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(54) Benævnelse: **FREMGANGSMÅDE TIL BETALING MED ET HÆVEKORT**

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DESCRIPTION

[0001] The present invention relates to a method for payment with a cash card in the form of a card, like a credit card, a mobile telephone or a tablet computer for payment in a payment station for debit and credit cards, or another corresponding carrier. In the following, such carriers are termed cash cards.

[0002] Cash, bills and coins, is a practical and quick payment means, in particular for smaller money amounts. However, cash also has drawbacks, use and circulation of cash require counting, usually several times during a cycle from central bank to bank to consumer to point of sale and back to bank and central bank. The circulation of physical cash also requires costly transport, which in turn constitutes a risk exposure as larger volumes are handled, and facilitates robberies and robbery attempts.

[0003] It is usually the central banks that administer and finance the manufacture and distribution of such cash. The end customer does not see these costs that are split between merchants and banks, including central banks.

[0004] During the last several decades, debit and credit cards have come to replace cash for a large part of "larger" payments, and this trend is progressing downwards to smaller money amounts. The use of these cards is today cheaper than cash, as viewed from a societal perspective, but is also associated with costs for administration and risk (card fraud). In this case, these costs are split between the end customer and the point of sale, while the card companies and the bank system usually gain from the system. Central banks are not affected.

[0005] The cards used in these systems do not keep any money, they only constitute an identifier for being able to authenticate (using a PIN code) a specific registered user who is to be debited and invoiced the transaction which at each time is requested. The card emitting party pays money to the merchant, and periodically invoices the user, in case of a credit card, or debits the user's account, in case of a debit card connected to an own account. In order to maintain a certain security, at each transaction checks are performed regarding availability of funds and whether the user pays his or her invoices, if the user respects the current credit limit and if the card is blocked. This takes a certain amount of time, requires communication online and of course is also associated with certain costs.

[0006] The following is a description of a system, which mimics physical cash management but without physical cash in the form of bills and coins. The system comprises three central components or devices. These devices are an emitting party, a so called trusted partner; a carrier device, which may be for instance a so called smartcard, or a mobile telephone which comprises a SIM card which actually is a smartcard, or another comparable device; and a device for receiving a payment, which may for example be a so called payment terminal or a POS (Point Of Sale) terminal which exists at almost all payment locations today.

[0007] Hence, the present invention relates to a method for cash card payment in a payment station for debit and credit cards, and is characterised in that the cash card comprises a processor and is caused to store a unique identity associated with a money amount, which exists at a money institution, such as a central bank, or which is caused to be transferred from a bank account or the corresponding, to the money institution, in that the transferred amount is caused to be stored on the cash card, in that the amount lacks a connection to the proprietor of the cash card except via the said identity, in that, at payment using the cash card, the amount to be paid is caused to be transferred, together with the said identity, from the cash card to a payment terminal comprising the said payment station, in that the payment terminal is caused to store the paid amount together with the said identity and that a remaining amount after payment is counted down on the cash card and is stored on the cash card, and in that the payment terminal is caused to activate the money institution to transfer, using the identity, the amount to be paid using the cash card to an account belonging to the point of sale where the payment terminal is located.

[0008] Below, the invention is described in closer detail, partly in connection to an exemplifying embodiment illustrated in Figure 1.

[0009] The invention relates to a method for cash card payment in a payment station for debit and credit cards. The purpose is to, for a payment, replace physical cash, in the form of bills and coins, with virtual cash stored at a card corresponding to a debit or credit card.

[0010] According to the invention, the cash card 1 comprises a processor 2. The cash card is caused to store a unique identity associated with an amount of money, which exists at a money institution 3, such as a central bank, or which is caused to be transferred from a bank account or the corresponding, to the money institution 3. The amount is caused to be stored on the cash card 1, as is illustrated by arrow 4 in Figure 1.

[0011] The amount lacks any connection to the proprietor of the cash card, except via said identity, why the cash card as such is anonymous.

[0012] The cash card does not contain any information about the account number from which money is transferred to the money institution.

[0013] The identity may, among other things, be used to designate the money institution from which money was initially transferred, or to which money institution money was transferred.

[0014] At the time of payment using the cash card, the amount to be paid is caused to be transferred, together with the said identity, from the cash card 1 to a payment terminal 5 connected to the said payment station. The payment terminal with the payment station is suitably of the same type as conventional payment terminals for debit or credit cards. The cash card communicates with the payment terminal.

