

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
24 February 2005 (24.02.2005)

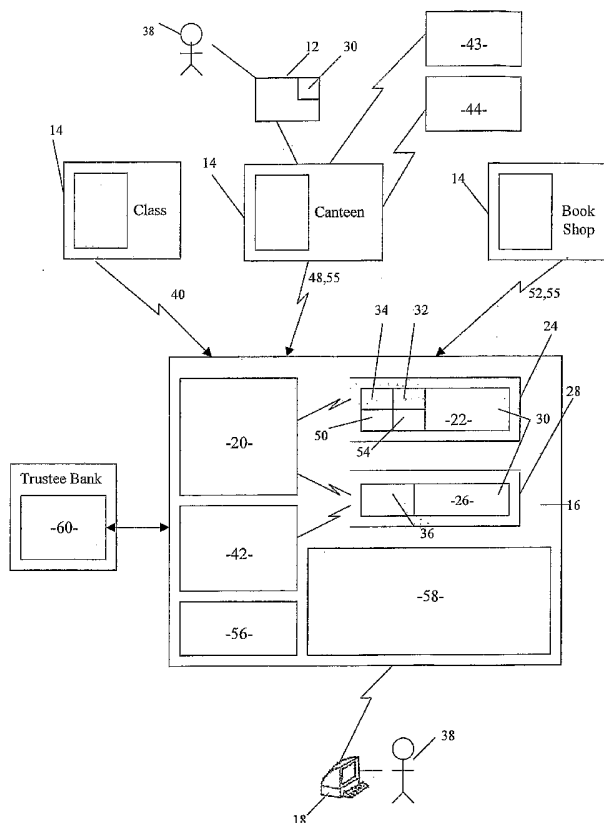
PCT

(10) International Publication Number  
WO 2005/017793 A1

- (51) International Patent Classification<sup>7</sup>: **G06F 17/60**
- (74) Agent: YU SARN AUDREY & PARTNERS; 190 Middle Road, #12-04, Singapore 188979 (SG).
- (21) International Application Number: PCT/SG2004/000248
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: 17 August 2004 (17.08.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 200304571-3 18 August 2003 (18.08.2003) SG
- (71) Applicant (for all designated States except US): **CHOWIZ PTE LTD** [SG/SG]; Blk 1003, Bukit Merah Central, #07-09, Redhill Industrial Estate, Singapore 159836 (SG).
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **CHOW, Hoo Siong** [SG/SG]; 9 Lenton Vale, Singapore 788859 (SG).

[Continued on next page]

(54) Title: ELECTRONIC PAYMENT NETWORK WITH MONITORING AND CONTROL FACILITIES



(57) Abstract: An electronic payment network (10) with monitoring and control facilities. The electronic payment network (10) is based upon a contactless smart card (12) used in conjunction with at least one contactless smart card reader (14) in data communication with a host server (16). As transactions are made using the contactless smart card, a student's (38) customer account (22) and customer record (26) are updated. Depending on the transaction, the update may change the value of the student's (38) current monetary balance (32) and/or current points balance (34). The transaction may also result in an update of the student's (38) monitoring information (36). The parent of the student (38) can thereafter obtain reports based on the monitoring information (36) and view other details of the student's (38) customer account (22) and customer record (26). The parent may also set limits on the spending abilities of the student (38), by implementing set daily credit limit amounts (50, 54).

WO 2005/017793 A1



SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,

IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designation US
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designation US
- of inventorship (Rule 4.17(iv)) for US only

**Published:**

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

**“Electronic Payment Network with Monitoring and Control Facilities”****Field of the Invention**

The present invention relates to an electronic payment network with monitoring facilities. The invention is particularly, but not exclusively directed, to an  
5 electronic payment network for use by school children where the electronic payment network allows parents of the school children to monitor and control the amount and nature of expenditure made using the electronic payment network.

**Background Art**

The following discussion of the background invention is intended to facilitate an  
10 understanding of the present invention. However, it should be appreciated that the discussion is not an acknowledgment or admission that any of the material referred to was published, known or part of the common general knowledge of the person skilled in the art in any jurisdiction as at the priority date of the application.

The utilisation of advanced electronic payment technologies, such as smartcards,  
15 has caused problems for a wide-range of consumers. For instance:

- Older consumers may have difficulty in using the electronic payment technology to conduct transactions and creating an appropriate balance between existing bank accounts and the stored value encoded onto the electronic payment technology; and
- 20 • Younger consumers may have no difficulty in using the electronic payment technology, but due to their familiarity with the virtual payment methods used, they may not understand the appropriate value of money.

Additionally, and particularly in the case of smart cards, the methods by which  
25 payment can be transferred to the stored value of the smart card, or to the appropriate account in systems utilising smart cards as the basis for transactions,

can be limited. This can lead to frustration and/or inconvenience as the user tries to increase the value of the card. In contrast, the limited acceptance of smartcards in some situations can result in "rigidity" – ie. a situation where the smart card has too much money in its stored value or account balance which cannot be easily transferred for other uses.

Finally, where children have their own smart cards, it is useful for parents to have means to control the expenditure of their children. Commonly this is achieved by setting a daily spending limit. In some cases, however, this limit may need to be extended to cover special situations, such as school excursions. In yet other instances, the daily spending limit may be exceeded due to the child having to purchase necessary items all at once, rather than over a period of time.

It is an object of the present invention to provide an electronic payment network with monitoring and control facilities that overcomes, or at least reduces the effects of, one or more of the above-mentioned problems.

Throughout the specification, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

### **Disclosure of the Invention**

In accordance with a first aspect of the present invention there is an electronic payment network comprising:

an identifier associated with a customer;

at least one reader means; and

a host server having an account record and a customer record each associated with the customer and including identification information of the associated customer,

where, on the customer making a purchase, the at least one reader means reads identification information in respect of the customer from the identifier and obtains details of the purchase and associated monitoring information, if any; the reader means thereafter operable to communicate the identification information, purchase details and associated monitoring information to the host server and where the host server is operable to deduct the cost of the purchase from a credit balance stored in the account record having matching identification information to the read identification information and the host server is operable to store the monitoring information in the customer record having matching identification information to the read identification information. Ideally, the electronic payment network includes at least one non-payment reader means, the at least one non-payment reader means operable to read identification information in respect of the customer from the identifier, and communicate the identification information, and monitoring information, to the host server and where the host server is operable to store the monitoring information in the customer record having matching identification information to the read identification information.

The monitoring information may include at least one of the following: location information; attendance information; disbursement costs; details of the purchased items; the number of calories in the purchased items; location information. If the monitoring information includes location information, the location information may be attained through GPRS. This location information may also be cross-referenced to a street map, the cross-referenced location forming the monitoring information, or a portion thereof.

