METHOD AND DEVICE FOR RESERVING TICKETS AND/OR EXTRA CHARGES FOR UTILIZING CHARGEABLE MEANS OF TRANSPORT CONVEYING PASSENGERS

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Abstract

Disclosed is a method for reserving tickets and/or extra charges for utilizing chargeable means of transport conveying persons with the aid of a display unit (10) and at least one user terminal (26). According to said method, the user terminal (26) is advanced to a display field (14; 16; 18; 20; 24) of the display unit (10) indicating a type of ticket and/or extra charge, whereupon a communication that triggers the reservation of the type of ticket and/or extra charge takes place between the user terminal (26) and the corresponding display field (14; 18; 20; 24).
The present invention relates to a method and a device for reserving tickets and/or extra charges for utilising chargeable means of transport conveying passengers.

In the following, the term "ticket" as a generic term comprises riding permits of all kinds, as e.g. short trip, single ride, day, monthly season or yearly season tickets or the like, entitlements of all kinds to obtain tickets at reduced prices, as e.g. reductions for children, groups, or disabled people or the like, etc.

Hitherto, tickets for the use of chargeable means of transport conveying passengers have been mainly provided in the form of tickets printed on paper. These tickets can for instance be bought at ticket offices or corresponding ticket automatcs, whereby the fare usually depends on the distance to be travelled with the chargeable means of transport. In addition, the fare systems of many passenger transit associations involve various types of extra charges which must be bought by the passenger either separately from the ticket or together with the ticket. In Stuttgart, for example, a separate ticket is required for taking dogs along, in Mönchengladbach, there is an extra charge for bicycles, and often a ticket with an extra charge corresponding to the number of additional persons needs to be bought for groups of persons, etc. For the reservation of such extra charges, ticket automatcs have already been known which have a display device, for instance in the form of push buttons, where symbols for individual types of extra charges are shown, or in the form of touch screens, where the desired type of extra charge can also be selected and correspondingly reserved by touching.

Tickets printed on paper, however, have proved to be relatively complicated to handle and can be falsified relatively easily. For this reason, there have been various approaches to replace the paper ticket by a so-called electronic ticket.

For instance, ticketing systems based on so-called smartcards are known. These can be either cards fitted with contacts (classical chip cards), or contactless cards (transponder cards), or hybrid forms (dual interface cards). Such smartcards contain the relevant data (ticket data and/or fare data) for ticket-charging.

For instance in Hanau, the Rhein-Main-Verkehrs-verbund (passenger transit association) operates a so called "check in/check out" system on a trial basis, where the passenger identifies himself by means of a chip card at a terminal in the vehicle on entering and exiting the vehicle. A background system then calculates which distances the customer has actually travelled and deducts the calculated fares from an account linked to the chip card.

Furthermore, from PCT application NL 01/00215 a method is known where the passenger uses a mobile apparatus (e.g. a mobile phone or a transponder) with a number allocated to him, in order to be automatically identified when he is in a vehicle of the public local traffic. The vehicle registers where the passenger enters the vehicle and where he leaves it. Usually, these data are transmitted to a background system which determines the fare for the distance travelled on the basis of these data. Such systems are often called "be-in/be-out" systems.

From DE 199 57 660, a method for deducting the fare for utilising public means of transport has been known where a cheque-card like memory carried along by the user is loaded with a credit. During the use of means of public transport, counting pulses are sent out by the transport means, and with each received counting pulse, an amount is deducted from the credit stored on the memory unit.

From Switzerland, a pilot project called "easyride" is known, where the customer carries along a transponder card which registers him in the vehicle when he uses a vehicle and which repeats this registration regularly. In this case, communication between the vehicle and the transponder card is bidirectional and increases in complexity the more passengers are inside the vehicle. Nevertheless, the comfort for the customers has already been good.