[0015] The payment terminal is caused to store the paid amount together with the said identity,

and a remaining amount after the payment is counted down on the cash card and is stored on the cash card. Counting down may alternatively take place in the payment terminal.

[0016] The present invention can be adapted to function online or offline, even if the offline case is preferred.

[0017] Thereafter, the payment terminal 5 is caused to contact, and thereby activate, the money institute 3 for transferring, using the identity, the amount which is paid using the cash card 1, as is illustrated by the arrow 6, to an account 7 belonging to the point of sale at which the payment terminal is located, which is illustrated by arrow 8.

[0018] In case the purchase and the transfer of the amount to the seller's account take place simultaneously, it is an online purchase.

[0019] This way, a payment is performed, corresponding to a cash payment using physical money, where there are no connections between the cash card and the proprietor of the cash card. Anyone can use the cash card for a payment, under condition that the cash card contains a required amount of money, as is the case with physical money.

[0020] The above described relates to a simple embodiment of the invention. However, there is a need to increase the security during the various transfers, why an embodiment with higher security is described in the following.

[0021] Also according to this embodiment, the cash card 1 is caused to store a unique identity but also a secret cryptographic key which is associated with an amount of money, which exists at the money institution, or which is caused to be transferred from a bank account or the corresponding, to the money institution 3. The amount lacks any connection to the proprietor of the cash card 1, except for via the said identity.

[0022] At the time of payment using the cash card 1, the amount to be paid, together with the said identity and any additional arameters, such as in the form of time of purchase, current amount and/or a random number, as well as a number calculated using the secret cryptographic key and by the cash card processor, is transferred from the cash card to a payment terminal 5, which is illustrated by the broken arrow 9. The payment terminal 5 is caused to store the current amount together with the said calculated number.

[0023] Thereafter, the payment terminal is caused to perform a calculation using the parameters that were used to perform the said calculation by the cash card processor, using the cash card's public cryptographic key. At a match between the number calculated by the cash card processor and the number calculated by the payment terminal, the payment terminal is caused to store the current transaction and to activate the money institution 3, which is illustrated using the broken arrow 10, to reimburse, using the cash card 1 identity, the amount to be paid to an account 7 belonging to the point of sale at which the payment terminal 5 is located, which is illustrated using the broken arrow 11. Usually, there will be a time difference

between the counting down of the cash card amount and the transfer by the point of sale of the current amount or the daily statement. The amount on the cash card is caused to be counted down and to be stored after payment on the cash card 1. When payment has taken place using the reimbursement, it is preferred that the counted down amount exists on the cash card in order to, at the next payment, be able to know the available amount.

[0024] According to a preferred embodiment, at the said activation of the money institution the payment terminal 5 is caused to calculate a number based upon known parameters regarding the purchase and using a secret cryptographic key at the payment terminal. The payment terminal 5 is caused to transfer the said parameters and the said number to the money institution, and the money institution is caused to perform a calculation using the same parameters and using the public cryptographic key of the payment terminal, and when there is a match the said transfer takes place to an account belonging to the point of sale.

[0025] Since it is possible to carry through with a purchase using the cash card, this can be used to buy physical cash money at an automatic cash dispensing machine, such as an ATM.

[0026] By both the processor on the cash card, the payment terminal and the money institution performing calculations using secret and public cryptographic keys, the purchase, the payment terminal and also the cash card are authenticated. Hence, this results in a very safe system which is very difficult to manipulate.

[0027] According to a preferred embodiment, the said unique identity can be emitted by the money institution.

[0028] According to an alternative embodiment, the said unique identity is caused to be emitted by the cash card emitter.

[0029] According to another preferred embodiment, the said unique identity is stored on the cash card in encrypted form, and the money institution has a required decryption key.

[0030] According to an additional preferred embodiment, the cash card is caused to be stored in the memory or chip of a mobile telephone, and the mobile telephone is caused to communicate with the said payment terminal during a payment.

[0031] It is preferred that transmission of money to the cash card is caused to take place via a cash dispensing machine, such as an ATM or a charging teller or a POS or a computer or a so called smartphone.

[0032] It is also preferred that the payment terminal is caused to verify that a sufficient amount is present on the cash card before the payment is effected.

[0033] Above, a number of embodiments have been described. However, the invention can be varied. Hence, the choice of parameters for performing the above mentioned calculations can

be other parameters than the ones mentioned above.

