"METHOD FOR CARRYING OUT A GUARANTEE DEPOSIT BETWEEN TWO ELECTRONIC PURSES"

The present invention concerns a method for carrying out a guarantee deposit between an owner-electronic purse and a client-electronic purse.

The invention can be effectively applied in the field of electronic transactions carried out using electronic purses.

Generally speaking, electronic purses resemble conventional electronic smart cards in that they are formed of a plastic card body conforming to ISO standards in which an electronic module is inserted so as to be connected to a reader or terminal.

Moreover, there currently exist two major categories of electronic purses, namely disposable electronic purses and rechargeable electronic purses.

In disposable electronic purses, the electronic module is mainly formed of a simple memory whose contents representing the available balance is decremented on each use of the amount of the transaction carried out until the balance is exhausted. This type of purse functions in the same way as a prepaid telephone card.

As for rechargeable electronic purses, these have a more complex structure since they include a re-writable memory in which a balance record file is defined whose contents, like the disposable electronic purse, is decremented on each transaction, or, on the other hand, incremented by the amount of the recharged amount, all its transactions being made under the control of a microprocessor and with a degree of security not existing in disposable electronic purses.

The invention is applicable to this second type of electronic purse.

Having regard to their extremely high degree of potential, it seems desirable to extend the functions of rechargeable electronic purses well beyond the simple conventional debit/credit transaction for covering more complex transactions, such as the guarantee of goods rented by a client from a trader who owns said goods.

Also, the technical problem to be resolved by the object of the present invention is to provide a method for carrying out a guarantee deposit between an owner-electronic purse (owner-PME) and a client-electronic purse (client-PME), said electronic purses each including a rewritable memory in which a balance file is defined, said method being able to easily carry out and render secure said guarantee deposit transaction.

This Sheet Has Been Replaced



THIS SHEET HAS BEEN REPLACED

According to the invention, the technical problem can be resolved in that said method consists of creating in said rewritable memory of each electronic purse a guarantee tracing file having for each guarantee deposit transaction a recording comprising data fields characteristic of said guarantee deposit transaction with at least one guarantee field and one limit date field in which respectively recorded are the amount of the guarantee asked from the client by the owner for given goods, and the limit date for restoring said goods to the owner and in that on each guarantee deposit transaction carried out between the owner and client electronic purses :

- in a first guarantee taking stage, the balance file of the client-PME is debited by the amount of the guarantee, whereas new recordings are created in the guarantee trace files of the owner-PME and client-PME entering at least the amount of the guarantee and the recovery limit date respectively in the guarantee and limit date fields, the balance file of the owner-PME not being credited with the amount of the guarantee,

- in a second stage for restoring the goods to the owner on a date subsequent to the recovery limit date, the balance file of the client-PME is credited with a repayment amount equal at the most to the amount of the guarantee, the balance file of the owner-PME being credited with the difference between the amount of the guarantee and the amount of the repayment,

- the balance file of the owner-PME being credited by the amount of the guarantee in the absence of the goods being recovered by the client on the recovery limit date.

The method for carrying out a guarantee deposit conforming to the invention defined above has a large number of advantages.

In fact, in the case of carrying out a guarantee deposit by cheque for example, although it is a simple matter to fully reimburse the guarantee by returning the client with his cheque, partial repayment on the other hand requires that the owner draws up an additional cheque in favour of the client. With the method of the invention, the partial repayment transaction is also as simple as the full repayment transaction and what differs is only the amount of the sum of money credited to the balance of the client-PME.

Secondly, it may be observed that the amount of the guarantee is not credited to the balance of the owner-PME in the first guarantee taking stage of the method, the

This Sheet Has Been Replaced



THIS SHEET HAS BEEN REPLACED

object of he invention, which during the second good recovery stage makes it possible to avoid any problem of the partial or total repayment of the guarantee in a case where the owner would not have available the sum of money required or should there be an accounting problem.

So as to render secure the initial taking guarantee operation, the invention provides that, during said first stage, a certificate is calculated by the owner-PME on the basis of at least one item of said data characteristic of the carrying out guarantee transaction and enters in each electronic purse in a certificate field of the corresponding recording.

Similarly, the retaking guarantee operation during restoring of the goods is rendered secure in that according to the invention said second stage starts by an authentication stage during which the client-PME sends said owner-PME at least one characteristic item of data and the certificate recorded in the certificate field, and in that the owner-PME recalculates said certificate and checks it with the certificate received from the client-PME.