Furthermore, a project called "intermobile" has been known, where a chip card, as for instance the chip card of a credit institution, is inserted in an "intelligent" sleeve with a display which can communicate on a contactless basis with a reader provided in the transport means. With entering and leaving a means of transport, the chip card inserted in the sleeve is then moved past the reader in combination with pressing a button on the reader, so that the costs of the ticket can be determined and deducted upon leaving the means of transport. This, too, is a check-in/check-out system, where the check-in and the check-out procedure can be accelerated by the use of the intelligent sleeve which, despite the use of cards fitted with contacts, enables contactless communication with the reader.

It is one object of the present invention to provide a device and a method for reserving tickets and/or extra charges for utilising chargeable means of transport by means of an electronic ticket.

According to the present invention, this problem is solved by a method according to claim 1 and a display device according to claim 16. The dependent claims relate to individual embodiments of the present invention.

In the method according to the invention for deducting tickets and/or extra charges for utilising a chargeable means of transport conveying passengers by using a display device and at least one user terminal, the user terminal is brought up to a display field of the display device showing a type of ticket and/or extra charge, whereupon a communication triggering the reservation of the type of ticket and/or extra charge takes place between the user terminal and the corresponding display.

According to a first variant of the method according to the invention, a transmitter allocated to the display field sends out corresponding signals containing ticket and/or extra charge information which are received by a receiver integrated in the user terminal as soon as it is within the transmission range of the transmitter. The received ticket and/or extra charge information is then further processed in the user terminal for the purpose of reserving the corresponding ticket and/or the corresponding extra charge.

The display device comprises at least one display field, preferably, however, several display fields each of which shows one type of ticket and/or extra charge. The types of extra charges can relate for instance to taking along a bicycle, travelling first class, taking along a pet, reserving a group ride, or the like. The display can be digital and show a symbolic representation, or a written description of the respective type of ticket and/or extra charge. Alternatively, the symbols for the types of ticket and/or extra charges or the
descriptions of the types of tickets and/or extra charges can be printed on, stuck on, or otherwise arranged or formed on the display fields. The display device further comprises several transmitters each of which is allocated to a display field and set up in such a way that they send out signals containing the ticket and/or extra charge information corresponding to the type of ticket and/or extra charge, whereby these signals can be received by user terminals for deduction purposes. These user terminals can on principle be a multitude of different terminals which can be assigned an electronic ticket and which can receive the signals from the transmitters of the display device, as for instance a transponder card, a mobile telephone, a handheld, or the like. Furthermore, the display device has at least a control which is preferably programable and serves to control the display device.

For reserving a ticket and/or an extra charge by means of a user terminal at the display device according to the invention, the user terminal, in the easiest case, is held against the respective display field showing the desired type of ticket and/or extra charge. The user terminal then automatically receives one or several signals from the transmitter allocated to the display field, whereby the signals of the type of ticket and/or extra charge contain the corresponding ticket and/or extra charge information. Based on this ticket and/or extra charge information, the fare can then be determined and deducted in connection with other information relevant to the fare.

At this point, it should be pointed out that the determination of the other information relevant to the fare is not subject of the present invention. Therefore, it is not relevant how exactly the other information relevant to the fare is recorded, whether for instance by a be-in/be-out system, or a check-in/check-out system, which is why this question is not dealt with in detail in the following.

The display fields of the display device used according to the invention are preferably retained modularly and interchangeably on a frame, whereby this may occur for instance in a positive or non-positive manner. For instance, the display fields can be formed as individual panels which can be inserted in the frame.

According to another embodiment, the display device comprises at least one display field which is a deletion field. The deletion field sends out deletion signals which trigger the deletion in whole or in part of that ticket and/or extra charge information which was previously transmitted from a transmitter to a user terminal. If the user realises that he has made a reservation in error, he can correspondingly hold his user terminal against the deletion field in order to delete the unwanted ticket and/or extra charge information from his terminal, so that no determination and deduction of the fare based on this ticket and/or extra charge information will occur. The deletion can preferably only be effected within a pre-determined period after selection of the ticket and/or extra charge.

