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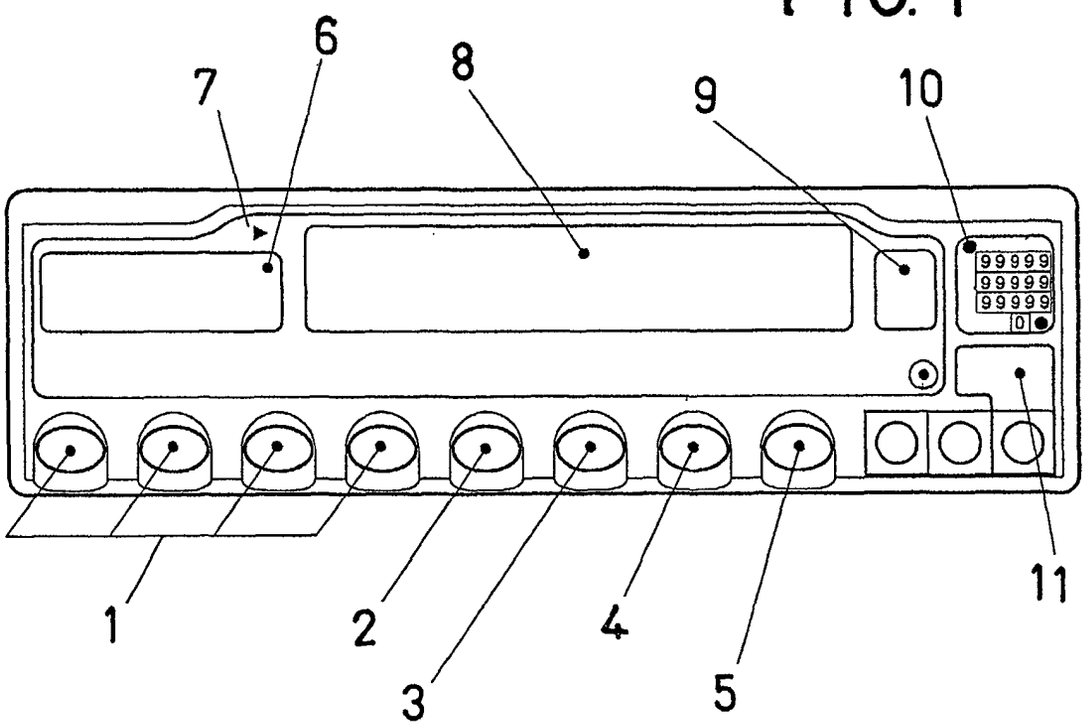
(54) Electronic taxi meter

(57) Electronic taxi meter controlled by an 8-bit microprocessor, provided with a memory for fares and for totallers of performed actions, and a program memory, with the memory powered by a lithium battery, in which the microprocessor (18) manages the viewers for the fare (8), status (9) and supplement (6), a keyboard having four fare pushbuttons (1), one pushbutton (2) for the total amount to be paid, another one (3) to indicate the free status, another for totals (4) and a calendar clock (5). It is provided on its rear with connections, one to the passenger presence sensor, another to the external indicator lamp, another to the pulse generator and another to the communications port.

FIG. 1



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Description

OBJECT OF THE INVENTION

[0001] The object of the present invention is an electronic taxi meter, that is, it relates to a counter device for a taxi where said device is an electronic tachometer-chronometer counter provided with a microprocessor with a digital solid-state viewer having seven segments and decimal point.

[0002] A taxi meter is a device which calculates the trip fare as a function of the parameters programmed for the selected fare, so that when the taxi travels below a predetermined speed the fare for the trip is based on time alone, while when the speed is above a predetermined speed the fare is based on the distance travelled.

[0003] The present invention for an electronic taxi meter is characterized by a special configuration of both its electronics and the elements required to operate it, providing a taxi meter that is easy to use and has numerous functions.

BACKGROUND OF THE INVENTION

[0004] The applicant is aware of another electronic taxi meter presented before with application number 9300534, which despite being controlled by a microcomputer and having the basic fare functions presents certain drawbacks, such as the impossibility of programming fares from an external device, the existence of safety seals to prevent manipulation, the possibility of connecting by external ports to other peripherals for transmission of data, and a connection to the pulse generator for the distance travelled. Likewise, taxi meters currently employed do not allow to calculate the total and partial totalling.

[0005] Therefore, the object of this invention is to solve the aforementioned drawbacks by developing a device which allows to provide and carry out all of the aforementioned functions.

DESCRIPTION OF THE INVENTION

[0006] The invention taught of an electronic taxi meter consists of a tachometer controlled by an 8-bit microprocessor, with sufficient memory to store the fare data and those of the totallers, up to 128 Kbytes, while the program memory is 32 Kbytes.

