

ELECTRONIC TICKET FOR PARKING SUBJECT TO CHARGES

The present invention concerns an electronic ticket for parking subject to charges.

The invention is particularly advantageous in the general field of parking subject to charges and more particularly in the field relating to individual parking meters placed
5 inside vehicles and known as ICPMs ("In-Car Parking-Meters").

There are ICPM type individual parking meter systems made up of two elements, namely firstly an electronic smart card precharged with parking units, and secondly a box able to accommodate said card and comprising a microprocessor intended, apart from other things, to gradually consume over a period of time the
10 parking units present in the smart card. In addition, said box is fitted with a display device indicating the date and time of the end of authorised parking.

This individual parking meter system operates as follows : the motorist inserts an electronic smart card, previously obtained from the parking operator or a distributor, into the box. After starting the system, the microprocessor of the box calculates the date
15 and time of the end of authorised parking according to the units remaining in the card, and possibly the current tariff. The box/card unit is then placed behind the windscreen of the vehicle. Then a parking operator is able at any moment to check the validity of the presence of the vehicle by comparing the current date and time with the date and time of the end of authorised parking indicated by the display device of the box.

20 However, these known type of individual parking meter systems do have the drawback in that the electronic smart card charged with parking units is permanently inserted inside the box and is thus visible from the outside of the vehicle throughout the period of parking, which is likely to encourage fraud, it being relatively simple to know the units contents of the card by comparing the current date and time with the displayed
25 date and time of authorised parking,

Accordingly, the technical problem to be resolved by means of the present invention is of proposing an electronic parking ticket subject to charges offering more security than current known ICPM systems.

According to the present invention, the solution to the technical problem consists

in that said electronic ticket is made up of an autonomous portable individual box including :

- a first tariff rate storage memory,
- a second parking unit storage memory,
- 5 - means for selecting a tariff rate stored in said first memory,
- a clock displaying the current date and time,
- means for calculating the date and time of the end of authorised parking, having regard to the selected tariff rate, the parking units stored inside said second memory, and the current date and time,
- 10 - a display unit able to display at least the selected tariff rate and the date and time of the end of authorised parking,
- means to gradually consume over a particular period of time the parking units stored in the second memory,
- means to deliberately stop said progressive parking unit consumption
- 15 means.

Thus, the parking electronic ticket subject to charges of the invention functions autonomously, the parking units to be consumed being stored in said second memory of the box and not in an external card and permanently connected to the box. The risk of fraud is thus limited to solely the units contained in the second memory.

20 So as to be able to take account of any modifications of the tariff rate, the invention provides that the electronic ticket is able to receive tariff rates of a tariff updating device. According to one embodiment of the invention, said tariff updating device is an electronic smart card known as a configuration card and is able to cooperate with an electronic smart card reader of said box. This configuration card is initially

25 issued by the relevant parking operator and, apart from the actual tariff conditions (hourly tariff, maximum period) contains information relating to access by users to favoured parking tariffs : free time, resident tariff, for example. The transfer of the tariff rate of the configuration card to the first storage memory is simply made by inserting the card into the reader.

30 Similarly, it is an advantage that the electronic ticket of the invention can be charged with parking units or recharged after using up the units contained in the second memory. To this effect, according to the invention, the electronic ticket is provided to

receive the parking units from a parking unit transfer device. Generally speaking, said parking unit transfer device is an electronic smart card compatible with the card reader of the box.

According to a particularly advantageous disposition of the invention, said box is
 5 fitted with means for the selective transfer of a given number of parking units from the parking unit transfer device to said second storage memory. The user therefore is able to choose the number of units he/she wishes to transfer. For greater security, it is advisable to transfer only those units corresponding to the provided period of parking, the remaining units being kept in the transfer card retained by the user outside the box and
 10 the vehicle.

In accordance with a particular embodiment of the invention, said configuration card also constitutes said parking unit transfer device. In this case, this is a sole card able to update the first storage memory of the box and allows for the transfer of units in the second storage memory of said box. This configuration card can be updated
 15 concerning the tariff and/or recharged with parking units. To this end, the configuration card of the invention is able to receive a tariff updating and parking units from an autonomous terminal, such as a time recorder or from a non-autonomous terminal, such as a points of sales terminal.

According to a first variant, the configuration card is only intended for tariff
 20 updating and said parking unit transfer device is a disposable electronic card able to cooperate with said electronic memory card reader of the box. This disposable card can be obtained from sale points approved by the parking operator.

According to a second variant, said tariff updating device and said parking unit transfer device constitute a disposable electronic smart card known as an autonomous
 25 card, able to co-operate with said electronic smart card reader of the box. This autonomous card is distributed by the parking operator via his various sale points.

The following description, relating to the accompanying drawing and given solely by way of non-restrictive example, gives full details of the invention and how it can be embodied.

30 Figure 1 shows a parking ticket 10 constituted by a portable individual box including a memory for storing tariff rates and known as the first memory. This concerns parking tariffs for the different areas of a given town : town centre, outskirts,

etc. The box 10 also includes a second memory to store parking units expressed as their financial value. Said first and second memories can be two separate memories or two separate areas of a single given memory.

The choice of a tariff rate is effected with the aid of two scrolling buttons 11, 12
5 able to scroll the list of tariff rates in either direction.

Furthermore, the box 10 is fitted with a microprocessor which, in relation to the contents of the first and second storage memories, is able to calculate the date and the end of the time of authorised parking according to the selected tariff rate, the parking units stored in the second memory and the current date and time provided by a clock of
10 the box 10.