Preferably, the transmitters are so-called RFID transmitters (Radio Frequency Identification) with a short transmission range which is preferably only a few centimetres in order to ensure in this manner that a user terminal held in front of a particular display field receives signals only from the transmitter allocated to this display field, and no unwanted signals from other transmitters allocated to different display fields. Of course also other types of transmitters can be used, as for instance infrared transmitters, contact surfaces, or the like.

Preferably, the transmitters are set up in such a way that they send out signals continuously while they are in operation. The transmitters can also send out signals in pre-determined time intervals, i.e. they can be clocked in a pre-determined manner.

In an alternative embodiment, the display device comprises at least one actuating device, whereby the transmitters are set up such that when the actuating device is actuated, they send out signals for a pre-determined period, either continuously or in pre-determined time intervals. The actuation device can for instance be provided in the form of a push button. Alternatively, the display device as actuation device can also comprise a proximity and/or motion sensor, whereby the transmitters send out signals as soon as the proximity and/or motion sensor responds, i.e. as soon as it detects the approach or motion of a person.

In another embodiment of the display device according to the invention, at least one transmitter is designed such that different signals can be sent out by it. If for example a group trip can be reserved via a display field, the allocated transmitter can correspondingly send out a signal for two persons, another signal for three persons, etc., in order to determine the number of persons in this manner. The number of persons can then be selected using the user terminal. The number of persons can also be determined by recording how many times the user terminal has successively been brought into and out of the transmission range of the corresponding transmitter.

The display device can further comprise at least one receiver which is set up such that it can receive signals from user terminals. If the display device further comprises a retractive communication device which is set up such that it emits a retractive signal as soon as the at least one receiver has received a receipt acknowledgement signal from a terminal, the user can be informed of the fact that a reservation was made by means of the retractive signal. The retractive signal can be an optical, an acoustic, or any another signal. For instance, an optical signal appears on the display field the type of extra charge allocated to it was just reserved.

A retractive communication device can also be integrated in the terminal and emit a retractive signal as soon as the terminal has received a signal from a transmitter of the display device. If the terminal comprises a display, the reserved type of ticket and/or extra charge can be shown on the display.

If this is not the case, the retractive communication device can emit another optical or acoustic retractive signal in order to inform the user of the reservation made.

If several signals different from each other representing different variants of tickets and/or extra charges of one type of tickets and/or extra charges are sent out by one single transmitter, one of the variants of the tickets and/or extra charges can preferably be selected by the user when these signals are received by a user terminal. These variants of tickets and/or extra charges can for instance be one, two or more additional persons, or bicycles or pets taken along, etc.

According to a second variant of the method according to the invention, the user terminal has a transmitter which sends out an identification unambiguously identifying the user terminal or the user, which in turn is received by a receiver allocated to a display field as soon as the receiver comes into the transmission range of the transmitter and which is further processed together with the ticket and/or extra charge information allocated to the display field for the purpose of reserving the corresponding ticket and/or the cor-
responding extra charge. In contrast to the first variant, the user terminal in this case sends an identification to the display field, whereby this identification is further processed together with the ticket and/or extra charge information, for instance in a processing unit for determination and deduction of the fare.

[0028] Here, too, the display device preferably comprises several display fields each of which a receiver is allocated to, whereby the display fields can also have a deletion field as already described above in relation to the first variant.

[0029] The transmitter integrated into the user terminal is preferably an RFID transmitter with a short transmission range which is advantageously only a few centimetres. Of course also other types of transmitters can be used, as for instance an infrared transmitter, a contact surface, or the like.

[0030] Just as with the first variant, the transmitter preferably sends out signals continuously or in pre-determined time intervals.

[0031] According to a preferred embodiment of the second variant of the method according to the invention, the display device comprises an activation device which activates the transmitter as soon as it approaches a display field, whereupon the transmitter sends out signals. In this manner, the transmitter can be prevented from transmitting continuously, which would unnecessarily consume energy.

