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(54) Card operated vending machine.

(57) A machine primarily for renting articles, e.g. video cassettes by the use of a club card and in which there is provided a memory (29) in which is recorded a card credit or a credit limit for a user of the machine when the user first passes the club card through a card reader on the machine, renting transactions being arranged to reduce the card credit in the memory.

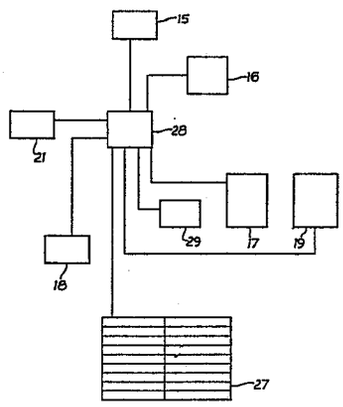

Fig. 2

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Description

CARD OPERATED VENDING MACHINE

This invention relates to vending machines. Such machines are arranged to dispense an article or to effect a service or to rent a reusable article and accept its return. The term "vending machine" in the present application is intended to cover all three of the foregoing aspects.

Vending machines are usually arranged to operate either upon the insertion of money or upon the insertion of a card or token. It is known that to use, for the operation of vending machines, cards having an encoded magnetic stripe and which have the ability to be read and re-written and for the information on them to be changed by being fed through an appropriate card reader.

Thus it is known to purchase such a card and for the card to have the amount of credit written thereon in a manner to be read by a card reading and writing device on the machine. To operate the machine the user places the card in the device on the machine which identifies the user and reads the amount of credit. Assuming that the credit is sufficient, the machine then dispenses the article and decrements the amount of credit on the card by the cost of the article or service which has been vended and re-writes the remaining credit on the card which is then returned to the user.

In order to be able to use this type of card, a comparatively sophisticated card reading and writing device has to be used which receives the card from the user and holds it while the necessary entries are being made on the card.

In a vending machine, the cost of such a sophisticated card reading and writing device would be a significant part of the cost of the machine and it is therefore an object of the present invention to provide a vending machine which can use a simple card reader, known generally as a "wipe-through" card reader, which has a capacity to read only what is on the card and cannot change the information thereon.

It is also known to have vending machines which can be operated by the use of credit or debit cards. The user inserts his card into the machine, which contains a modem connected to an authorising source, and indicates the credit that he requires. After this credit is authorised it is decremented as transactions take place, each transactions is downloaded from the memory and billing is carried out centrally. This arrangement requires a modem in the machine and the requirement to download each transaction, i.e. each debit and credit transaction, from the machine for billing purposes.

It is an object of an aspect of the invention to provide a vending machine in which, although in some embodiments credit can be obtained by use of a credit or debit card, it is not necessary to download each vending transaction, i.e. each credit and debit transaction, from the machine for billing purposes. Only the original debit or credit transaction is used for billing purposes.

According to the invention we provide a vending machine operable by the use of a club card having information recorded thereon including an identifying code, the machine including: a card reader capable of reading said information; enabling means associated with the card reader for setting the machine for operation by a user who has passed a valid club card through the card reader; a memory; means responsive to the passage of a club card through the card reader for the first time to record in the memory a credit or credit limit (the card credit) for that club card; input means to allow a user to select an article or service to be vended, comparator means to compare the card credit held in the memory for the club card which has been read by the card reader with the cost of the selected article or service and to enable the dispensing of the article or rendering of the service if the card credit is equal to or greater than said cost; and control means to allow the dispensing or effecting of the selected article or service to the user when enabled by the comparator means and to reduce the card credit by said cost.

The term "club card" is used herein to mean a card which is special to the vending machine or group of vending machines in which it is used as distinct from a general purpose debit or credit card. It is envisaged that the users of the cards could belong to a "club" associated with the machine or group of machines.

The essence of this machine is that the card credit is held in the machine memory rather than on a card or other means and that the card credit is established in the memory by the first use of the club card in the machine or, if a group of machines as described above is interlinked, by the first use of the club card in a machine of the group.

The card credit may be set by the operator, all club cards having the same card credit. Alternatively information corresponding to the initial card credit may be "written" on the club card and this may establish the card credit. In either event, when the club card is first used in the machine the credit or credit limit of the user (herein called the card credit) is recorded in the memory.

