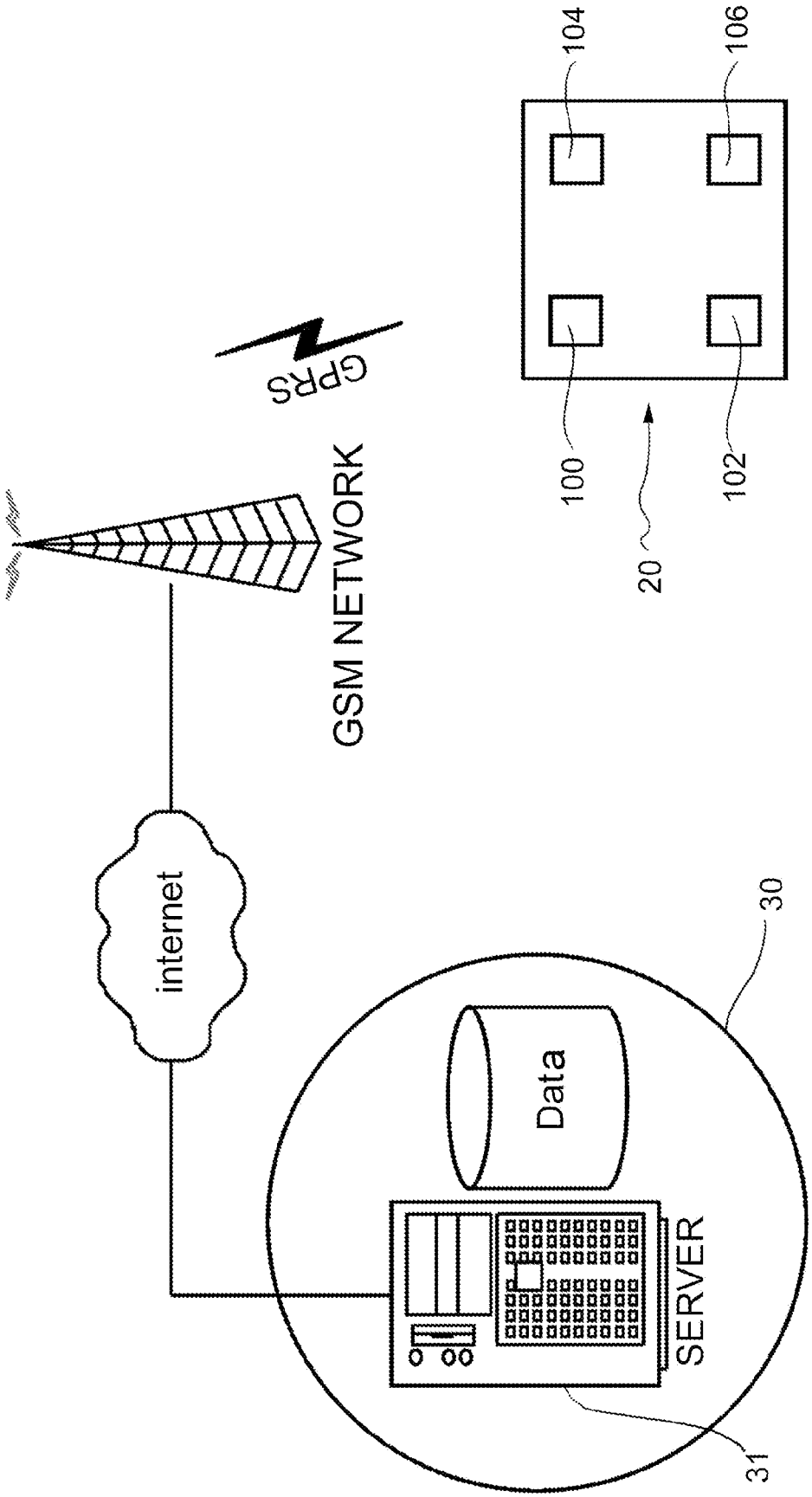

104
106
100
102
20
GPRS
GSM NETWORK
internet
30
Data
SERVER
31
Data collection centre

FIG.5