[0007] Fare parameters and control counters are stored in said memory, which is fed by a lithium battery.

[0008] It incorporates a keyboard with 8 pushbuttons having different functions, as well as three viewers, one of them with 7 displays, another with 4 and another with 1, all of which are seven segment LED displays.

[0009] Likewise, on its rear side it has connectors for the various operational requirements, both current and foreseeable ones in the future. The connections provided are the following:

- Connection to the distance sensor or pick-up
- Connection for bi-directional communication with the fare programmer
- Connection to the external luminous fare indicator
- Connection to the passenger presence sensor
- Connection for communication with other peripherals

[0010] The method by which the taxi meter determines the fare is either based on time or distance, depending on whether the taxi is travelling at a speed above or below a certain predetermined speed threshold. When below said threshold the fare is determined based on the time employed, while when above it the fare is determined by the distance covered. An LED on the front of the taxi meter indicates whether time or distance is being counted. This taxi meter incorporates the possibility of storing 32 fares and sub-fares.

[0011] When the taxi meter is in STAND-BY and FREE status the time and distance tracking do not act on the fare display. The device can also operate as an odometer, displaying the distance travelled.

[0012] In addition, the device allows as an option to control the time periods when work is allowed (days of the week, holidays, etc.) so that when it detects a mandatory rest day or an excess number of working hours it can disable the ENGAGED position.

[0013] In order to protect and ensure transmission of data to other peripheral units the taxi meter can be connected by an armoured and screened lead.

[0014] On the keyboard are 9 pushbuttons, the first four of which correspond to the four fares, another is the amount to be paid pushbutton, another is the free indicator LED and the other two are the totaller and the time and date indicator.

[0015] The taxi meter can operate in the free position, in which case this status is displayed on the viewer and the distance travelled is counted. When a passenger boards the car it passes to the BUSY status, and the free status cannot be recovered until the TO BE PAID status is first defined. When the TO BE PAID status is entered the amount owed for the trip is displayed, broken down to show any supplements included. Trip supplements may be introduced at two different times: when pressing TO BE PAID with the fare pushbuttons, each of which is associated to a different supplement. These can be deleted using the totalling pushbutton. It is also possible to limit the number of times that a supplement can be entered; in addition, it is possible to enter supplements while the meter is in the ENGAGED position for which the free pushbutton, the totalling pushbutton and the calendar clock pushbutton are used.

[0016] It is also possible to view supplements which may be useful for the taxi driver and the user, such as speed, chronometer in minutes and seconds, distance travelled in hectometres, fare in Ptas/Km and Ptas/hour.

[0017] The totallers allow to view the various amounts of the different trips performed, which are increased and

updated at the end of each one. The data which are totalled are the following:

- Number of trips
- Number of steps
- Total Kms. travelled
- Kms. travelled while ENGAGED
- Fare for each trip
- Supplements for each trip
- Total fares
- Number of times the partial totals have been erased
- Number of disconnections
- Time of operation
- Time since last disconnection

[0018] Likewise, the above information may be shown by partial amounts, distinguished from the above by the presence of a point at the end of each identifier which can be viewed.

[0019] It is possible to view the taxi and fare parameters when the meter is in the STAND-BY position by pressing key 8. Among the different values which may be viewed are the following:

- The meter "K" constant, that is the pulses per km.
- Calibration of the "K" constant by measuring a distance
- Serial number of the fare
- Date of recording of the fare
- ID number of the fare distributor installer
- ID control number for the fare
- Taxi license number
- Meter serial number
- Date of manufacture of the meter
- Date of installation of the meter
- ID number of the meter distributor installer

[0020] It is possible to obtain information on the parameters which define the entire fare system, accessed by pressing the totalling key when the meter is in STAND-BY status.

DESCRIPTION OF THE DRAWINGS

[0021] The description given below is complemented by the accompanying drawings, which will aid a better understanding of the characteristics of the invention and where for purposes of illustration only and in a non-limiting manner the main details of the invention are shown.

[0022] Figure 1 shows a front view of the taxi meter object of the invention.

[0023] Figure 2 shows a rear view of the taxi meter.

[0024] Figure 3 shows a perspective view of the taxi meter and the sealing systems.

[0025] Figure 4 shows a schematic representation of the electronics of the assembly.

PREFERRED EMBODIMENT OF THE INVENTION

[0026] In view of the figures, a preferred embodiment of the invention is now described together with an explanation of said figures.

[0027] Figure 1 shows 8 pushbuttons on the front of the meter, of which the first four pushbuttons (1) are the fares, the pushbutton (2) is the TO BE PAID pushbutton, the pushbutton (3) is used to indicate the FREE status, the pushbutton (4) is used to show the data totals and the pushbutton (5) is a calendar clock.

[0028] The fare pushbuttons allow to begin a trip, or to indicate a trip from the FREE status; it is possible to change from one fare to another during the trip as long as no forbidden actions are performed.

[0029] Also on the front of the meter are three viewers: the supplement viewer (6) which has four seven-segment displays; the viewer for the total amount to be paid (8) which has seven seven-segment displays; and the status viewer (9) which indicates the current status of the meter at any time, which can be one of the following:

- L indicating FREE
- 1 indicating ENGAGED with fare 1
- 2 indicating ENGAGED with fare 2
- 3 indicating ENGAGED with fare 3
- P indicating the meter is in the TO BE PAID status

[0030] On the front of the meter is also present a tracking indicator LED (7) which shows whether the fare is being determined by the time or distance, so that when this LED is on fare is calculated by time tracking. The characteristics plate (10) is attached on the front. Finally, a lid (11) is placed which can be sealed and which must be removed to access the fare programming connector.

[0031] Figure 3 shows the various means by which it is possible to seal the device. In option A, plastic seals are employed with a housing for the plug (14), a flat head screw (13) and a series of plugs (12). Option B achieves this sealing with anti-rotation drilled brackets (17) and drilled head screws (16) which are later sealed with a seal (15).

[0032] Figure 4 shows a schematic representation of the electronics of the assembly. The assembly is controlled by a microprocessor (18) which manages all the operations of the three viewers (6, 8, 9), which are respectively the supplement viewer, the status viewer and the viewer for the total amount to be paid. It also manages the keyboard, the communications with the fare programmer (11), the distance sensor (15), the connector for the external luminous sign (14), the communications port for connection to other peripherals (13), the passenger sensor and the connection to the calendar clock.

[0033] It is not considered necessary to extend this description further to allow any expert in the field to understand the scope of the invention and the advantages derived thereof.

[0034] The materials, shape, size and arrangement of the elements may vary as long as the essence of the invention is not affected.

[0035] The terms used in this description must be understood in a wide and non-limiting sense.

Claims

1. Electronic taxi meter **characterized in that** it is controlled by an 8-bit microprocessor which is provided with a memory for storing fare data and totaller data, as well as a program memory, with these memories being powered by a lithium battery; it has a keyboard with 8 pushbuttons of which four are fare pushbuttons (1), one is a TO BE PAID pushbutton (2), one is a FREE pushbutton (3), one is a totaller pushbutton (4) and one is a calendar clock pushbutton (5), also being provided with three viewers (6, 8 and 9) which respectively show the supplements, the total amount to be paid and the meter status; all of the aforementioned viewers have seven-segment displays, with the supplement viewer (6) having four displays, the amount to be paid viewer having seven displays and the status viewer a single display. On the rear of the device there is a series of connectors such as: a connector for a passenger sensor (12), a connector for the external luminous sign (14), a connector for the pulse generator (15), a connector for the communications port (13); and finally on the front is placed the characteristics plate (10), a lid (11) meant to protect the programming connector and an LED indicator (7) which is a tracking indicator to show whether the fare is being calculated by time or by distance, being lit when it is by time.

2. Electronic taxi meter as claimed in claim 1, **characterized in that** the programming connector can be sealed with plastic plugs by means of housings for the plug (14) and flat head screws (12), or it can be sealed with an anti-rotation drilled bracket (17) with drilled head screws (16) and seals (15).

3. Electronic taxi meter as claimed in claim 1, **characterized in that** the microprocessor (18) controls the viewers (6, 8 and 9), the keyboard (1, 2, 3, 4 and 5), the communications with the distance sensor, the external luminous sign, the passenger sensor, the communications port (13) to other peripherals and the calendar clock.

4. Electronic taxi meter as claimed in claim 1, **characterized in that** the device allows to control as an option the time periods in which work is allowed (days of the week, holidays, etc.) so that when a rest day or excessive working hours are detected it will not pass into the ENGAGED status.

5. Electronic taxi meter as claimed in claim 1, **characterized in that** in order to ensure the transmission of data to other peripherals the taxi meter can be connected by an armoured and screened lead.