The account record can include a loyalty point balance, the at least one reader means or host server operable to calculate the amount of loyalty points that accrue to the customer for the purchase and increment the loyalty point balance by the calculated amount of loyalty points. A bonus amount of loyalty points may be credited to the customer on the customer satisfying a pre-condition.

Preferably, the customer uses a non-payment reader to provide advance details of an intended purchase of a good or service, such that a merchant from whom the good or service will be purchased, can take appropriate action to ensure the

availability of the good or service. This may be the pre-condition that accrues bonus loyalty points.

The customer may convert their loyalty point balance, or a portion thereof, into a monetary value, the credit balance stored in the account record thereafter being  
5 incremented by the monetary value.

Preferably, the account record includes at least one daily credit limit, each daily credit limit associated with at least one good or service and where the host server is operable to check that the cost of all goods or services purchased within a predetermined time period does not exceed the daily credit limit associated with  
10 the purchased goods or services.

Alternatively, the account record includes at least one set of daily credit limits, each set of daily credit limits associated with at least one good or service, and each daily credit limit within a set of daily credit limit associated with a predetermined time period, where the host server is operable to check that the  
15 cost of all goods or services purchased within a predetermined time period does not exceed the daily credit limit associated with the predetermined time period in the set of daily credit limits associated with the purchased goods or services.

A person, such as a parent, may access a user interface and, via appropriate operation of the user interface, change at least one daily credit limit.

20 Preferably, the host server may increment the credit balance stored in the account record and temporarily increment at least one daily credit limit for a predetermined time period.

Ideally, the account record is associated with a savings account established with a financial institution, such that the credit balance, or a portion thereof, may be  
25 transferred from the account record to the savings account. More preferably, at least one reward is provided to the customer, the at least one reward commensurate with the amount transferred.

The host server may include reporting means for reporting the monitoring information. The reporting means can report the monitoring information in one or more of the following formats: voice communication through interactive voice recording; e-mail; paper.

- 5 An authorised person may amend monitoring information stored in the customer record.

The identifier can be one of the following: a smart card; a contactless smart card; a magnetic card; a radio-frequency card; mobile phone. Ideally, the identifier is a smart card or contactless smart card and the identifier has a stored value. In this  
10 manner, if the credit balance stored in the account record is less than the cost of the purchase, the reader means operates to deduct the cost of the purchase, or at least a portion thereof, from the stored value.

Preferably, the credit balance stored in the account record is incremented following a payment of the customer by way of: credit card; bank transfer; cheque;  
15 cash; direct debit on a periodic basis; direct debit on the credit balance falling below a predetermined amount.

In accordance with a second aspect of the invention there is a host server for use in an electronic payment network according to the first aspect of the invention described above.

- 20 In accordance with a third aspect of the invention there is a reader means for use in an electronic payment network according to the first aspect of the invention described above.

In accordance with a fourth aspect of the invention there is a non-payment reader for use in an electronics payment network according to the first aspect of the  
25 invention described above..

In accordance with a fifth aspect of the invention there is a method of making a payment comprising:

- 6 -

receiving purchase details and associated monitoring information, if any, from a reader means;

receiving identification information in respect of a customer, as read by the reader means;

5 deducting the cost of the purchase from a credit balance stored in an account record associated with the identification information received;

storing the associated monitoring information, if any, in a customer record associated with the identification information received.

Preferably, the method further comprises the steps of:

10 receiving identification information in respect of the customer, as read by a non-payment reader means;

receiving associated monitoring information from the non-payment reader means;

15 storing the associated monitoring information in the customer record associated with the identification information received.

More preferably, the method also comprises the step of attaining location information through GPRS, said location information forming part of the monitoring information.

20 More preferably still, the method also comprises the step of cross-referencing the location information with a street map, the cross-referenced location forming the monitoring information or a portion thereof.

25 Preferably, the method further comprises the steps of calculating an amount of loyalty points that accrue to the customer for the purchase and incrementing a loyalty point balance of the account record by the calculated amount of loyalty points.



- 7 -

More preferably, the method includes the step of calculating a bonus amount of loyalty points if the customer satisfies a pre-condition.

The method may also includes the steps of converting the loyalty point balance of an account record, or a portion thereof into monetary value and increasing the credit balance of said account record by the monetary value. Yet further, the method may include the steps of:

storing at least one daily credit limit in the account record, each daily credit limit associated with at least one good or service; and

checking that the cost of all goods or service purchased within a predetermined time period does not exceed the daily credit limit associated with the purchased goods or services.

Alternatively, the method may also comprise the steps of:

storing at least one set of daily credit limits in the account record, each set of daily credit limit associated with at least one good or service and each daily credit limit within a set of daily credit limited associated with a predetermined time period; and

checking that the cost of all goods or service purchased within a predetermined time period does not exceed the daily credit limit associated with the predetermined time period in the set of daily credit limits associated with the purchased goods or services.

The method can also comprise the step of changing at least one daily credit limit stored in the account record via appropriate operation of a user interface.

Preferably, the method comprises the steps of incrementing the credit balance stored in the account record and temporarily incrementing at least one daily credit limit for a predetermined time period.

The method may also include the steps of associating a savings account established with a financial institution with the account record and transferring the credit balance of the associated account record, or a portion thereof, to the savings account. The method may further include the step of providing at least one reward to the customer, the at least one reward commensurate with the amount transferred.

More preferably, the method may include the step of reporting the monitoring information by one or more of the following formats: voice communication through interactive voice, recording, e-mail; paper.

#### 10 **Brief Description of the Drawings**

The invention will now be described, by way of example only, with reference to the accompanying drawings, of which:

Figure 1 is a schematic representation of a first embodiment of an electronic payment network with monitoring and control facilities.

15 Figure 2 is a flowchart of the generic processing handled by a Transaction Processing module.

#### **Best Mode(s) for Carrying Out the Invention**

In accordance with a first embodiment of the present invention there is provided an electronic payment network 10. The electronic payment network 10  
20 comprises:

- a contactless smart card 12;
- at least one contactless smart card reader 14;
- a host server 16; and
- a networked computer 18.

The contactless smart card reader 14 and networked computer 18 are in data communication with the host server 16. The remaining elements of the first embodiment will be described in the context of the electronic payment network 10 as used.

5 In use, the host server 16 initiates Account Creation module 20. Account Creation module 20 operates to:

a) create a new customer account 22 and store details of the new customer account 22 in a customer account file 24; and

10 b) create a new customer record 26 and store details of the new customer record 26 in a customer record file 28.