The club card may be pre-paid, i.e. the user may purchase the club card for the amount of the card credit. Alternatively, the club card may permit the user to use the machine up to a predetermined credit limit.

The machine may include disabling means to prevent operation by the use of a club card which has a card credit which is zero, negative or less than the cost of the article or service selected by the user. If the card credit is positive but less than said cost the machine may be arranged to issue a credit note and reduce the card credit to zero.

Since the memory in the machine will have a finite capacity it is envisaged that club cards will have a period of validity of several months after which they will not be accepted by the machine. Thus the machine may be arranged for use with a club card having date information recorded thereon and the

enabling means may be arranged not to set the machine for operation if the club card is out of date.

At some stage, the card credit or credit limit will be decreased below the cost of the article or service that the user wishes to obtain or rent. In such a case the machine may be arranged to enable a user to obtain the selected article or service by using in the card reader a second club card when the card credit of the first card is insufficient to meet the cost.

The machine may be arranged to receive money (i.e. coinage and/or notes) to pay, at least partly, for the selected article or service.

The machine may be arranged to enable a user to establish a card credit by using a debit or credit card, the machine having means for connection to a remote terminal to obtain authorisation of the card credit e.g. from the issuer of the credit or debit card or an intermediate management company, the credit being recorded in the memory by passing a club card through the card reader to record the authorised card credit in the memory.

Specifically, the vending machine may be arranged for renting re-usable articles, e.g. video tape cassettes. In such a machine the comparator means compares the card credit with the initial rental cost of the selected article for an initial period. This cost may include a security amount equivalent to the value of the article. The input means is arranged to allow a user to return an article after renting.

In such a rental machine, each article will carry a code and the machine may include timing means to record the actual time period between the rental and the return of the article and, if said actual period is greater than the initial period to reduce the card credit by the additional rental fees corresponding to the difference between the actual and initial periods. The machine may be arranged so as not to accept the article on its return if it has been kept for more than a predetermined period. Alternatively the machine may accept the articles whenever returned within the validity period of the club card but be arranged to print a list of articles which are overdue, i.e. have been kept for more than said predetermined period to enable the operation of the machine to chase up the users to seek return of the articles.

As additional security, the machine may be arranged so that when a user first passes his club card through the card reader to establish the card credit, he is required to enter a personal identification number (PIN) into the memory and all subsequent transactions involving that club card also require the input of the PIN.

This arrangement has the advantage that since the PIN is in the memory of the machine rather than on the card, the card cannot be read by an unauthorised user to establish what the corresponding PIN is. The user will select his PIN at random when first using his club card.

The vending machine thus far described may be a stand alone machine. Alternatively, a group of vending machines may be interlinked so that their memories contain common information on the card credits of the club cards usable in the group of machines. In this arrangement the machines will be modified so that the card credit of a club card is recorded in the memories of all of the group of machines the first time that the club card is passed through the card reader of any of the machines of the group, the card credit then being decreased in all the memories by transactions using the club card on any of the machines in the group.

This arrangement gives the user access to a number of machines and therefore a greater selection of goods or services than can be carried by one machine while still retaining the advantages of the invention, i.e. simplified accounting and the ability to use an unsophisticated, wipe-through card reader.

The invention will now be described in detail by way of example with reference to a machine for renting video tape cassettes and with reference to the accompanying drawings in which:-

Figure 1 is a perspective view of a machine embodying the invention;

Figure 2 is a block diagram of the circuit of the machine; and

Figure 3 is a simplified flow chart of the machine.

Referring first to Figure 1, the machine comprises a master unit 10 and a slave unit 11 which are connected together. Further slave units can be physically connected to the unit 11 and electronically connected to the master unit 10.

The master unit 10 contains a control panel 14 which in turn contains a display 15, a "wipe-through" card reader 16, a key pad 17, a coinage mechanism 18, a bar code reader 19, and a printer outlet 21.

The cassettes are received in columns of compartments. There are four such columns of compartments indicated generally at 22, 23, 24 and 25. The columns 22 and 23 are in the master unit, the column 23 being below the control panel, and the columns 24 and 25 are in the slave unit. Each column comprises a group of compartments some of which are indicated in the column 22 at 26. Each compartment comprises a pocket, not shown, which is pivotted about a vertical axis and contains a cassette. The pocket is latched shut but the control means of the machine can release the latch so that the pocket pivots outwardly to allow a user to remove a cassette. When the user returns the cassette an empty pocket will be opened, as will be described, the user then returns the cassette to the compartment and closes it. Appropriate mechanism is shown in International Application No. PCT/GB87/00197 (International Publication No. WO 87/05730) to which reference should be made.