[0032] Finally, the display device preferably comprises a reductive communication device which is set up such that it will emit a reductive signal as soon as at least one of the receivers allocated to the display fields receives a signal from a transmitter of a user terminal in order to inform the user in this manner that a communication has taken place between the user terminal and the display device. The display field the allocated receiver of which has received a signal from a user terminal can for instance emit an optical signal, as for instance a flashing light signal or the like. Of course also other reductive signals are possible.

[0033] In the following, exemplary embodiments of the display device according to the invention are described in more detail with reference to the drawing.

[0034] The drawing shows a display device for reserving extra charges for utilisation of chargeable means of transport conveying passengers. The display device comprises a frame 12, wherein display fields 14, 16, 18, 20, 22, and 24 showing symbols of one type of extra charge each are retained in a positive and/or non-positive manner. Display field 14 shows the numeral 1 for reserving a first-class ride, display field 16 a bicycle for taking along a bicycle, display field 18 a group of persons for reserving group rides, display field 20 a dog for taking along pets, display field 22 the inscription “Delete” for deleting an extra charge information stored on a terminal, and display field 24 question mark symbols for other possible types of extra charges. The individual display fields 14, 16, 18, 20, and 22 are formed like panels and can be inserted in the frame 12, as indicated by means of the display field 24. The individual symbols can be arranged on the display fields 14 to 24 by printing, embossing, sticking on, or in any other way. Alternatively, the display fields represented in the drawing can also be designed as an electronic display, for instance as an LCD display.

[0035] According to a first variant, an RFID transmitter with a short transmission range of preferably only a few centimetres is arranged behind each display field 14 to 24, which sends out signals comprising extra charge information corresponding to the type of extra charge, whereby these signals can be received by user terminals for purposes of deduction. During operation, the transmitters continuously send out the mentioned signals. Alternatively, the signals can also be transmitted by the transmitters clocked in pre-determined time intervals.

[0036] Furthermore, the display device 10 comprises a programmable control not shown here for controlling the display device 10 which ensures that each transmitter sends out signals with the allocated extra charge information. Reference numeral 26 designates a user terminal which is set up such that it can receive and further process signals sent out by display device 10. Sending signals from user terminal 26 to display device 10, however, is not possible. User terminal 26 therefore is a uni-directionally operating terminal. The present user terminal 26 comprises a display 28 and two push buttons 30 and 32.

[0037] If an extra charge is to be reserved by means of user terminal 26, so if for instance the user wants to transport a bicycle in the means of transport, the user brings up the user terminal 26 close to display field 16 which represents the symbol of a bicycle. As soon as user terminal 26 comes into the transmission range of the transmitter allocated to display 16, it receives the signals sent out by the corresponding transmitter with the extra charge information relating to taking along a bicycle. As soon as user terminal 26 has received these signals, it emits a reductive signal via a reductive communication device not shown here, for instance an optical or acoustic signal. Furthermore, the user is requested via display 28 to confirm that he wishes to make a reservation based on the received extra charge information. The reservation can be confirmed or rejected via the push buttons 30 or 32, respectively. If the reservation is rejected, the received information is deleted. On the other hand, if the reservation is confirmed, the received fare information is stored and further processed in a memory unit of the user terminal, for instance together with route information showing the distance travelled by the user on the chargeable means of transport. At this point it should be mentioned that the further processing of the information, in particular the determination and deduction of fares, is not subject of the present invention, which is why it is not dealt with in more detail in the following.

[0038] If a reservation was confirmed by the user by mistake, so that the corresponding extra charge information was stored on the memory unit of user terminal 26, this information can be deleted again with the aid of display field 22, the so-called “deletion field”. For this purpose, the user brings up his user terminal 26 close to display field 22, so that user terminal 26 receives signals from the transmitter allocated to display field 22. Subsequently, the user is requested via display 28 of user terminal 26 to confirm the deletion of the information stored in the memory unit of user terminal 26. If the confirmation occurs, the data are deleted. If the confirmation is rejected, the corresponding information remains stored in the memory unit.

[0039] During the reservation of a group ride via display field 18, the allocated transmitter can send signals essentially in two different manners. On the one hand, it can send a signal comprising the extra charge information for one additional person each. By repeatedly receiving and confirming these signals by user terminal 26, when the latter is for instance repeatedly brought into and out of the transmission range of the transmitter, the desired number of persons can be reserved successively. On the other hand, the transmitter allocated to display field 18 can also send different signals, each of which comprises extra charge information for one additional person,
two additional persons, etc. The desired type of extra charge showing the desired number of persons can be selected via user terminal 26 which receives these signals. Alternatively, here, too, the number of persons can be determined by repeatedly bringing the user terminal into and out of the transmission range of the corresponding transmitter.

In the following, an alternative embodiment of the first variant of the present invention is described with reference to the drawing. In this embodiment, the display device 10 has an additional receiving device which can receive signals from a user terminal. Furthermore, the user terminal is a bi-directionally communicating terminal. Consequently, signals can both be received from the transmitters of display device 10 and transmitted to the receiving device of display device 10. If an extra charge is to be reserved, the user terminal is brought up to the corresponding display field, so that it will receive the corresponding signals from the allocated transmitter. If signals are received by the user terminal, the user terminal automatically emits a retractive signal to the receiving device of display device 10, which informs the latter about the type of extra charge information received. A retractive communication device integrated into display device 10 then emits a retractive signal informing the user which extra charge was received by the user terminal. The retractive signal can occur for instance by flashing of the corresponding symbol of the selected type of extra charge in order to inform the user of his extra charge selection. If the user agrees with it, no further step is required. If this is not the case, he can delete the corresponding extra charge information by means of display field 22, i.e. the deletion field. The advantage of this embodiment is that the user terminal does not need a display device like display 28 and/or push buttons 30 and 32 in order to confirm the reservation.

In another embodiment of the first variant of the present invention, display device 10 comprises actuation devices allocated to the respective display fields 14 to 24. This actuation device can be for instance push buttons. It is also possible that the display field itself is designed as a push button. In this embodiment, the transmitters allocated to the display fields 14 to 24 only: send out signals if an actuation device was actuated. For instance, if a first-class ride is to be reserved, the actuation device allocated to display field 14 is actuated, whereupon the transmitter allocated to display field 14 sends out signals for a pre-determined period, either continuously or cycled in pre-determined time intervals. In this manner, inadvertent reservations of unwanted extra charges can be avoided, since only that particular transmitter sends out signals the extra charge information of which has been requested by actuation of the actuation device.

In the following, another variant according to the present invention is described in more detail, also with reference to the drawing.

In this further variant, user terminal 26 comprises an RFID transmitter with a short transmission range which is preferably only a few centimetres. A receiver is arranged behind each display field 14 to 24 of display device 10, which can receive signals sent out by user terminal 26. Furthermore, display device 10 comprises an activation device not shown here, and a retractive communication device not shown here.

For reserving one type of extra charge, the user brings up his user terminal 26 close to that one of the display fields 14 to 24 which shows the type of extra charge he wants to reserve, for instance display field 16, if he wants to transport a bicycle on, the means of transport. As soon as user terminal 26 is within the range of the activation device, the transmitter integrated in user terminal 26 is automatically activated, whereupon it sends out at least one identification which unambiguously identifies the user terminal 26 or the user. If the user terminal 26 is then brought up to close enough to display field 16 so that the receiver arranged behind the display field is within the transmission range of the transmitter, the receiver will receive the identification sent out by the transmitter. Thereupon, the retractive communication device of display device 10 sends out a retractive signal informing the user that a receiver of display device 10 has received an identification sent out by the transmitter of user terminal 26. The retractive signal is preferably allocated to the corresponding display field 16. So for instance, display field 16 can flash as soon as the allocated receiver has received information.

After receipt of the identification, the latter, together with extra charge information, is transmitted to a further processing unit not shown here which determines and deducts the fare based on this information. The deduction can be made here for instance based on a customer account allocated to the identification and therefore to the user which customer account has been set up with the method provider. Of course other deduction methods are possible as well.

According to another variant of the method according to the invention, user terminal 26 sends data to display device 10 in order to reserve an extra charge, whereby the reservation and the deduction are made advantageously through a reservation and deduction system of the method provider.

It should be clear that the embodiments of the present invention described above are not restrictive. On the contrary, modifications and changes are possible without leaving the scope of protection of the present invention which is defined by the enclosed claims. In particular, individual characteristics of one embodiment or variant can be replaced or supplemented by individual characteristics of another embodiment or variant, if the person skilled in the art considers this reasonable.

LIST OF REFERENCE NUMERALS

- **0048** 10 Display device
- **0049** Display device 10
- **0050** 14 Display field
- **0051** 16 Display field
- **0052** 18 Display field
- **0053** 20 Display field
- **0054** 22 Display field
- **0055** 24 Display field
- **0056** 26 User terminal
- **0057** 28 Display
- **0058** 30 Push button
- **0059** 32 Push button

1. A method for reserving tickets and/or extra charges for the use of a means of transport with costs for conveying passengers by using a display device and at least one user terminal, where the user terminal is brought up to the display field of the display device displaying a type of ticket and/or extra charge, whereupon a communication triggering the reservation of the type of ticket and/or extra charge takes place between the user terminal and the corresponding display field.

2. The method according to claim 1, whereby a transmitter allocated to the display field sends out signals containing the corresponding ticket and/or extra charge information which
are received by a receiver integrated into user terminal as soon as the latter comes within the transmission range of the transmitter, and the received ticket and/or extra charge information is further processed in the user terminal for reserving the corresponding ticket and/or extra charge.

3. The method according to claim 1, whereby display device comprises several display fields, each of which is allocated to.

4. The method according to claim 1, whereby at least one display field is a deletion field which allocated signal is a deletion signal which triggers the deletion of individual or all ticket and/or extra charge information.

5. The method according to claim 1, whereby display device comprises at least one actuation device and the transmitters are adapted to emit signals for a pre-determined period upon actuation of the actuation device.

6. The method according to claim 1, whereby at least one transmitter sends out different signals.

7. The method according to claim 1, whereby display device comprises at least one receiver which is adapted to receive signals from user terminals.

8. The method according to claim 7, whereby display device comprises an acknowledgement device which is adapted to emit an acknowledgment signal as soon as the at least one receiver receives a receipt acknowledgement signal from a user terminal.

9. The method according to claim 1, whereby user terminal has a transmitter which sends out at least one identification identifying the user terminal or the user unambiguously, which identification is received by a receiver allocated to a display field as soon as the receiver comes into the transmission range of the transmitter, and the received identification is further processed together with the ticket and/or extra charge information allocated to the display field for the purpose of reserving the corresponding ticket and/or the corresponding extra charge.

10. The method according to claim 9, whereby display device comprises several display fields, whereby each of them is allocated to a receiver, whereby the display fields can also comprise one or more deletion fields.

11. The method according to claim 9, whereby display device comprises an actuation device which activates the transmitter as soon as the latter approaches a display field, whereupon the transmitter emits out signals.

12. The method according to claim 9, whereby display device comprises an acknowledgement device which is adapted to emit an acknowledgment signal as soon as at least one of the receivers allocated to the display fields receives a signal from a transmitter of a user terminal.

13. The method according to claim 1, whereby the transmitter is an RFID transmitter with a short transmission range.

14. The method according to claim 1, whereby the transmission range of the transmitter is only a few centimetres.

15. The method according to claim 1, whereby the transmitter is adapted to emit signals continuously or in pre-determined time intervals.

16. A display device which is adapted to carry out suitable the method according to claim 1.

17. The display device according to claim 16, whereby the display fields are retained modularly and interchangeably at a frame.

18. The display device according to claim 17, whereby the display fields are retained positively or non-positively at the frame.

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