The stored details of the customer account 22 include customer identification details 30, current monetary balance 32 and current points balance 34. At the time of creation, the current monetary balance 32 and current points balance 34 are set to zero.

15 The stored details of the customer record 26 include customer identification details 30 and monitoring information 36. The monitoring information 36 can take any form. However, in the context of the embodiment being described, the monitoring information 36 includes:

- calorie intake information;
- 20 • student expenditure information; and
- school attendance information.

The use of common customer identification details 30 creates an association between the customer account 22 and customer record 26. The customer identification details 30, or a subset thereof, corresponds to information stored in  
25 the contactless smart card 12. In this manner, a link is established between the

contactless smart card 12 and each of the customer account 22 and customer record 26.

Once a customer account 22 and customer record 26 have been created, the associated contactless smart card 12 is provided to a student 38 whose details  
5 are the subject of customer identification details 30.

To ensure that the student 38 can make use of the contactless smart card 12, a parent or guardian of the student 38 is required to make payment to a network operator, ie. the operator of the electronic payment network 10. Payment may be made by credit card, bank transfer (whether requested physically or virtually via  
10 the Internet), cheque or cash.

In the case of cash payments, the network operator organises for a courier service to accept the cash payment and securely convey the payment to the network operator's premises. The cost of the courier service is deducted from the cash payment.

15 The amount of payment – or in the case of cash payments, the balance of payment – is credited to the current monetary balance 32 upon receipt of the payment by the network operator using a \$1:\$1 conversion rate.

Having received the contactless smart card 12 that now has a positive corresponding current monetary balance 32, the student 38 is ready to attend  
20 school.

Positioned in each classroom of the school and other designated areas, such as the canteen and book shop, are contactless smart card readers 14. As the student 38 attends class, they pass their contactless smart card 12 over contactless smart card readers 14. The contactless smart card reader 14 then  
25 operates to read data 40 from the contactless smart card 12, including the customer identification details 30, or the subset thereof, as appropriate. This data 40, along with ancillary data, is then communicated to the host server 16.

The data 40 communicated to the host server 16 is received by a Transaction Processing module 42. The Transaction Processing module 42, recognising the contactless smart card reader 14 who sent the data 40 as being a non-payment related contactless smart card reader 14, retrieves the appropriate customer record 26 from the customer record file 28. Determination of the appropriate customer record 26 is determined by searching each customer record 26 until the customer identification details 30 of the searched customer record 26 match the customer identification details 30, or the subset thereof, embodied in data 40. The ancillary data embodied in data 40 is then processed and stored as part of the monitoring information 36 of the appropriate customer record 26. In this particular instance, the stored monitoring information 36 will then reflect the fact that the student 38 has attended class, as well as recording the time of attendance.

At recess or meal times, the student 38 may purchase food from the canteen. The student 38 may also order the purchased food direct from the canteen. Ideally, however, the student 38 has pre-ordered the purchased food through the canteen's website 43 or an interactive touch-screen kiosk 44 located within the school. When pre-ordering the student 38 must enter in sufficient personal details to allow the pre-order to be matched with the customer identification details 30, or the subset thereof, stored in the contactless smart card 12 at the time of payment.

To encourage the student 38 to make use of the pre-ordering facilities available to them, ie. the canteen's website 43 and interactive touch-screen kiosk 44, for every \$1 spent on food purchased through the pre-ordering facilities, the student 38 is awarded 100 points. The awarded points are credited to the appropriate current points balance 34 on payment of the food purchased.

When paying for the food purchased, the student 38 passes their contactless smart card 12 over the contactless smart card reader 14 located at the canteen. The contactless smart card reader 14 then operates to read data 48 from the contactless smart card 12, including the customer identification details 30, or the subset thereof, as appropriate. The cost of the food purchased, details of whether the food has been pre-ordered or not, and other ancillary data are then combined

with the read data 48 (collectively now referred to as data 48) and communicated to the host server 16.

The data 48 communicated to the host server 16 is again received by the Transaction Processing module 42. The Transaction Processing module 42, 5 recognising the contactless smart card reader 14 who sent the data 48 as being a payment related contactless smart card reader 14, thereafter:

- 10 a) retrieves the appropriate customer account 22 from the customer account file 24. Determination of the appropriate customer account 22 is determined by searching each customer account 22 until the customer  
15 identification details 30 of the searched customer account 22 match the customer identification details 30, or the subset thereof, embodied in data 48. The cost of the food purchased is then extracted from the data 48 and checked against a first set daily credit limit amount 50 recorded as part of the customer account 22. If the cost of the food purchased is less than the  
20 first set daily credit limit amount 50, the cost of the food purchased is then checked against the current monetary balance 32 of the appropriate customer account 22. If the cost of the food purchased is less than the current monetary balance 32, the following actions are undertaken:
  - 20 (i) the first set daily credit limit amount 50 is reduced by the cost of the food purchased;
  - (ii) the current monetary balance 32 is reduced by the cost of the food purchased; and
  - 25 (iii) if the data 48 records the food purchased as having been pre-ordered, the current points balance 34 of the appropriate customer account 22 is increased. The amount of the increase is determined by the cost of the food purchased calculated on a \$1:100 points conversion rate.

b) retrieves the appropriate customer record 26 from the customer record file 28. Determination of the appropriate customer record 26 is determined by searching each customer record 26 until the customer identification details 30 of the searched customer record 26 match the customer identification details 30, or the subset thereof, embodied in data 48. The ancillary data embodied in data 48 is then processed and stored as part of the monitoring information 36 of the appropriate customer record 26. In this particular instance, the stored monitoring information 36 will reflect the total calorie intake of the student 38 as a result of consuming the food purchased and details of the quantity and type of food purchased.

The Transaction Processing module 42 thereafter returns a signal to the contactless smart card reader 14 indicating the result of the checks mentioned above (ie. whether payment could be processed or not). Canteen staff can then act accordingly.

15 The student 38 may also need to purchase items from the book shop at various times throughout the day. When paying for the purchased items, the student 38 again passes their contactless smart card 12 over the contactless smart card reader 14 located at the book store. The contactless smart card reader 14 then operates to read data 52 from the contactless smart card 12, including the customer identification details 30, or the subset thereof, as appropriate. The cost of the purchased items and other ancillary data are then combined with the read data 52 (collectively now referred to as data 52) and communicated to the host server 16.