The invention also provides that, during the second stage, a new certificate is calculated by the owner-PME on the basis of at least said repayment amount and sent with the repayment amount to the client-PME which recalculates said new certificate and checks it with the certificate received from the owner-PME so as to validate the credit of the client-PME by the repayment amount.

According to a mode for implementing the method of the invention, said characteristic data of the carrying out a guarantee deposit operation further include an identification number, a goods identification number and a transaction number. In particular, said identification number of one of the electronic purses is the series number of the other electronic purse.

The following description with reference to the accompanying drawings given by way of non-restrictive examples clearly shows details of the invention and on how it can be embodied.

Figure 1 is a diagram of an owner-electronic purse and a client-electronic purse able to carry out a guarantee deposit operation conforming to the method of the invention.

Figures 2a and 2b are diagrammatic representations of the respective structures

This Sheet Has Been Replaced



THIS SHEET HAS BEEN REPLACED

of the owner and client electronic purses of figure 1.

Figure 1 shows an owner-PME 10 belonging to a trader, owner of goods intended to be rented in consideration of the payment of a guarantee C to a client having a client-PME 20. Communication between the two electronic purses 10, 20 is carried out by means of a terminal 30 traditionally including a display screen 31 and a keypad 32.

As shown on figure 1, the owner and client-PMEs each include a microprocessor 11, 21 and an E2PROM type rewritable memory 12, 22. Each rewritable memory 12, 22 includes a balance file 121, 221 in which are recorded a transaction number #TRP, #TRC and the balance SP, SC available in the corresponding electronic purse.

With the aim of carrying out a guarantee deposit operation between the owner 10 and client 20 PMEs, figure 2 shows that each of the rewritable memories 12, 22 also comprises a guarantee tracing file 122, 222 whose structure is given respectively on figures 2a and 2b.

Generally speaking, each guarantee deposit operation is defined in a guarantee tracing file by a recording marked by a number # and a certain number of fields of data characteristic of said guarantee deposit operation including of necessity a guarantee field C and a limit date field DLIM in which are respectively written the amount of the guarantee demanded from the client by the owner for the goods in question and the limit date for restoring said goods to the owner.

In addition, a recording of the guarantee tracing file 122, 222 may comprise an identification number field which in the case of a guarantee tracing file 122 of the owner-PME 10 is a typical IDC number of the client-PME 20 and which conversely is a typical IDP number of the owner-PME 10, in the case of the guarantee tracing file 222 of the client-PME 20. In practice, the identification number of one of the electronic purses is taken as equal to the series number of the other electronic purse.

Other data can constitute recording fields of the client 20 and owner PMEs, such as an identification number IDM of the goods given as a guarantee, a transaction number # TRC drawn in particular from the balance file 221 of the client-PME 20, and a certificate CER intended to ensure authentication of the carrying out guarantee deposit operation in a way which shall now be explained with details of the method conforming to the invention.

This Sheet Has Been Replaced



THIS SHEET HAS BEEN REPLACED

In the first guarantee taking stage, the amount C of the guarantee, the restoration limit date DLIM and the goods identification number IDM are input by the keyboard 32 of the terminal 30 and entered in the corresponding fields of a new recording of the guarantee trace files 122, 222 of the owner-PME 10 and client-PME 20.

During this operation, a new #TRC transaction number is entered in the balance file of the client-PME 20 at the same time as the balance SC available is debited by the amount C of the guarantee, the new transaction number #TRC being entered in the transaction number fields of the new recordings.

Finally, the identification number fields IDP and IDC are respectively completed by the series numbers of the owner-PME 10 and the client-PME 20.

The owner-PME 10 then calculates a certificate CER on the basis of part of the data characteristic of the guarantee deposit operation, for example an identification number, the transaction number, the amount of the guarantee and the recovery deadline. The certificate CER, calculated with the aid of an encryption algorithm, is entered in the corresponding fields of the new recording of the guarantee trace files 122, 222.

It is to be noted that during this first stage of the method, the amount C of the guarantee is not credited to the balance file 121 of the owner-PME 10.

In a second stage, when the client restores the hired goods prior to the deadline expiry date, the two electronic purses are again put into communication via the terminal 30. Then a mutual recognition phase occurs of the identification numbers, the owner 10 and client 20 PMEs exchanging their respective IDC and IDP. This operation enables the owner-PME to be positioned on a recording of the guarantee trace file 122 corresponding to the identification number received from the client-PME.

Then the client-PME 20 sends the owner-PME 10 the characteristic data entered in the recording corresponding to the current guarantee deposit operation required for calculation of the certificate, as well as the certificate CER. The owner-PME 10 then recalculates the certificate and checks it with the certificate CER received from the client-PME 20. If this authentication phase is positive, the operation continues or, if inappropriate, is interrupted.