[0034] Therefore, the present invention is not to be considered limited to the above described exemplifying embodiments, but may be varied within the scope of the enclosed claims.

FREMGANGSMÅDE TIL BETALING MED ET HÆVEKORT

Patentkrav

1. Fremgangsmåde til kortbetaling i en betalingsstation til debet- og kreditkort, hvilket kort (1) omfatter en processor, hvor kortet lagrer en hemmelig krypteringsnøgle såvel som en unik identitet, der er knyttet til et pengebeløb i et pengeinstitut (3), for eksempel en centralbank, eller hvilket bliver overført fra en bankkonto eller tilsvarende til pengeinstituttet, hvor beløbet gemmes på kortet (1), og hvor beløbet kun forbindes med ejeren af kortet via identiteten, hvor beløbet, der skal betales, i forbindelse med betaling ved brug af kortet (1) overføres sammen med identiteten og et tal, der beregnes på basis af visse parametre ved brug af den hemmelige krypteringsnøgle og ved hjælp af kortprocessoren, fra kortet (1) til en betalingsterminal (5), der omfatter betalingsstationen, ved at betalingsterminalen (5) gemmer det betalte beløb sammen med identiteten og det beregnede tal, ved at et resterende beløb efter betalingen nedtælles på kortet og gemmes på kortet, ved at betalingsterminalen (5) aktiverer pengeinstituttet (3) til at overføre, ved hjælp af identiteten, beløbet, der skal betales ved hjælp af kortet (1), til en konto (7), der hører til salgsstedet, hvor betalingsterminalen (5) er placeret, ved at betalingsterminalen (5) udfører en beregning ved hjælp af parametrene, der blev brugt til at udføre beregningen ved hjælp af kortprocessoren ved brug af kortets offentlige krypteringsnøgle, og ved at overførslen kun gennemføres i tilfælde af et match mellem tallet, der beregnes af kort (1)-processoren og et tal, der beregnes af betalingsterminalen (5).

2. Fremgangsmåde ifølge krav 1, **kendetegnet ved**, at identiteten og det beregnede tal, yderligere parametre, f.eks. i form af tidspunktet for købet, aktuelt beløb og/eller et vilkårligt tal overføres på tidspunktet for betalingen ved brug af kortet (1), sammen med beløbet, der skal betales, fra kortet til betalingsterminalen (5).

3. Fremgangsmåde ifølge krav 1, **kendetegnet ved**, at betalingsterminalen (5) ved aktiveringen af pengeinstituttet (3) beregner et tal, der er baseret på kendte parametre med hensyn til købet ved hjælp af en hemmelig krypteringsnøgle i betalingsterminalen (5), ved, at betalingsterminalen overfører parametrene og tallet til pengeinstituttet (3), ved, at pengeinstituttet foretager en beregning ved hjælp af de samme parametre og den offentlige krypteringsnøgle i betalingsterminalen, og ved, at overførslen i tilfælde af et match foretages til en konto, der hører til salgsstedet.

4. Fremgangsmåde ifølge krav 1, 2 eller 3, **kendetegnet ved**, at den unikke identitet udsendes af pengeinstituttet (3).

5. Fremgangsmåde ifølge krav 1, 2, 3 eller 4, **kendetegnet ved**, at den unikke identitet udsendes af kortsenderen.

6. Fremgangsmåde ifølge krav 1, 2, 3, 4 eller 5, **kendetegnet ved**, at den unikke identitet gemmes på kortet (1) i krypteret form, og ved, at pengeinstituttet (3) har en krævet dekrypteringsnøgle.

7. Fremgangsmåde ifølge krav 1, 2, 3, 4, 5 eller 6, **kendetegnet ved**, at kortet (1) gemmes i hukommelsen eller chippen i en mobiltelefon, og ved, at mobiltelefonen kommunikerer med betalingsterminalen (5) ved en betaling.

8. Fremgangsmåde ifølge krav 1, 2, 3, 4, 5, 6 eller 7, **kendetegnet ved**, at overførslen af penge til kortet (1) foretages via en pengeautomat, f.eks. en ATM.

9. Fremgangsmåde ifølge et hvilket som helst af de foregående krav, **kendetegnet ved**, at betalingsterminalen (5) bekræfter, at der er tilstrækkelig dækning på kortet (1), før betalingen foretages.

DRAWINGS

FIG 1