25 The data 52 communicated to the host server 16 is again received by the Transaction Processing module 42. The Transaction Processing module 42, recognising the contactless smart card reader 14 who sent the data 52 as being a payment related contactless smart card reader 14, thereafter:

a) retrieves the appropriate customer account 22 from the customer account file 24. Determination of the appropriate customer account 22 is determined by searching each customer account 22 until the customer

identification details 30 of the searched customer account 22 match the customer identification details 30, or the subset thereof, embodied in data 52. The cost of the purchased items are then extracted from the data 52 and checked against a second set daily credit limit amount 54 recorded as part of the customer account 22. If the cost of the purchased items is less than the second set daily credit limit amount 54, the cost of the purchased items are then checked against the current monetary balance 32 of the appropriate customer account 22. If the cost of the purchased items are less than the current monetary balance 32, the following actions are undertaken:

- (i) the second set daily credit limit amount 54 is reduced by the cost of the purchased items; and
  - (ii) the current monetary balance 32 is reduced by the cost of the purchased items.
- b) retrieves the appropriate customer record 26 from the customer record file 28. Determination of the appropriate customer record 26 is determined by searching each customer record 26 until the customer identification details 30 of the searched customer record 26 match the customer identification details 30, or the subset thereof, embodied in data 52. The ancillary data embodied in data 52 is then processed and stored as part of the monitoring information 36 of the appropriate customer record 26. In this particular instance, the stored monitoring information 36 will reflect the quantity and type of items purchased by the student 38.

The Transaction Processing module 42 thereafter returns a signal to the contactless smart card reader 14 indicating the result of the checks mentioned above (ie. whether payment could be processed or not). Book shop staff can then act appropriately.

In situations where payment could not be processed due to an insufficient current monetary balance 32, the electronic payment network 10 checks the student's



- customer account 22 to see whether the student 38 or one of the student's 38 parents has authorised for stored value within the student's 38 contactless smart card 12 to be used. If the student 38 or parent has so authorised the stored value to be used, as much stored value as is needed to facilitate the purchase is subtracted from the stored value of the contactless smart card 12 and credited to the student's 38 current monetary balance 32. The purchase order will then be resent to the Transaction Processing Module 42 by the payment related contactless smart card reader 14 and handled in the appropriate manner described above.
- 5
- 10 If the student 38 or parent has not authorised the stored value of the student's 38 contactless smart card 12 to be used, the student 38 has a number of alternative courses of action available to him/her. One such course of action is to contact one of their parents and ask them to top-up their current monetary balance 32 or change their daily credit limit amounts 50, 54.
- 15
- When topping-up the current monetary balance 32 of a student 38, a parent has two possible options available to them. Firstly, the parent may make payment to the network operator. Payment may be made by credit card, bank transfer (whether requested physically or virtually via the Internet), cheque or cash. Again, in the case of cash payments, the network operator organises for a courier service to accept the cash payment and securely convey the payment to the network operator's premises. The cost of the courier service is deducted from the cash payment.
- 20
- The amount of payment – or in the case of cash payments, the balance of payment – is credited to the current monetary balance 32 of the student 38 upon receipt of the payment by the network operator. Again, the amount credited to the current monetary balance 32 is calculated using a \$1:\$1 conversion rate.
- 25
- Secondly, the parent may request the network operator to credit an advance to the current monetary balance 32 of the student 38. The request may be made by SMS, telephone or by logging on to the network operator's website 58 (discussed

in more detail below). After receiving and processing the request, the crediting of an advance is handled by the Credit Advance module 56.

Upon receiving a request from a parent to credit an advance to a student 38, the Credit Advance module 56 checks what membership status, if any, the parent has with respect to this service. If the parent is not a member of this service, no advance is made. Otherwise, the Credit Advance module 56 credits the current monetary balance 32 of the student 38 with an amount equal to the maximum allowed by their parent's membership level.

The crediting of an advance in this manner is performed rapidly, ie. approximately 10 minute turn-around time, so as to provide an "emergency" solution to customer accounts 22 having a deficient current monetary balance 32.

For credit control purposes, details of the advance made by the Credit Advance module 56 are recorded. In this manner, when a parent makes a payment to increase the current monetary balance 32 of the student 38, the total amount of any recorded advances applicable to the student 38 are deducted from the payment amount prior to increasing the student's 38 current monetary balance 32.

As mentioned above, an alternative arrangement available to the student 38 is to ask their parent to raise their set daily credit limit amounts 50, 54. However, it should be noted that this proposed solution is only useful in situations where the student 38 has sufficient current monetary balance 32 to pay for the items purchased or purchased food, but the value of the present purchase exceeds the appropriate set daily credit limit amount 50, 54.

To adjust the set daily credit limit amounts 50, 54, the parent either:

- calls a set telephone number and places the request via an interactive voice recognition ("IVR") system; or
- logs on to the network operator's website 58 (discussed in more detail below).

Regardless of the means used to adjust the set daily credit limit amounts 50, 54, the parent may adjust the amounts to new limits as required. A first maximum daily credit limit amount and second maximum daily credit limit amount recorded within the student's 38 customer account 22 are then overwritten with the new set  
5 limits. The first and second set daily credit limit amounts 50, 54 are also adjusted, respectively, by an amount equal to the difference between the old maximum daily credit limit amount and the new maximum daily credit limit amount. The student 38 can then proceed with their purchase in their own time. However, to ensure that the electronic payment network 10 operates as intended, at a predetermined  
10 time each day (for example, 12:00am), the first set daily credit limit amount 50 is reset to equal the first maximum daily credit limit amount and the second set daily credit limit amount 54 is reset to equal the second maximum daily credit limit amount.

Yet a further alternative open to the student 38, is to use their current points  
15 balance 34 to pay for goods. In this situation, the parent, and in the case of older children, the student 38 themselves, can log on to the network operator's website 58 (described in more detail below). From the network operator's website, the parent or child, as the case may be, can view their current points balance 34. The parent or child, as the case may be, can then convert some or all of their current  
20 points balance 34 to money to be credited to the current monetary balance 32. The designated conversion rate between points to money credited is set at \$1:1000 points.

If the student 38 is unable to, or chooses not to, make payment using their contactless smart card 12, payment can still be made using other methods, such  
25 as credit cards or cash money. However, to ensure that such transactions are monitored, the student 38 is still requested to pass their contactless smart card 12 over the contactless smart card reader 14. The contactless smart card reader 14 then operates to read data 55 from the contactless smart card 12, including the customer identification details 30, or a subset thereof, as appropriate. The cost of  
30 the purchased items and other ancillary data are then combined with the read data 55 (collectively now referred to as data 55) and communicated to the host server 16.