Referring now to Figure 2, the machine comprises the groups of compartments which in this figure are indicated at 27 and which are controlled by control means indicated schematically at 28. The control means is connected to the display 15, the card reader 16, the key pad 17 and the coinage mechanism 18. The bar code reader 19 is connected to the control means 28 as is the printer 21 and a memory 29.

The machine is arranged to be operated by a club card as described above. Thus a user may purchase a club card for a given sum and this will entitle him to a certain number of rentals or he may be allowed a number of rentals on credit.

The sequence of operation of the machine is, referring to Figures 2 and 3, as follows. The user will pass his club card through the card reader 16. This will read the information on the card including an identification code for the user. If this is a valid identification code, and normally a club card will only be usable on one machine unless a group of machines is inter-linked as described below, the user will be enabled to use the machine. The first time that the club card is passed through the card reader 16 it will establish a credit, the card credit, which will be stored in the memory 29 against the identification code on the card.

The card credit may be set to a common value for all users by the machine operator so that when the card is first passed through the card reader the card credit is set in the memory against the identification code on the card. Alternatively the user or a code on the card may "select" one of a number of card credits pre-programmed into the machine and record this in the memory when the card is first used in the machine. Yet again an amount may be pre-programmed on the card and this amount set up as a card credit the first time that the card is used in the machine.

When a user first passes his club card through the card reader on the machine he may also be required to input, by means of the key pad 17, a personal identification number (PIN). This PIN will be recorded in the memory 29 and for all subsequent transactions using the club card the PIN will have to be input by the key pad 17 to enable the machine to operate. This arrangement has the advantage that since the PIN is recorded in the machine memory rather than on the card, there is no way in which an unauthorised possessor of the card will be able to read the PIN on the card and thus use it in the machine.

Referring now to Figure 3, the sequence will be that the user will be asked if he wishes to rent a cassette. Assuming he says 'yes' by operation of the key pad 17 he will be asked to insert the appropriate compartment number also by means of the key pad. The compartments have transparent fronts so that the user can see through the front of the compartment the cassette which he requires.

Preferably each of the compartments will be numbered. Alternative arrangements may be made for selection of the desired compartment, for example each compartment may have an operating button by its side or there may be a series of numbered buttons or any other convenient means may be used to identify the compartment required.

The machine will then display on the display how much the cassette rental costs and ask if this is acceptable. If the user says 'yes' by appropriate operation of the key pad then the control means will operate to open the selected compartment from which the user will take the cassette. After the user has taken the cassette he will close the compartment. There will be an audible signal if the compartment is left open and the machine will be disabled until the compartment is closed.

The control means and the memory will operate so as to decrease the card credit in the memory by the amount of the rental charge for the cassette. The rental charge will be computed for an initial period, for instance 24 hours, and may or may not include a security amount equal to the value of the cassette. After the initial period, the rental for additional periods will be debited to the card credit. Alternatively on return of the cassette the actual total rental cost is debited.

The memory will also record that the compartment from which the cassette has been removed is empty.

If the machine is fitted with a printer as indicated then the printer can be arranged to print out a receipt showing the amount which the user has been debited.

Each cassette has an identifying code. This may be a number and/or may be a bar code. When the user wishes to return the cassette he will pass his club card through the card reader 16 which will identify him. Assuming that the cassette has been returned within the maximum allowable rental period the user may then enter the number of the cassette on the key pad 17 or, if a bar code reader such as 19 is provided, may place the cassette in front of the bar code reader which will read the code on the cassette. Figure 3 shows the series of operations. When the machine has received a valid article code number the control means will open an empty compartment for the receipt of the cassette and the user will then close the compartment, after inserting the article, and the transaction is complete. Each compartment contains means for detecting whether or not a valid article has been inserted into the compartment for example the means disclosed in our patent application GB 8720298.