At the same time, the owner-PME 10, with the aid of the recalculated certificate CER, checks that the guarantee trace file 122 is positioned on the correct recording, or if not looks for the latter, this possibly occurring when the same client has several

This Sheet Has Been Replaced



THIS SHEET HAS BEEN REPLACED

guarantees with the same owner.

Then, so as to carry out the full or partial repayment of the guarantee, the client-PME 20 sends the owner-PME 10 a new transaction number #TRC taken from the balance file 221. The owner-PME 10 then calculates a new certificate CER' on the basis of the amount C' which is credited to the client-PME 10, this amount C' being introduced with the aid of the keyboard 32 of the terminal 30 and having to be at the most equal to the amount C of the guarantee, this being verified by the owner-PME 10. Also the new transaction number #TRC and the client identification number IDC are used in calculating the new certificate CER'.

Then the new certificate CER' and the amount C' of the repayment is sent by the owner-PME 10 to the client-PME 20 which checks the authenticity of the new certificate CER' received so as to validate the credit of the balance file 221 of the client-PME of the amount C' of the repayment. At the same time, the balance file 121 of the owner-PME is credited with the difference C-C'.

Of course, if the client does not return the goods to the owner on the return deadline date, the amount C of the guarantee is credited to the balance file 121 of the owner-PME.

Finally, it may be that on restoring the goods the balance file 221 of the client-PME is full and can no longer accept any additional credit. In this case, a test is provided for this situation and is visually displayed on the screen 31 of the terminal 30. The goods and the client shall then find another means (cash, cheque) to pay the client the amount C' of the repayment.

This Sheet Has Been Replaced



THIS SHEET HAS BEEN REPLACED

* C L M S *

CLAIMS

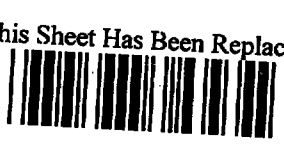
1. Method for carrying out a guarantee deposit between an owner electronic purse (owner-PME) and a client electronic purse (client-PME), said electronic purses each including a rewritable memory in which a balance file is defined, characterised in that said method consists of creating in said rewritable memory of each electronic purse a guarantee trace file having for each guarantee deposit operation a recording comprising fields of data characteristic of said guarantee deposit operation including at least one guarantee field and a deadline field in which respectively entered are the amount of the guarantee asked for by the owner from the client for certain goods and the deadline for restoring said goods to the owner, and in that on each guarantee deposit operation carried out between the owner and client PMEs :

- in a first taking of guarantee stage, the balance file of the client PME is debited by the amount of the guarantee, whereas created in the guarantee trace files of the owner and client PMEs are a new recording in which at least the amount of the guarantee and the restoration deadline respectively in the guarantee and deadline fields, the balance file of the owner-PME not being credited by the amount of the guarantee,
- in a second stage for restoring the goods to the owner on a date not later than the deadline recovery date, the balance file of the client-PME is credited with a repayment amount at the most equal to the amount of the guarantee, the balance file of the owner-PME being credited with the difference between the amount of the guarantee and the amount of the repayment,
- the balance file of the owner-PME being credited with the amount of the guarantee in the absence of the client restoring the goods on the restoration deadline date.

2. Method according to claim 1, characterised in that during said first stage a certificate is calculated by the owner-PME on the basis of at least one item of said data characteristic of the guarantee deposit operation and enters in each electronic purse in a certificate field of the corresponding recording.

3. Method according to claim 2, characterised in that said second stage starts by an authentication phase during which the client-PME sends the owner-PME at least one

This Sheet Has Been Replaced



THIS SHEET HAS BEEN REPLACED

item of characteristic data, as well as the certificate entered in the certificate field, and in that the owner-PME recalculates said certificate and checks it with the certificate received from the client-PME.

4. Method according to one of claims 1 to 3, characterised in that during the second stage, a new certificate is calculated by the owner-PME on the basis of said repayment amount and sent along with the amount of the repayment to the client-PME which recalculates said new certificate and checks it with the certificate received from the owner-PME so as to validate the credit of the client-PME with the repayment amount.

5. Method according to one of claims 1 to 4, characterised in that said data characteristic of the guarantee deposit operation further include an identification number, a good identification number and a transaction number.

6. Method according to claim 5, characterised in that said identification number of one of the electronic purses is the series number of the other electronic purse.

This Sheet Has Been Replaced

THIS SHEET HAS BEEN REPLACED