The data 55 communicated to the host server 16 is, as normal, received by the Transaction Processing module 42. Due to the presence of a control flag in the ancillary data embedded into data 55, the Transaction Processing module 42, while noting that the contactless smart card reader 14 who sent the data 55 is a payment related smart card reader, simply retrieves the appropriate customer record 26 from the customer record file 28. Determination of the appropriate customer record 26 is determined by searching each customer record 26 until the customer identification details 30 of the searched customer record 26 match the customer identification details 30, or a subset thereof, embodied in data 55. The ancillary data embodied in data 55 is then processed and stored as part of the monitoring information 36 of the appropriate customer record 26. In this particular instance, the stored monitoring information 36 will reflect the quantity and type of items purchased by the student 38 as well as the fact that the payment was made using funds not derived from the student's 38 current monetary balance 32.

While the above situations reflect specific examples of payment requirements, there is nothing preventing a parent to increase the value of the current monetary balance 32 when convenient for the parent to do so. The facilities available for payment, and processing of payment, are as have been described above. Additionally, the parent may organise for payment to be made periodically by way of direct debit.

If the student 38 should ever lose their contactless smart card 12, a replacement contactless smart card 12 can be provided almost immediately. In order to do so, however, the parent of the student 38 must complete a form and pay the required fee. The network operator arranges for a courier to pick up the form along with the required fee (if paying in cash). Upon receipt of the form and required fee, the replacement contactless smart card 12 is couriered to the student 38.

Both the student 38 and their parents can access information and perform administrative tasks by using networked computer 18 to access the network operator's website 58. As the type of information that can be accessed and administrative tasks that can be performed differs according to the user, the student 38 and their parents have separate, but related, log-ins and passwords.

Regardless of the user, the network operator's website 58 presents the following information using a web-browser of the networked computer 18:

- the student's 38 current monetary balance 32;
  - the student's 38 current points balance 34;
- 5
- calendar of activities organised by organisations associated with the school the student 38 attends, eg. scouts, band, cadets, etc.;
  - calendar of activities organised by the school the student 38 attends;
  - announcements made by the school the student 38 attends; and
  - the student's timetable.
- 10
- When logged onto the network operator's website 58, either the parent or the student 38 can establish or utilise a savings account 60. The savings account 60 is actually a part of a trust account operated by a trustee bank.
- To establish a savings account 60, the parent or student 38 transfers all or a desired amount of the student's 38 current monetary balance 32 to the savings
- 15
- account 60. Further transfers can thereafter be performed on an *ad hoc* basis or as a result of pre-set instructions of the parent or student 38.
- To make this experience more enjoyable for the student 38, and to assist the student 38 to understand the value of savings, when money is transferred from the student's 38 current monetary balance 32 to the savings account 60, the
- 20
- student can choose whether they wish to receive stickers or use the value of the amount transferred in playing an on-line money game. The accumulation of points in the game, or the amount of stickers collected, represent the amount of money saved. Variations of the on-line money game could stimulate certain "targets" or goals for the child to save towards, such as a mountain bike or
- 25
- compact disc.

- 20 -

Additionally, once established, the parent or student 38 can use the savings account 60 to transfer money to the student's 38 current monetary balance 32 as required. The money stored in the savings account 60 can also be used to pay for certain expenditures or be used in establishing or contributing to other financial products, such as unit trusts. Details of the savings account 60, including expenditure details, are displayed to the parent or student 38 using the web-browser connected to the network operator's website 58 following establishment.

When a parent has logged onto the network operator's website 58, the parent may access summary details of, or reports based on, monitoring information 36. For instance, in the embodiment being described, a report on the student's 38 school attendance (including details of any late attendances) can be obtained as well as a report on the calorie intake of the student over a pre-set period of time. Other reports, such as those on the financial activities of the student 38, can be used by the parent in teaching the student 38 about the value of budgeting, planning and saving.

It should also be noted that teachers and school administrators have access to the network operator's website 58 to provide further information or edit existing information as required. When editing existing information, such as attendance records, corresponding changes to a student's 38 customer record 26 may also be made.

In accordance with a second embodiment of the invention, where like numerals reference like parts, the contactless smart card and contactless smart card reader may be replaced with other identification devices, such as:

- other forms of smart cards;
- magnetic cards and magnetic card readers;
- radio-frequency cards and associated readers; or
- mobile phones.

Changes to processing as are necessary to allow the electronic payment network 10 as described to utilise these changes in technology are as would be known to the person skilled in the art and therefore will not be described here.

In accordance with a third embodiment of the present invention, where like numerals reference like parts, the first and second maximum daily credit limit amounts take the form of a set of values.

In this arrangement, the set of values corresponds with a predetermined time period, such as a week or month, and each value in the set of values represents the maximum daily credit limit amount for that day. To explain by way of example, in a situation where the set of values corresponds with a week, the first value of the set of values may represent the maximum daily credit limit amount for Monday. In a situation where the set of values corresponds with a month, the twelfth value of the set of values may represent the maximum daily credit limit amount on the 12<sup>th</sup> day of that month.

The set of values can be changed at any time by a parent logging on to the network operator's website 58.

In accordance with a fourth embodiment of the invention, where like numerals reference like parts, parents may be able to obtain reports or summaries of the monitoring information 36 via e-mail and/or IVS and/or by hand-delivery in addition to obtaining them through the network operator's website 58.

In accordance with a sixth embodiment of the invention, where like numerals reference like parts, the electronic payment network 10 is adapted for use within a business office.

While the technical configuration of this embodiment is identical to that described in the first embodiment, the type of monitoring information 36 captured by the electronic payment network 10 can be changed to include:

- attendance information;

- 22 -

- information as to the location of employees; and
- details of disbursement costs, such as photocopying and facsimile costs, incurred by each employee.

If the electronic payment network 10 is configured so as to monitor information  
5 relating to the location of employees, the electronic payment network 10 may also  
incorporate General Packet Radio Service (“GPRS”) functionality. The GPRS  
functionality operates to locate an employee via their mobile phone. The actual  
geographical location of the employee (calculated in degrees and minutes) is  
10 calculated by triangulation using fixed point mobile phone towers as reference  
points. The physical location of the employee is then calculated by cross-  
referencing the employee’s geographical location with a street map of the area.

The electronic payment network 10 may also be adapted to handle emergency  
situations, such as the SARS outbreaks, by posing a series of questions to the  
employee when they make first contact with a contactless smart card reader 14.  
15 In this arrangement, the employee is then only allowed access to the office for  
that day if appropriate responses to the series of questions have been given.