If the cassette has been retained by the user for a period greater than the initial rental period then additional rental charges are made against the card credit as described above. If these charges are greater than the card credit in the memory then the card credit is reduced to zero and the user will be unable to use the machine unless he discharges the debit. He may do this in the machine described by inserting an appropriate amount of money in the coinage mechanism 18, the amount of money being displayed by the display 15. Alternatively, the machine may be arranged to enable the user to discharge the debit by using a second club card and the first time this second club card is passed through the card reader 16 within a short period of time, e.g. ten seconds, of the first "identifying" card, it will record the credit appropriate to that club card in the memory and against this will be debited any debit held against that card by the memory.

If, when the user comes to return the cassette he has retained it on rental for a period greater than a predetermined period the machine may be arranged to refuse the return of the cassette. The cost of the cassette will then be debited to the card credit in the memory and the user will be deemed to have purchased the cassette. Again, if this results in a debit balance in the memory it may be discharged by the user as mentioned above. Alternatively the machine may be arranged to accept return of a cassette even if it has been retained for more than the predetermined time and to print out a list of

overdue cassettes and the users who have rented them to enable the operator of the machine to take action to recover the cassette.

It is envisaged that club cards will not be issued except on proof of identity so that if a user fails to return a cassette on time or does get into a debit situation which he does not discharge on the machine he will be billed by the owner of the machine for the debit or contacted to return the cassette.

The machine will include disabling means to prevent use of the machine by a user of a club card which has a card credit which is zero, negative or less than a predetermined amount, e.g. a multiple of the initial rental charges. If the card credit is positive but less than the rental cost of the cassette selected the machine may reduce the card credit to zero and issue a credit note which may be subsequently used against the purchase of a fresh club card.

As has been described above, a club card may have a period of validity and will contain date information and when this has expired the club card will not be usable in the machine.

The machine may be arranged to allow credit to be established in the machine with the use of a credit or automatic teller machine (ATM) card. This is effected by first using the card reader 16 for reading the e.g. credit card. The user will then be asked to indicate how much credit he requires by operation of the key pad 17. The machine will then go on line by means of a modem, not shown, to a remote location to validate the credit to be established. Then the user will pass his club card through the card reader to establish the authorised credit in the memory 29. The machine may be arranged to issue a club card from the slot 30 in Figure 1 to a user when a credit has been authorised as a result of the user using a credit or ATM card.

The control means and memory will be so arranged that all the necessary information may be down-loaded from the machine by plugging in, for example, a portable computer printer or by a modem, if provided, to a remote site. So far as the accounting records are concerned, these will only need to be processed in so far as the club cards have not been prepaid. Even in this case it is only necessary to process the card credit allowed against each card rather than every debit and credit transaction.

The memory, as has been described, records the list of empty compartments so that an empty compartment can be opened when a cassette is returned. Moreover, when a cassette is returned the memory will record, against the cassette code, the compartment code so that a record is retained of the movements of the cassettes and if a cassette is returned in a damaged state the record will show who the last renter of the cassette was.

The machine has been described as being arranged for rental of cassettes. Additionally it may be arranged to sell cassettes and the flow chart in Figure 3 will be modified accordingly to give the user an opportunity of deciding whether to rent or buy.

The machine has been described as a self-standing machine with the club card being usable only in that machine. However, a group of machines may be interlinked so that their memories contain common information regarding the card credit of each club card in use in the group of machines. The machines will therefore be modified so as to ensure that the first time that a club card is used in any one of the machines of the group a card credit will be established in the memories of all the machines of the group. The card credit will be decreased in all the memories as transactions take place using that card, the transactions may take place in any one of the machines in the group.

The machine has been described as being a machine for renting video tape cassettes, it could also be used for renting other articles. Moreover, the machine could be used as a vending machine for vending an article or a service.

The arrangement for selecting the empty compartment into which a cassette being returned can be placed is the subject of our co-pending patent application [8709233GB].

Claims

1. A vending machine operable by the use of a club card having information recorded thereon including an identifying code, the machine including: a card reader capable of reading said information; enabling means associated with the card reader for setting the machine for operation by a user who has passed a valid club card through the card reader; a memory; means responsive to the passage of a club card through the card reader for the first time to record in the memory a credit or credit limit (the card credit) for that club card; input means to allow a user to select an article or service to be vended, comparator means to compare the card credit held in the memory for the club card which has been read by the card reader with the cost of the selected article or service and to enable the dispensing of the article or rendering of the service if the card credit is equal to or greater than said cost; and control means to allow the dispensing or effecting of the selected article or service to the user when enabled by the comparator means and to reduce the card credit by said cost.

2. A vending machine according to Claim 1 wherein the means for recording the card credit in the memory sets a common card credit for each club card the first time that the card is passed through the card reader.

3. A vending machine according to Claim 1 for use with a club card having credit information recorded thereon and wherein the card credit is recorded in the memory as a result of the club card being passed through the card reader for the first time.

4. A vending machine according to any preceding claim for use with a club card having date information recorded thereon and wherein

the enabling means does not set the machine for operation if the club card read by the card reader is out of date.

5. A vending machine according to any one of the preceding Claims wherein the machine is arranged to enable a user to establish a card credit by first using a debit or credit card, the machine including means for connection to a remote terminal to obtain authorisation of the amount of the card credit, and secondly by passing a club card through the card reader to record the authorised card credit in the memory.

6. A vending machine according to any of Claims 1 to 5 including disabling means to prevent the vending of an article or service by the use of a club card having a card credit which is zero, negative or less than the cost of the article or service selected by the user unless the user increases the card credit at least to equal the cost.

7. A vending machine according to Claim 6 including means to issue a credit note if the card credit is less than a predetermined amount while reducing the card credit to zero.

8. A vending machine according to any of Claims 1 to 6 wherein the input means is operable, when a card credit is less than a predetermined amount, to accept part payment from the card credit and to reduce the card credit to zero.

9. A vending machine according to any of Claims 1 to 7 wherein the machine is arranged to enable a user to obtain the selected article or service by using two club cards in sequence when the card credit of the first-used card is insufficient to meet the cost of the article or service selected by the user.

10. A vending machine according to Claim 8 including means for receiving money (i.e. coinage and/or notes) to pay at least in part for the selected article or service.

11. A vending machine according to any of the preceding Claims and arranged for renting re-usable articles, e.g. video tape cassettes, wherein the comparator means compares the card credit with an initial rental cost of the selected article for an initial period (which cost may include a security amount equivalent to the value of the article) and enables the dispensing of the article if the card credit is equal to or greater than the said cost, and wherein the input means allows a user to return an article after renting.

12. A vending machine according to Claim 11 wherein each article carries a code and the machine includes timing means to record the actual time period between the rental and return of an article and, if said actual period is greater than said initial period, to reduce the card credit by additional rental fees corresponding to the difference between the actual and initial periods.

13. A vending machine according to Claim 12 wherein, if said actual time period exceeds a pre-determined limit, the control means operates to prevent the article being returned to the machine and the card credit is reduced by a figure representing the value of the article or to zero or a negative amount if said figure is greater than the card credit.

14. A vending machine according to Claim 12 wherein, if said actual time period exceeds a predetermined limit, the machine prints out details of the rental transaction to enable the machine operator to take steps to recover the article.

15. A vending machine according to any preceding claim wherein, when a user first passes his club card through the card reader on the machine to establish the card credit he is required to enter a personal identification number (PIN) into the memory and wherein all subsequent transactions involving that club card also require the input of the PIN.

16. A group of vending machines according to any preceding claim which are interlinked so that their memories contain common information on the card credits of the club cards usable in the group of machines, the machines being modified so that the card credit of a club card is recorded in the memories of all the machines of the group the first time that the club card is passed through the card reader in any of the machines of the group, the card credit then being decreased in all of the memories by transactions using the club card on any of the machines in the group.

17. A group of machines according to Claim 16 when appendant to Claim 14 wherein the memories of all the machines in the group contain the PINs of each of the club cards having a card credit in the memories.