The selected tariff rate and the date and time of the end of parking are displayed on a display unit 13 of the box 10 so as to enable a parking operator to inspect the legality of parking when the electronic ticket is placed behind the windscreen of a vehicle. Of course, the display unit 13 can display other types of information, such as
15 the amount paid, the time elapsed from the start of parking and the identity of the parking operator.

During the parking period, said microprocessor gradually consumes the parking units stored in the second memory until they are used up, unless the user returns to his vehicle before the end of authorised parking and stops the consumption of units by
20 pressing, for example, on a key 14 for stopping functioning of the electronic ticket 10. The units not consumed shall be used subsequently during a period following parking subject to charges.

To the extent that the tariff rates are likely to be modified over a period of time, it is necessary to provide a device for updating the first memory of the electronic ticket 10.

25 As shown on figure 1, said tariff updating device can be an electronic smart card 1 known as a configuration card issued by the parking operator by means of a computer 20. In this case, the box 10 is fitted with a smart card reader so as to transfer the tariff rate (\$/h) contained in the configuration card 1 in the first storage memory of the box 10.

30 Figure 1 also shows that the configuration card 1 can be used as a parking unit transfer device (\$) in the second storage memory of the box 10. In this operating mode, the user obtains a configuration card 1 from the parking operator and inserts it into the

card reader of his electronic ticket 10. The tariff rate (\$/h) of the configuration card is then transferred into said first memory. The user then has the possibility of transferring parking units (\$) from the card 1 to said second memory. The number of parking units transferred to the box 10 is selected according to the provided period of parking with the aid of selective transfer means, such as the buttons 11, 12. However, if he wishes, the user can transfer all the parking units contained in the configuration card 1.

According to the embodiment of figure 1, the configuration card can be brought up to date as regards tariffs and can be recharged with parking units from an autonomous terminal, such as a time recorder 30. Said time recorder contains a memory containing the current tariff rate, this memory being updated by the operator 20 using a tariff transfer card 4. So as to update and/or recharge his configuration card 1, the user needs to insert it into a card reader of the time recorder 30. The new tariff rate (\$/h) contained in the memory of said time recorder is entered on the configuration card 1. So as to recharge the card 1 with parking units, the user puts into the time recorder coins, notes or even a bank card or smart card or any other payment device accepted by the time recorder. The configuration card 1 is then ready to be used in the electronic ticket 10.

Of course, this updating and/or recharging of the configuration card can also be effected with a non-autonomous terminal, such as a sales point terminal, or with the counters of the operator, for example with the aid of a computer provided with a card reader.

In addition to the configuration card 1 shown on figure 1, the user can use a disposable electronic smart card 2 compatible with the reader of the box 10 and intended solely for the transfer of parking units (\$) in the electronic ticket 10. In this case, the configuration card 1 strictly needs to be used to transfer the tariff rate (\$/h).

Finally, according to another embodiment, the means for updating the tariff and the means for transferring parking units is a disposable electronic smart card 3 compatible with the reader of the box 10. This card, which is autonomous, is also issued by the operator 20 and is available from his distributors.



CLAIMS

1 – Electronic parking ticket subject to charges, characterised in that it is constituted by an autonomous portable individual box (10) including :

- a first memory for storing tariff rates,
- 5 - a second memory for storing parking units,
- means (11, 12) for selecting a tariff rate stored in said first memory,
- a clock supplying the current date and time,
- means for calculating the date and the time of the end of authorised parking, having regard to the selected tariff rate, parking units stored in said
- 10 second memory, and the current date and time,
- a display unit (13) for displaying at least the selected tariff rate and the date and time of the end of authorised parking,
- means to gradually consume over a period of time the parking units stored in the second memory,
- 15 - means (14) to deliberately stop said means for gradually consuming the parking units.

2 – Electronic ticket according to claim 1, characterised in that said display unit (13) is also able to display at least one of the following types of information : amount paid, time elapsed since the start of parking, and the identity of the parking operator.

20 3 – Electronic ticket according to claim 1 or 2, characterised in that it is able to receive the tariff rates from a tariff updating device (1, 3).

4 – Electronic ticket according to one of claims 1 to 3, characterised in that it is able to receive the parking units from a parking unit transfer device (1,2,3).

25 5 – Electronic ticket according to claim 3, characterised in that said tariff updating device is an electronic smart card (1) known as a configuration card able to co-operate with an electronic smart card reader of said box (10).

6 – Electronic ticket according to claims 4 and 5, characterised in that said configuration card (1) also constitutes said parking unit transfer device.

30 7 – Electronic ticket according to claim 5 or 6, characterised in that the configuration card (1) is able to receive a tariff updating and parking units from an autonomous terminal (30).

8 – Electronic ticket according to claim 7, characterised in that said autonomous



terminal is a time recorder

9 – Electronic ticket according one of claims 5 or 6, characterised in that the configuration card (1) is able to receive a tariff updating of the parking units from a non-autonomous terminal.

5 10 – Electronic ticket according to claims 4 and 5, characterised in that said parking unit transfer device is a disposable electronic smart card (2) able to co-operate with said electronic smart card reader of the box (10).

10 11 – Electronic ticket according to any one of claims 5 to 10, characterised in that said tariff updating device and said parking unit transfer device is a disposable electronic smart card (3), is autonomous and is able to cooperate with said electronic smart card reader of the box (10).

15 12 – Electronic ticket according to any one of claims 5 to 11, characterised in that said box (10) is fitted with means (11, 12) for the selective transfer of a given number of parking units of the parking unit transfer device (1,2,3) to said second storage memory.