It should be appreciated by the person skilled in the art that the above invention is  
not limited to the embodiments described. In particular, as would be known to the  
person skilled in the art, the following modifications may be made without  
20 departing from the scope of the invention:

- ancillary reporting tools, such as the STEPS™ program produced by the applicant, may be incorporated into the payment network to assist parents and students 38 in setting goals and targets based on the monitoring information 36.
- 25 • Payment for goods may be made at the time of pre-order. In this situation, however, student identification information will still need to be recorded to allow for the goods to be collected;



- The electronic payment network 10 may be adapted to incorporate payment for services;
- Different rates of point awards and conversion rates may be used. Also, points may be awarded on differing basis to those mentioned in the embodiments; and
- Rather than using a “subtraction” method to determine whether a payment can be processed, an “addition” method may be used. In the “addition” method, the set daily credit limit amounts are increased after each purchase. To determine whether payment can be processed using this method, if the maximum credit limit value are not exceeded by the total of the appropriate current set daily credit limit amount and the new purchase, payment can be processed.

Furthermore, where possible, features or alternatives described in one embodiment may be incorporated into yet further embodiments that fall within the scope of the present invention.

**The Claims Defining the Invention are as Follows**

## 1. An electronic payment network comprising:

an identifier associated with a customer;

at least one reader means; and

- 5 a host server having an account record and a customer record each associated with the customer and including identification information of the associated customer,

where, on the customer making a purchase, the at least one reader means reads identification information in respect of the customer from the identifier  
10 and obtains details of the purchase and associated monitoring information, if any; the reader means thereafter operable to communicate the identification information, purchase details and associated monitoring information to the host server and where the host server is operable to deduct the cost of the purchase from a credit balance stored in the account record having matching  
15 identification information to the read identification information and the host server is operable to store the monitoring information in the customer record having matching identification information to the read identification information.

2. An electronic payment network according to claim 1, including at least one non-payment reader means, the at least one non-payment reader means  
20 operable to read identification information in respect of the customer from the identifier, and communicate the identification information, and monitoring information, to the host server and where the host server is operable to store the monitoring information in the customer record having matching identification information to the read identification information.

- 25 3. An electronic payment network according to claim 1 or claim 2, where the monitoring information is at least one of the following: location information;

- 25 -

- attendance information; disbursement costs; details of the purchased items; the number of calories in the purchased items; location information.
4. An electronic payment network according to claim 3, where the location information is attained through GPRS.
  - 5 5. An electronic payment network according to claim 4, where the location information is attained through GPRS and cross-referenced to a street map, the cross-referenced location forming the monitoring information, or a portion thereof.
  6. An electronic payment network according to any preceding claim, where the  
10 account record includes a loyalty point balance and where the at least one reader means or host server is operable to calculate the amount of loyalty points that accrue to the customer for the purchase and increment the loyalty point balance by the calculated amount of loyalty points.
  7. An electronic payment network according to claim 6, where the host server is  
15 operable to calculate a bonus amount of loyalty points on the customer satisfying a pre-condition and increment the loyalty point balance by the bonus amount of loyalty points.
  8. An electronic payment network according to any one of claims 2 to 7, as  
20 dependent on claim 2, where the customer uses a non-payment reader to provide advance details of an intended purchase of a good or service, such that a merchant from whom the good or service will be purchased, can take appropriate action to ensure the availability of the good or service.
  9. An electronic payment network according to claim 8, as dependent on claim 5,  
25 where the pre-condition is the customer's use of the non-payment reader to provide advance details of the intended purchase of a good or service.
  10. An electronic payment network according to any one of claims 6 to 9, where the customer can convert their loyalty point balance, or a portion thereof, into a

- monetary value, the credit balance stored in the account record thereafter being incremented by the monetary value.
11. An electronic payment network according to any preceding claim, where the account record includes at least one daily credit limit, each daily credit limit associated with at least one good or service and where the host server is operable to check that the cost of all goods or services purchased within a predetermined time period does not exceed the daily credit limit associated with the purchased goods or services.
12. An electronic payment network according to any one of claims 1 to 10, where the account record includes at least one set of daily credit limits, each set of daily credit limits associated with at least one good or service, and each daily credit limit within a set of daily credit limit associated with a predetermined time period, where the host server is operable to check that the cost of all goods or services purchased within a predetermined time period does not exceed the daily credit limit associated with the predetermined time period in the set of daily credit limits associated with the purchased goods or services.
13. An electronic payment network according to claim 11 or claim 12, where the host server has a user interface and where a person may change at least one daily credit limit via appropriate operation of the user interface.
14. An electronic payment network according to claim 11 or claim 12, where the host server may increment the credit balance stored in the account record and temporarily increment at least one daily credit limit for a predetermined time period.
15. An electronic payment network according to any preceding claim where the account record is associated with a savings account established with a financial institution, such that the credit balance, or a portion thereof, may be transferred from the account record to the savings account.

16. An electronic payment network according to claim 15, where at least one reward is provided to the customer, the at least one reward commensurate with the amount transferred.
17. An electronic payment network according to any preceding claim, where the host server includes reporting means for reporting the monitoring information.
18. An electronic payment network according to claim 17, where the reporting means is operable to report the monitoring information in one or more of the following formats: voice communication through interactive voice recording; e-mail; paper.
19. An electronic payment network according to any preceding claim, where an authorised person may amend monitoring information stored in the customer record.
20. An electronic payment network according to any preceding claim, where the identifier is one of the following: a smart card; a contactless smart card; a magnetic card; a radio-frequency card; mobile phone.
21. An electronic payment network according to claim 20, where the identifier is a smart card or contactless smart card and where the identifier has a stored value.
22. An electronic payment network according to claim 21, where, if the credit balance stored in the account record is less than the cost of the purchase, the reader means operates to deduct the cost of the purchase, or at least a portion thereof, from the stored value.
23. An electronic payment network according to any preceding claim, where the credit balance stored in the account record is incremented following a payment of the customer by way of: credit card; bank transfer; cheque; cash; direct debit on a periodic basis; direct debit on the credit balance falling below a predetermined amount.

24. A host server for use in an electronic payment network according to any one of claims 1 to 23.

25. A reader means for use in an electronic payment network according to any one of claims 1 to 23.

5 26. A non-payment reader for use in an electronics payment network according to any one of claims 2 to 23.

27. A method of making a payment comprising:

receiving purchase details and associated monitoring information, if any, from a reader means;

10 receiving identification information in respect of a customer, as read by the reader means;

deducting the cost of the purchase from a credit balance stored in an account record associated with the identification information received;

15 storing the associated monitoring information, if any, in a customer record associated with the identification information received.

28. A method of making a payment according to claim 27, further comprising:

receiving identification information in respect of the customer, as read by a non-payment reader means;

20 receiving associated monitoring information from the non-payment reader means;

storing the associated monitoring information in the customer record associated with the identification information received.