18. A vending machine substantially as hereinbefore described with reference to the accompanying drawings.

19. A group of vending machines substantially as hereinbefore described with reference to the accompanying drawings.

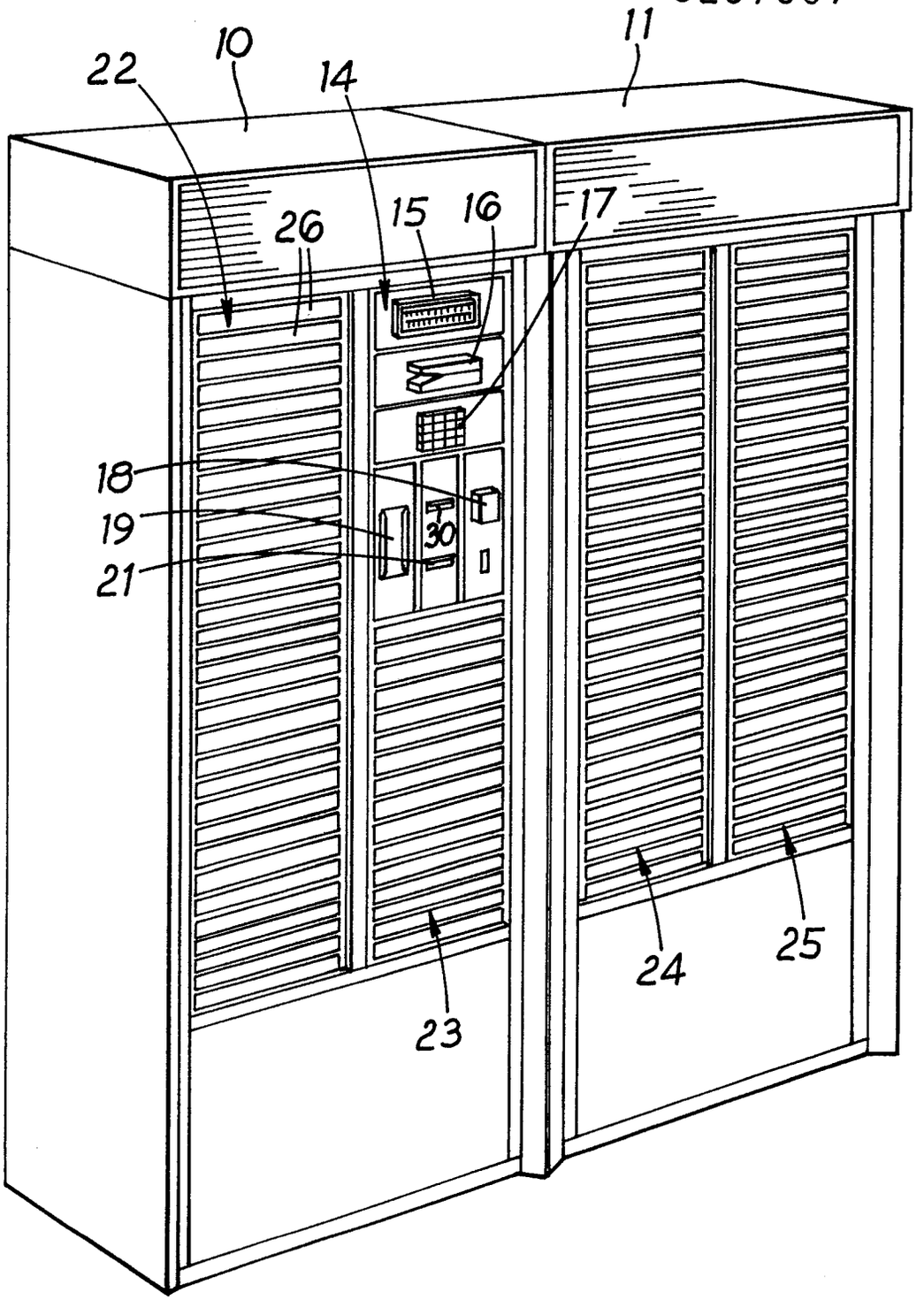

Fig. 1

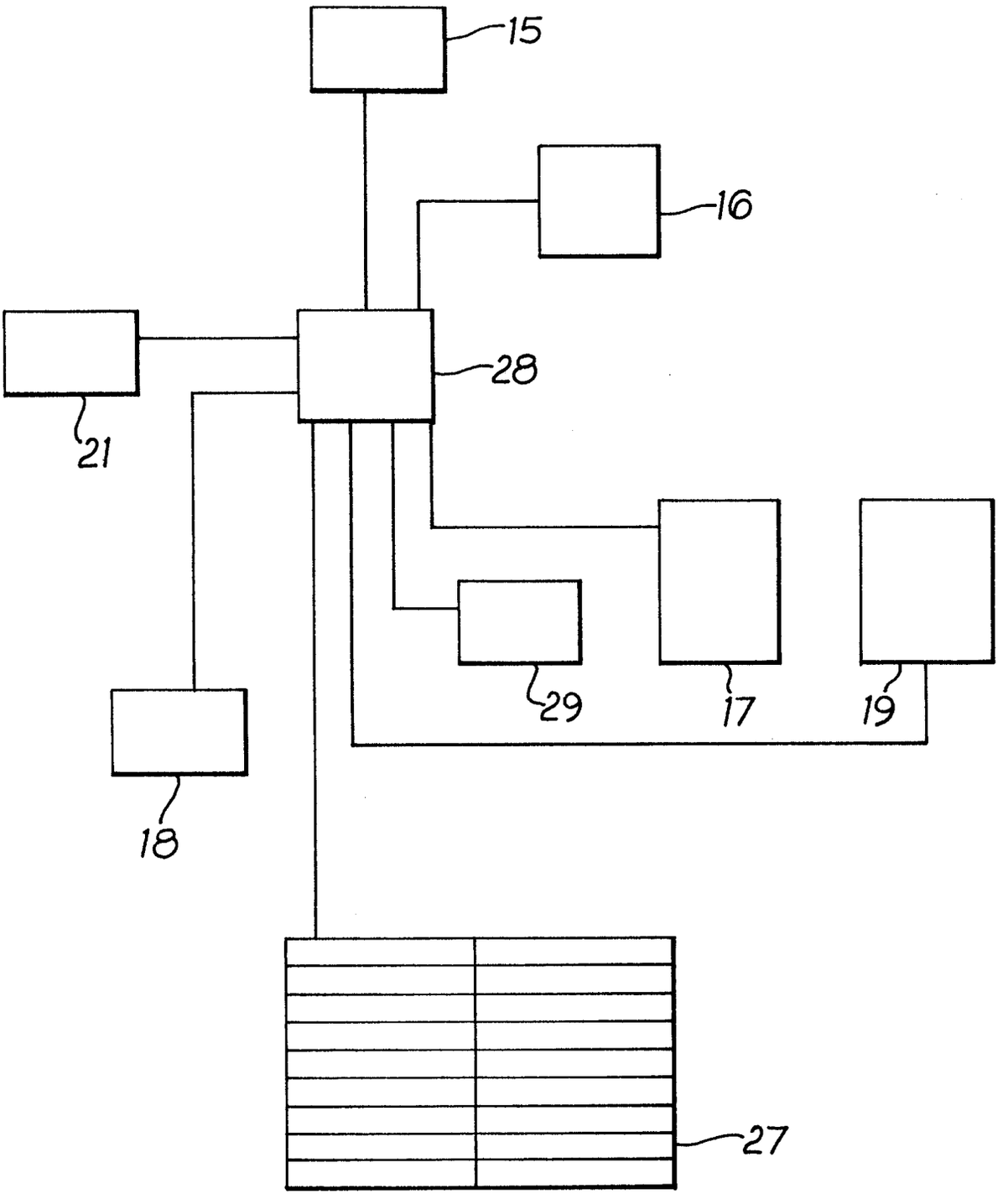

Fig. 2

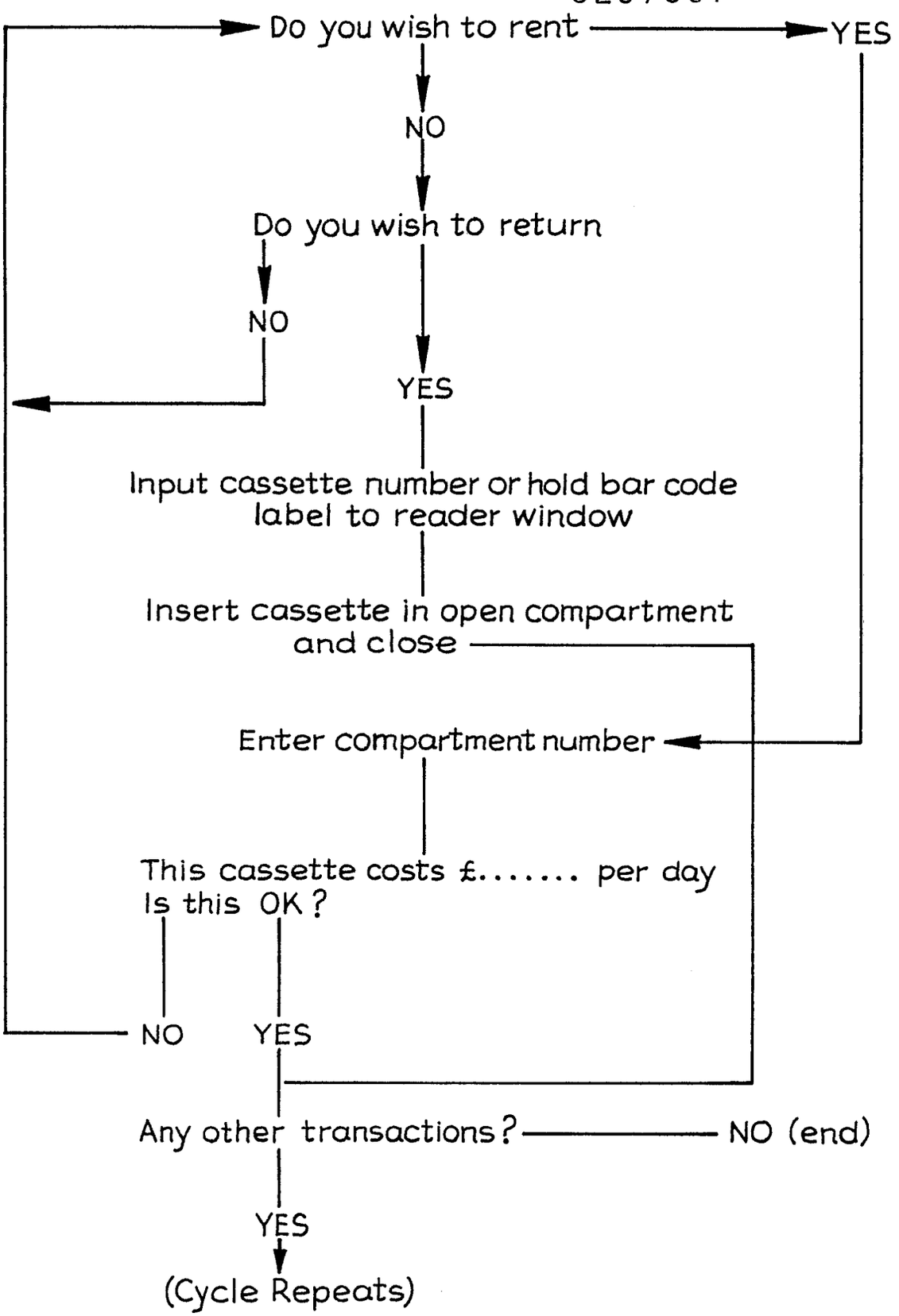
Do you wish to rent
YES
NO
Do you wish to return
NO
YES
Input cassette number or hold bar code label to reader window
Insert cassette in open compartment and close
Enter compartment number
This cassette costs £..... per day
Is this OK ?
NO
YES
Any other transactions?
NO (end)
YES
(Cycle Repeats)

Fig. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 30 3361

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	EP-A-0 205 691 (BROWN et al.) * Abstract; page 6, lines 6-20; page 7, lines 15-21; claims 1,4-6,10; figures 1-4 *	1,2,5, 11,12, 15	G 07 F 7/06 G 07 F 7/00
A		3,4,6-10,13, 14	

X	DE-U-8 431 917 (P. RAISSAKIS et al.) * Whole document *	1	
A		2-17	

A	FR-A-2 559 599 (B. GAUER) * Abstract; page 2, lines 19-37; page 6, lines 14-20; claims 1,5,8; figure 1 *	1,5,11-15	

A	US-A-4 598 810 (B. SHORE et al.) * Abstract; figures 1,22-31; column 1, lines 1-45; column 6, line 22 - column 7, line 13; column 8, line 50 - column 10, line 60; column 12, lines 47-63; claims 1-16 *	1-17	TECHNICAL FIELDS SEARCHED (Int. Cl.4) G 07 F

A	CA-A-1 207 411 (J.N. CLINTON) * Figures 1,2; claims 1,7-11,18,20,21 *	1,5,12-14	

A	WO-A-8 501 812 (AVICOM INTERNATIONAL INC.)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10-07-1988	GUIVOL,O.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)