6. Electronic taxi meter as claimed in claim 1, **characterized in that** the totallers allow to view the different amounts for the trips performed, which are increased and updated at the end of each one, allowing to view the following information:

   - Number of trips
   - Number of steps
   - Total Kms. travelled
   - Kms. travelled while ENGAGED
   - Fare for each trip
   - Supplements for each trip
   - Total fares
   - Number of times the partial totals have been erased
   - Number of disconnections
   - Time of operation
   - Time since last disconnection

7. Electronic taxi meter as claimed in claim 1, **characterized in that** the above information can be shown partially, differing from the above manner **in that** a point is entered at the end of each identifier viewed.

8. Electronic taxi meter as claimed in claim 1, **characterized in that** it is possible to view the meter parameters and the fare parameters when the meter is in a STAND-BY status by pressing the pushbutton (8), showing the following data:

   - The meter "K" constant, that is the pulses per km.
   - Calibration of the "K" constant by measuring a distance
   - Serial number of the fare
   - Date of recording of the fare
   - ID number of the fare distributor installer
   - ID control number for the fare
   - Taxi license number
   - Meter serial number
   - Date of manufacture of the meter
   - Date of installation of the meter
   - ID number of the meter distributor installer

FIG. 1

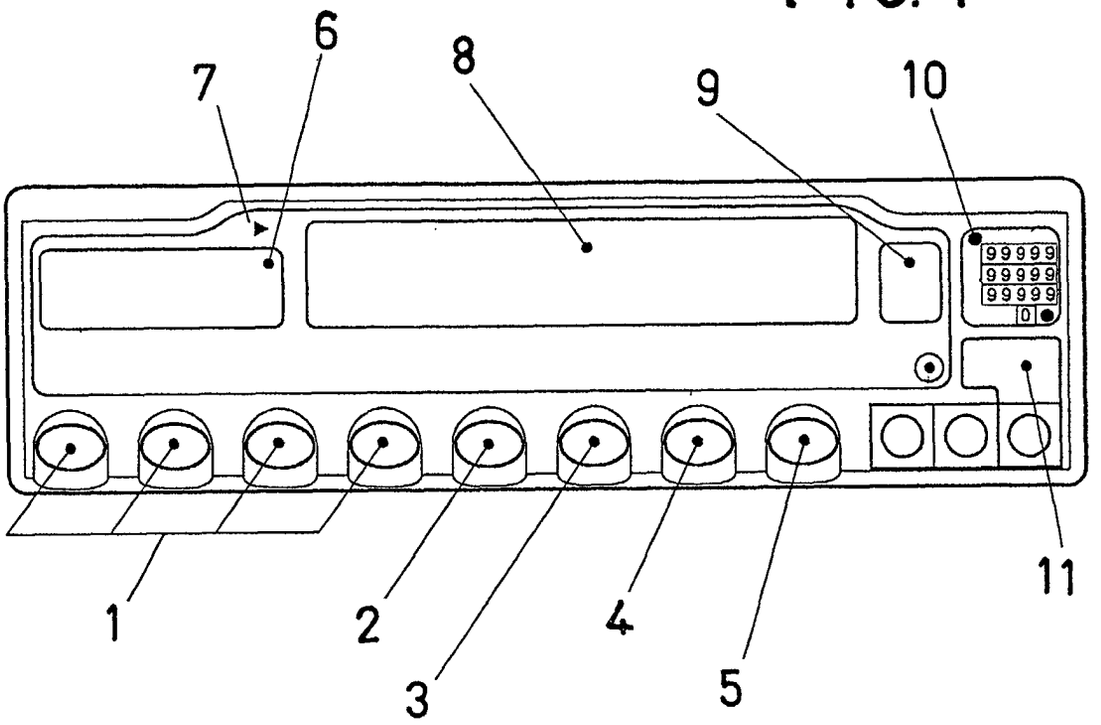
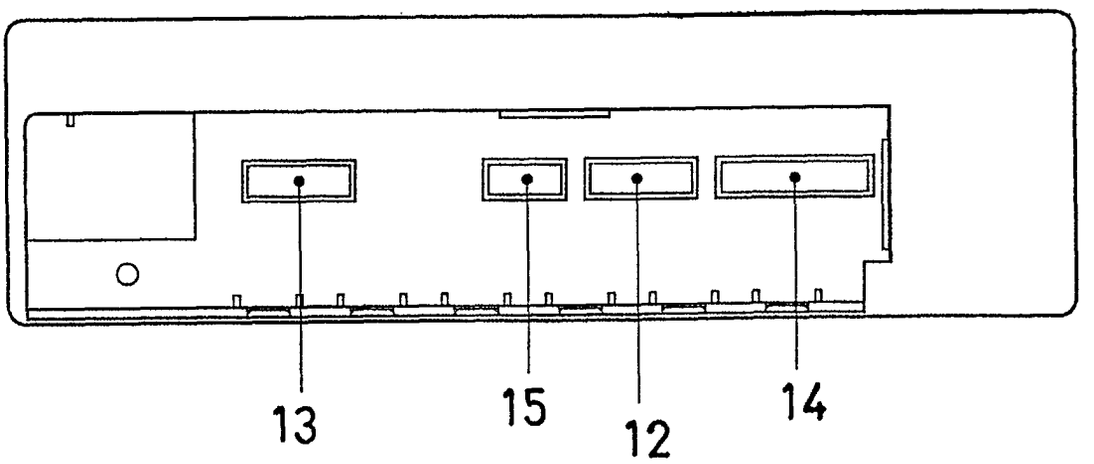


FIG. 2



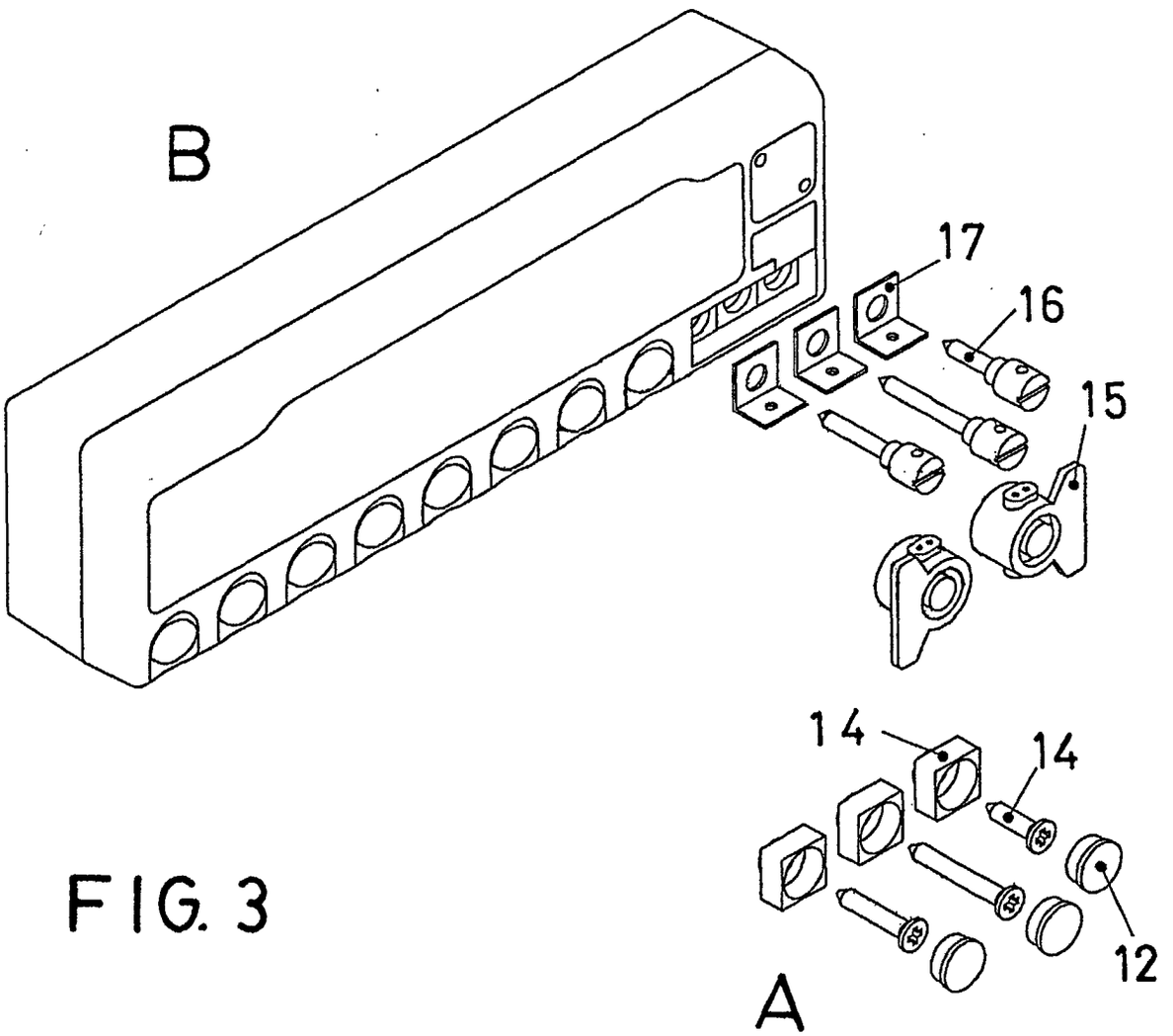


FIG. 3

FIG. 4