29. A method of making a payment according to claim 27 or claim 28, further comprising the step of attaining location information through GPRS, said location information forming part of the monitoring information.
- 5 30. A method of making a payment according to claim 29, further comprising the step of cross-referencing the location information with a street map, the cross-referenced location forming the monitoring information or a portion thereof.
- 10 31. A method of making a payment according to any one of claims 27 to 30, further comprising the steps of calculating an amount of loyalty points that accrue to the customer for the purchase and incrementing a loyalty point balance of the account record by the calculated amount of loyalty points.
32. A method of making a payment according to claim 31, including the step of calculating a bonus amount of loyalty points if the customer satisfies a pre-condition.
- 15 33. A method of making a payment according to claim 31 or claim 32, including the steps of converting the loyalty point balance of an account record, or a portion thereof into monetary value and increasing the credit balance of said account record by the monetary value.
34. A method of making a payment according to any one of claims 27 to 33, further comprising the steps of:
- 20       storing at least one daily credit limit in the account record, each daily credit limit associated with at least one good or service; and
- checking that the cost of all goods or service purchased within a predetermined time period does not exceed the daily credit limit associated with the purchased goods or services.
- 25 35. A method of making a payment according to any one of claims 27 to 33 comprising the steps of:

- storing at least one set of daily credit limits in the account record, each set of daily credit limit associated with at least one good or service and each daily credit limit within a set of daily credit limited associated with a predetermined time period; and
- 5 checking that the cost of all goods or service purchased within a predetermined time period does not exceed the daily credit limit associated with the predetermined time period in the set of daily credit limits associated with the purchased goods or services.
- 10 36.A method of making a payment according to claim 34 or claim 35 comprising the step of changing at least one daily credit limit stored in the account record via appropriate operation of a user interface.
- 15 37.A method of making a payment according to claim 34 or claim 35 comprising the steps of incrementing the credit balance stored in the account record and temporarily incrementing at least one daily credit limit for a predetermined time period.
- 38.A method of making a payment according to claim 27 to 37, including the steps of associating a savings account established with a financial institution with the account record and transferring the credit balance of the associated account record, or a portion thereof, to the savings account.
- 20 39.A method of making payment according to claim 38, including the step of providing at least one reward to the customer, the at least one reward commensurate with the amount transferred.
- 25 40.A method of making payment according to any one of claims 27 to 39, including the step of reporting the monitoring information by one or more of the following formats: voice communication through interactive voice, recording, e-mail; paper.



41. An electronic payment network substantially as described herein with reference to the drawings.
42. A host server for use in an electronic payment network substantially as described herein with reference to the drawings.
- 5 43. A reader means for use in an electronic payment network substantially as described herein with reference to the drawings.
44. A non-payment reader means for use in an electronic payment network substantially as described herein with reference to the drawings.
- 10 45. A method of making payment substantially as described herein with reference to the drawings.

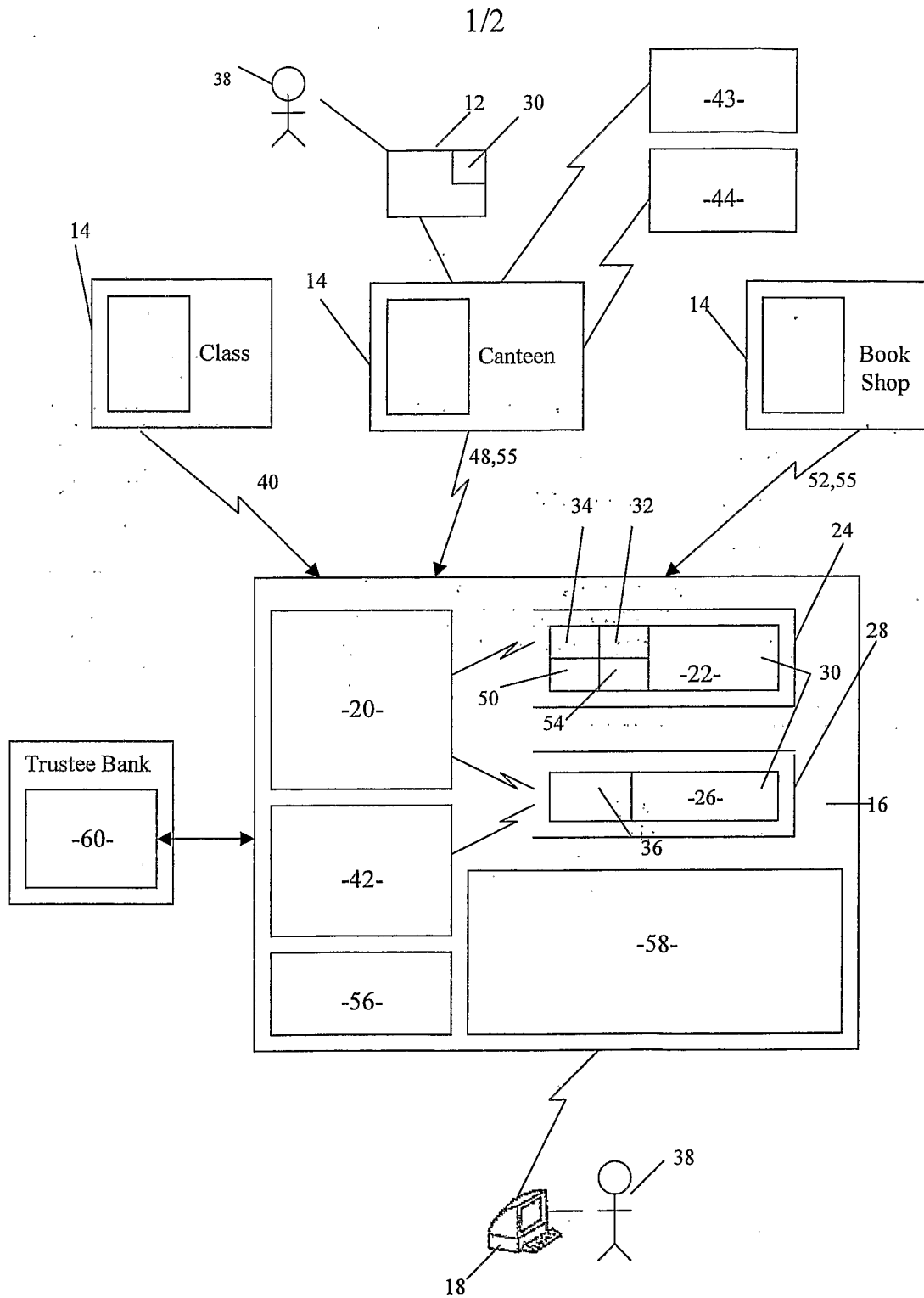


FIGURE 1

2/2

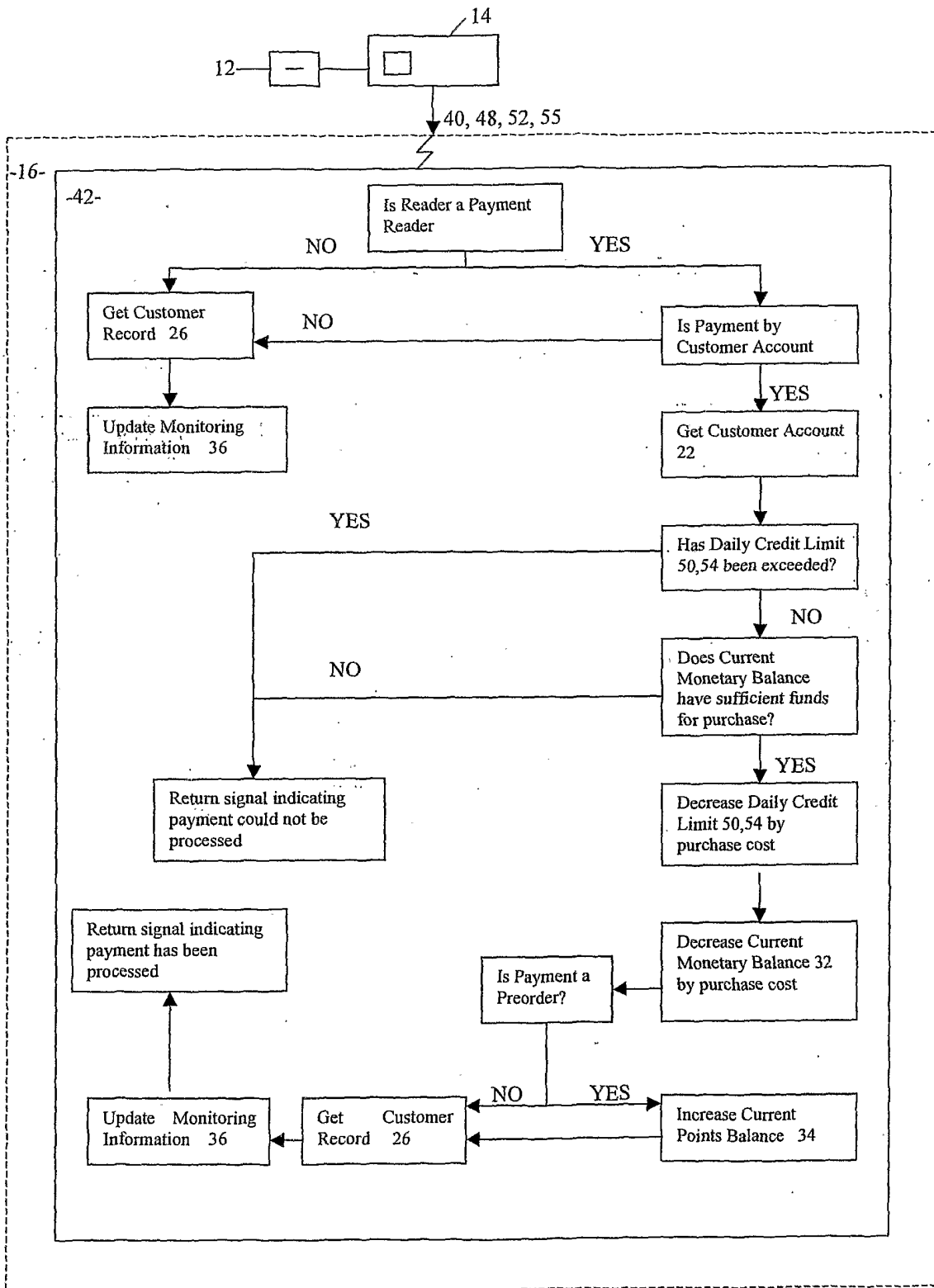


FIGURE 2

# INTERNATIONAL SEARCH REPORT

International application No.

**PCT/SG2004/000248**

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> Int. Cl. 7: G06F 17/60 According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) DWPI: IPC G06F 17/60, G06K 19/073 and keywords: payment, customer, loyalty, reward, school, pupil, location, identification, credit, balance, smart card and similar terms; Google: keywords		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Campbell, B. "Reward card lets pupils earn and learn", The Observer, 16 March 2003. Retrieved from the Internet: <URL: <a href="http://observer.guardian.co.uk/uk_news/story/0,6903,915132,00.html">http://observer.guardian.co.uk/uk_news/story/0,6903,915132,00.html</a> > Entire page	1-45
X	US 6460019 B (WALKER et al.) 1 October 2002 Entire document, see in particular columns 4 to 8	1-45
X	US 6138911 A (FREDREGILL et al.) 31 October 2000 Entire document, see in particular columns 3 and 4	1-45
X	WO 1995/20195 A (DYNAMIC DATA SYSTEMS PTY. LTD.) 27 July 1995 Entire document, see in particular pages 2 and 3	1,27
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
* Special categories of cited documents:		
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention	
"E" earlier application or patent but published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone	
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search 24 November 2004	Date of mailing of the international search report 9 DEC 2004	
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized officer  <b>JOHN THOMSON</b> Telephone No : (02) 6283 2214	

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/SG2004/000248

C (Continuation).

DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DTA Computer Systems, Product Menu (online), retrieved on 23 June 2003. Retrieved from the Internet: <URL: <a href="http://web.archive.org/web/20030623162618/http://www.dta.co.uk/products.htm">http://web.archive.org/web/20030623162618/http://www.dta.co.uk/products.htm</a> > Entire page	1-45
A	CA 2224600 A (CAMPBELL) 27 August 1999 Entire document	1-45
A	US 5884271 A (PITRODA) 16 March 1999 Entire document	1-45

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

**PCT/SG2004/000248**

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	6460019	AU	32051/99	US	6687679	US	2004117261
		WO	9950733				
US	6138911	AU	76271/98	CA	2273971	GB	2334609
		US	5923016	WO	9825242		
WO	9520195	AU	66417/94	AU	83217/98	CA	2181999
		CN	1142871	EP	0741884	NZ	265896
		US	6010067				
CA	2224600	NONE					
US	5884271	CA	2194015	EP	0766852	EP	1477943
		US	5590038	WO	9535546		

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX