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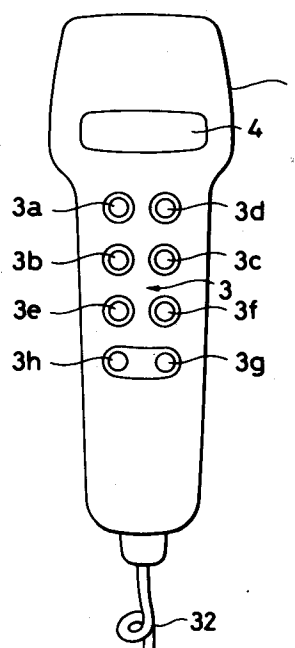
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(54) **Automatic vending machine.**

(57) An automatic vending machine having input unit includes a hand held type bar code reader. Furthermore the input unit has various operational keys, an indication unit and a control unit which may transmit via a wired or wireless medium the input information to a control unit provided in the body of the automatic vending machine so that the operator may control operations of the machine based on the data indicated on the indication unit.

FIG. 1**EP 0 479 297 A2**

FIELD OF THE INVENTION

The invention relates to an automatic vending machine, in particular to an automatic vending machine having an input unit suitable for registering article names and setting the prices of the articles.

BACKGROUND OF THE INVENTION

Management of an automatic vending machine often requires data input operations by an operator. Such operations involve, for example, registration of the articles to be sold, test operations, confirmation of sales record, and setting article prices. Generally, a key board has been used as a means for inputting the instructions and data.

Recently, a new type of input system known as a bar code system is used for this purpose, as shown in Japanese Patent Early Publication 60-189093 (also in USP No. 4,608,487). The bar codes are read by a bar code reader. The prior art includes such data and instructions in the form of bar codes printed on a sheet.

An advantage of such input system is that the operator may simply scan instructions printed on the sheet to operate the bar code reader in reading the bar codes, thereby necessary information may be input in the machine.

However, the prior bar code system mentioned above resorts to sequential selection of bar codes to be scanned, it takes time. Furthermore, in order to confirm the data read by the bar code reader, the operator must pay attention to both the bar code to read and the indicator indicating the content of the bar code. This is often difficult for the operator of the vending machine and can cause an error.

BRIEF SUMMARY OF THE INVENTION

It is an object of the invention to overcome these disadvantages mentioned above, that is, to provide an automatic vending machine which is easy to input necessary data and confirm the input data.

Therefore, an automatic vending machine according to the invention comprises:

a hand held type bar code reader having on the surface thereof a set of operational keys for inputting instructions; and

an input unit having means for transmitting, via a wired or wireless transmission medium, the information read by said bar code reader or input by said operational keys to a control unit of said automatic vending machine.

With this arrangement an operator of the vending machine may easily manipulate the input unit to perform bar code reading as well as the oper-

ational keys, without using a key-input unit provided elsewhere.

The bar code reader is preferably provided with an indication unit for visually indicating the data read by said bar code reader. Such indication unit may further improve operability of the bar code reader, since it permits the operator to confirm data while inputting the data and avoid erroneous input.

The automatic vending machine is preferably provided with a control unit for controlling predetermined modes of operations based upon the data read by said bar code reader or input via the operational keys, and for transmitting to said indication unit indication data required for indicating information concerning the predetermined modes. This may permit the operator to confirm operations of the machine.

The automatic vending machine is preferably provided with a control unit for controlling delivery of articles designated by corresponding article codes input from said bar code reader. This allows accurate designation of articles.

The above mentioned control unit has preferably means for designating articles for which prices are set means for confirming the amounts of sales of the designated articles based on the article codes input from said bar code reader. Such means allows straight forward designation of articles in setting prices thereof and straight forward confirmation of the sales.

The automatic vending machine is preferably provided with an input unit for inputting article names and a memory for storing article names input from the input unit in association with the corresponding article codes read by the bar code reader.

This minimizes errors encountered in the management of articles based on the article codes.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of an input unit according to the invention.

Fig. 2 is a cross sectional elevation of the input unit.

Fig. 3 is block diagram of a circuit of the input unit.

Fig. 4 is a bar code sheet for use in registering article names.

Fig. 5 is a general perspective view of an automatic vending machine according to the invention.

Fig. 6 is a block diagram of a control circuit for the automatic vending machine.

Fig. 7 schematically illustrates a memory map of a RAM for use with the automatic vending machine according to the invention.

Fig. 8 shows a process for establishing cor-

respondence between article selection switches and article columns.

Fig. 9 shows a process for registering vendible articles.

Fig. 10 shows a process for setting prices for each of the article columns.

Fig. 11 shows a process for setting prices for each of articles.

Fig. 12 shows a process for vending test through operations of article selection switches.

Fig. 13 shows a process for vending test through operation of an up-key /down-key.

Fig. 14 shows a quick test procedure.

Fig. 15 shows a process for confirming the gross amount of sales/number of articles sold.

Fig. 16 shows a process for confirming the gross amount of sales money and the total number of articles sold for each column.

Fig. 17 shows a process for confirming sales account and the number of articles sold.

Fig. 18 shows a process for clearing sales account.

Fig. 19 is a flow chart of a process for registering article names.

Fig. 20 is a flow chart of a process for sales mode operation.

Fig. 21 is a flow chart of a process for account mode operation.

Fig. 22 shows a print out of sales account output from a printer unit.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figs. 1 and 2 show a perspective view and a cross section, respectively, of an input unit. This is a hand held type input unit 1, which is suitable for reading a bar code at hand. The unit 1 has at one end thereof a light transmission section 2 and on one side thereof a key input unit 3. The key input unit 3 has a plurality of rubber capped keys 3a - 3h which are associated with respective switches provided beneath a base 9, so that when pushed down, close the respective switches. On the base 9 is a liquid crystal indication unit 4, which may be observed through a transparent window 16.

There is a bar code read section 5 under the base 9. The bar code read section 5 includes a light source 6 for illuminating through the light transmission section 2 bar code printed on bar code sheets 171-173 or on an article 18. The light emanating from the light source 6 passes through a collimator 7 to illuminate the bar code 8. The bar code 8 is a series of black and white bars having different widths. The light reflected from the bar code 8 returns through a lense 11 and forms an image of the bar 8 along the read line of a read sensor 12. The read sensor 12 includes a CCD

(charge-coupled device) to convert the image formed on the read line into electric signals.

The bar code key 3a provided in the key input portion 3 is used for initiating bar code reading. The key 3b, which is referred to as sales account key, is used for confirming the gross amount of sales money and number of articles sold. The clear key 3c is used for clearing the sales account data. The vending test key 3d is used for testing the vending operation. The quick test key 3e is used for a quick vending test by quickly delivering all the articles in succession from a designated column. The start/stop key 3f is used for temporarily stop start/vending operation while undergoing a vending test or a quick test. The up key 3g and down key 3h are used for designating a column number of the relevant column during setting operations as described later.

Fig. 3 is a block diagram of a control circuit 33 for use with the input unit 1, in which a first controller 13 controls the operation of the bar code read section 5 and a second controller 14 controls the operations of the key input unit 3 and the indication unit 4. The controller 14 is connected with a controller 20 provided in an control box 21 of the automatic vending machine, and controls transmission of signals to and from the control unit 20. The controllers 13 and 14 include an 8-bit and a 4-bit CPU, respectively, for carrying out programmed operations. There are also provided a wave form control circuit 15, a power source 31. The read sensor 12 generates signals associated with the pattern of the scanned bar code 8. The signals are output to the control circuit 15 which in turn converts the signals to digital signals and supplies them to the controller 13. A power source circuitry 31 is supplied with 8-volt and 12-volt DC voltages from a power source 30 of the automatic vending machine and in turn provides 8-volt voltage to the light source 6, 12-volt voltage to the read sensor 12, and 5-volt voltage to the controllers 13 and 14.

In order to read a bar code printed on a bar code sheet 171, 172, 173, 174 (Fig. 5) or printed on articles 13 so that the article codes thereon may be identified, the input unit 1 is initiated by pushing the bar code key 3a.

An article code is a standardized JIS(Japan-Institute -Standard) bar code symbol for POS systems, which is called JAN code. This includes a first two digits representing a name of a country (for example 49 assigned to Japan), a 5-digit article maker code, a 5-digit article code (or article item code), and a check digit. In the U.S. UPC(Universal Product Code) is used.

As shown in Fig. 4, a bar code sheet 173 includes: a bar code 60 symbolizing information required to "define article name" ; a code 61 "to clear article name" which contains information re-

quired to clear registered article name; a bar code 62 for " confirmation of an article name" which contains information required for confirming registration of article names; a bar code 63 for use in completing defining article names; and bar codes 64 which are coded characters for use in inputting article names, all the bar codes printed on the sheet.

Fig. 5 illustrates an over all perspective view of an automatic vending machine provided with the input unit 1. The automatic vending machine has a coin slot C on its front service panel, a multiplicity of switches S for a customer to select his desired article, an indicator I for indicating sale conditions such as "sold out" or "on sale" status for each article column, a sale indicator J for indicating that a designated article is vendible, and a lever L for refunding money when cancelling the purchase. The automatic vending machine has therein 10 article columns and 10 article selection switches S associated with respective columns for selecting articles therein. On the inside of a front door 19 are a control box 21 and a coin mechanism 22 comprising a coin selector 50, a coin pay-off unit 52 and so on. The input unit 1 is connected with the control box 21. Next to the control box 21 is a small printer unit 23 for printing out a record of the sales account.

Fig. 6 is a block diagram of a control unit 20 installed in the control box 21 of the automatic vending machine. The control unit 20 includes a CPU (central processing unit) 41 for executing operations according to a program. The CPU 41 is connected, via an address bus 45 and a data bus 46, with a ROM 42 which stores the program, a RAM 43, and an I/O interface 44. The I/O interface 44 is connected to a control circuit 33 of the input unit 1, the coin mechanism 22, an indication unit 48, a selection unit 49, a coin selector 50, and a printer unit 23.

The coin mechanism 22 transmits to the CPU 41 via I/O interface 44 an acknowledgement signal indicative of detecting correct amount of coins by the coin selector 50. The coin mechanism 22 actuates the coin pay-off unit 52, when it receives a pay-off signal from the CPU 41 via I/O interface 44.

The indication unit 48 includes indicators I associated with respective article columns and selection indicators J associated with respective article selection switches S. Each of the indicators is controlled by indication data received from CPU 41 via I/O interface 44. The selection indicator J is mounted on the front service panel 51, and in vending mode indicates for customers which of the articles may be purchased for the coins deposited by a customer.

A selection unit 49 includes the multiplicity of article selection switches S and provides signals to

the CPU 41 via I/O interface 44 indicative of the operation of the switches S.

The coin selector 50 includes driving motors one for each article column for delivering articles. Operations of the motors are controlled by the instructions given by the CPU 41 via I/O interface 44.

The printer unit 23 prints out sales accounting data output from the CPU 41 in response to the operation of the sales account key.

A RAM 43 has at least 9 memory regions, as shown in a map of the memory region of Fig. 7A and Fig. 7B.

A memory region 43a is a buffer memory having an article code buffer for storing the article code read by the input unit 1, a column indicator buffer, a selection switch indicator buffer, a buffer for storing the amount of coins deposited, a printer buffer, and an article name buffer for use in article name registration. The column indicator buffer is a 5-bit buffer which may store indication data to be indicated by turning on or off five column indicators 19, each indicating a bit "1" or "0". The selection switch indicator buffer is also a 5-bit buffer and may store indication data to be indicated by turning on or off five selection switch indicators 20, representing a bit "1" or "0", respectively.

A memory region 43b stores correspondence between the each article selection switch S and its corresponding article code to be selected by the switch. It has thus the same number of addresses as the number of the switches S.

A memory region 43c stores the correspondence between each article column and its corresponding article selection switch S.

The memory thus has the same number of addresses as the the number of columns.

A memory region 43d stores prices of articles in association with respective article columns and article codes. It has a maximum number of five addresses, since in this example the automatic vending machine has a maximum of five article columns.

A memory region 43e stores the gross number of articles sold and the gross amount of money therefor as well as other sales account data for articles in association with the registered article codes.

A memory region 43f stores article names at article name addresses according to the registered article codes. In the preferred embodiment shown, the article codes are input from the input unit 1 by reading the bar codes printed on a bar code sheet 173.

A memory region 43g stores the total amount of money for sold articles.

A memory region 43h stores the total number of articles sold.

A memory region 43i stores the article codes and corresponding prices thereof.

The automatic vending machine equipped with the above input unit 1 is operated as follows. Read operation of inputting bar coded data into the machine of the input unit 1 is started by pushing down the bar code key 3a. This causes to activate the light source 6 and to instruct the control unit 20 so that the automatic vending machine turns into bar code read mode. The following operations are possible with the automatic vending machine.

Establishing correspondence between the article selection switches and the article columns

This procedure follows steps shown in Fig. 8. After pushing down the bar code key 3a, the operator sets the light transmission section 2 of the input unit 1 to a bar code 8a. The bar code 8a, printed on a bar code sheet 171, includes information for establishing correspondence between the article selection switches S and the article columns. The control unit 20 receives this coded information from the controller 14 and processes it for establishing the correspondence. This operation is called correspondence establishing mode. The control unit 20 reads an article selection switch data stored in the RAM 43 in the control unit 20, and generates an indication data for turning on the indicator I associated with the article selection switch S, which is specified by the article selection switch data.

Designation of an article column may be made by either pushing down the up-key 3g or the down-key 3h, or reading a bar code indicative of a column number of the column. The former procedure is as follows. As the up-key 3g or 3h is first operated, the controller 14 transmits a key switch data indicative of a column number 1 to the control unit 20. The control unit 20 then reads article selection switch data for the corresponding switch S stored in the memory region 43c of the RAM 43 and transmits an indication data for turning on the corresponding indicator I associated with the column number 1, thereby activating the indicator I. The indication unit 4 transmits indication data indicative of the column number 1 to the control unit 14. The indication unit 4 indicates the column number under the control of the controller 14.

When the up-key 3g is operated the controller 14 also transmits to the control unit 20 a key switch data indicative of a column number which is greater than the preceding one by 1, or smaller by 1 if the down-key 3h is operated. Thus, the control unit 20 instruct the indication unit 4 to turn on the correct indicator specified by up-key 3g or down-key 3h, and at the same time transmits necessary indication data to the controller 14 and the indicator I to turn on the corresponding indicator I. In this

manner the operator may designate in turn different columns by properly operating either up-key 3g or down-key 3h. In the later procedure, the operator selects a bar code 8b, which is printed on the bar code sheet 171 and indicative of the column number. The operator then sets the light transmission section 2 of the input unit 1 to the bar code 8b to inform the control unit 20 of the column number. The control unit 20 transmits to the controller 14 and the corresponding indicator I the indication data to turn on the indicator.

Following the designation of an article column, an article selection switch S associated with the designated column is operated. This results in transmission of an article selection switch data indicative of the corresponding article selection switch S to the control unit 20, which in turn causes the RAM 43 to store data indicative of the correspondence between the designated column number and the article selection switch S operated and output an indication data required for activating the corresponding indicator I.

In order to clear the correspondence between an article selection switch S and a corresponding column 31, the article selection switch S is pushed down following designation of the article column and turning on of the indicator I. The control unit 20 will clear the data in the RAM defining the correspondence.

Registration of Vendible Articles

This is a procedure for registering vendible articles, called article registration mode. The procedure follows steps as shown in Fig. 9. The operator first sets the light transmission section 2 to a bar code 8c printed on the bar code sheet 172. The bar code 8c includes encoded information specifically provided for registering articles. The controller 20 is set in the article registration mode by the coded signal 8c received from the controller 14. Also, designation of an article column may be made by either operating keys or reading the bar code 8b. Following the designation of the column, an article code is read by the input unit 1 set to the bar code printed on the article to be store in the designated column. Receiving the article code from the controller 14, the control unit 20 stores the article code in the memory region 43b of the RAM 43 in association with the designated column. The control unit 20 also reads out a preset price data for the article stored in the RAM 43 in association with the article code, and transmits the data as an indication data to the controller 14 so that the price is indicated on the indication unit 4.

Price setting

Price may be set for each column (in a column-wise price setting mode) or for article (in an article-wise price setting mode described below).

(1) Column-wise price setting mode

This procedure is shown in Fig. 10. Following the operation of the bar code key 3a, the operator sets the key input unit 3 of the input unit 1 to the bar code 8d printed on a price bar code sheet 173. This bar code 8d includes coded information required for "price setting". As the information is received from the controller 14, the control unit 20 enters the price setting mode, in which a desired article column is designated by operating the up-key 3g and control unit 20 transmits to the controller 14 indication data so that the corresponding column number is indicated. The control unit 20 then reads out the price data stored in the memory region 43d of the RAM 43 in association with the designated column, and transmits them as indication data to the controller 14. Thus, the indication unit 4 indicates the column number first and then indicates the price.

The light transmission section 2 of the input unit 1 is then set to a bar code 8e, which is printed on the price bar code sheet 173. In this example shown in Fig. 10 the price bar code stands for 200 yen. Thus, the control unit 20 causes the RAM to store encoded 200 yen as the price associated with the article column and transmits to the controller 14 an indication data indicative of the price of 200 yen.

(2) Article price setting

This procedure is shown in Fig. 11. As in the case of column-wise price setting mode, the light transmission section 2 of the input unit 1 is set to a bar code 8d following the operation of the bar code key 3a, which sets the control unit 20 in the price setting mode. Then, a bar code printed on an article 18 is read by the input unit 1. In response to the coded data received from the controller 14, the control unit 20 reads the corresponding price data stored in the RAM and transmits them as indication data to the controller 14. The indication unit 4 indicates the price associated with the article code stored in the memory region 43e of the RAM 43. If the setting of the price is to be changed, for example to 150 yen, the light transmission section 2 of the input unit 1 is sequentially set to a bar code 8f indicative of 100 yen and a further bar code indicative of 50 yen 8g. The control unit 20 then causes the RAM 43 to store data indicative of 150 yen in the memory region 43e. In this case the control unit 20 transmits to the controller 14 indication data indicative of 100 yen at the time the bar

code 8f is read, and transmits to the controller 14 indication data indicative of 150 yen at the time the bar code 8g is read. If only the bar code 8f is read by the input unit 1, price is set to be 100 yen in the RAM 43

Vending Test

In this test a particular article column 31 may be selected by the article selection switch S or the up key 3g and/or down key 3h.

(1) Vending Test by the Article Selection Switches S

This test is performed following the steps shown in Fig. 12.

First, the vending test key 3d is operated, which causes the controller 14 to transmit key switch data to the control unit 20,

setting the control unit 20 in the vending test mode. In this mode, the control unit 20 transmits indication data to the indication unit so as to turn on all the indicators I. If an article selection switch S is operated under this condition, corresponding article selection switch data are transmitted to the control unit 20. The control unit 20 then searches the memory region 43c of the RAM 43 for the corresponding article column, and outputs control data so that the vending unit 50 delivers an article from the article column. When another column is to be operated, another corresponding article selection switch S is operated. In order to terminate the vending test, the vending test key 3d is operated again or a refund lever L is turned. The later lever will turn on the refund switch of the coin mechanism 22. In this case the control unit 20 clears the vending test mode when the key switch data indicative of the operation of the vending test key 3d or the data indicative of the operation of the refund switch is transmitted from the controller 14.

(2) Vending Test by Up key 3g/Down key down-key 3h

This test is performed following the procedure shown in Fig. 13. As in the case of the previously described test, this test is started by the operation of the vending test key 3d. First, a particular column is designated by properly operating the up key 3g or the down key 3h. Then the control unit 20 transmits vending data to control the vending unit 50 so that an article is delivered once from the column. If the start/stop key 3f is operated once more, the control unit 20 repeats vending from the same column once again. If the vending test key 3d is operated one more time or if the refund lever is operated, the test is ended.

Quick Test

A quick test is performed to test if the vending machine may successively deliver articles from designated columns. This test mode may be utilized also when removing articles from a column. The test proceeds in steps as shown in Fig. 14. As the quick test key 3e is operated, the control unit 20 is set in the quick test mode. Then, while setting the light transmission section 2 of the input unit 1 to an article code 8b printed on the column setting bar code sheet 171 or to a label of an article 18 to be subjected to the test, the start/stop key 3f is operated to start vending operation. Receiving from the control unit 14 a coded data indicative of the corresponding column number, the control unit 20 outputs vending data for instructing delivery of an article from the column, thereby actuating the vending unit 50 to deliver articles in succession from the column. On the other hand, when the control unit 20 receives from the controller 14 an article code, the control unit 20 reads the memory 43b of the RAM 43 for the corresponding column number, and then outputs vending data that controls delivery of the designated article from the column designated by the column number. In a case where a multiplicity of columns is designated or there corresponds a multiplicity of articles to a designated article code, the control unit 20 starts vending operation for the least numbered column, and proceeds to the operation of the greatest numbered column. When the vending operations are performed for all the columns, or when the quick test key 3e is operated again during the test, the quick test mode is ended. If instead the start/stop key 3f is operated during the test, the control unit 20 instructs a temporary halt of the test, which is resumed when the start/stop key 3f is operated again. It should be noted that designation of a column may be made by the corresponding article selection switch S instead of reading the bar code 8b printed on the column bar code sheet 171.

Confirmation of Sales Account

If the sales account key 3b is operated once, gross amounts of sales for each column and for each article are indicated. The numbers of articles sold are indicated for each column and for each article if the key is operated twice.

(1) Confirmation of the gross amounts of sales in yen and number of articles sold

There is a confirmation mode that follows those steps shown in Fig. 15. Receiving key switch data from the controller 14 indicative of the operation of the sales account key 3b, the control unit 20 is set

in a sales amount confirmation mode. First, the memory region 43g of the RAM 43 is searched for the gross sales amount, which is transmitted to the controller 14 as indication data. The controller 14 controls the indication unit 4 to indicate the gross sales amount. If the sales account key 3b is operated again, the control unit 20 transmits to the controller 14 data indicative of the number of articles sold retrieved from the RAM, thereby indicating the number on the indication unit 4. If the key is operated once more, the control unit 20 ends the confirmation operation.

(2) Confirmation of Gross Amount of Sales and Number of articles for Each Column

This proceeds in steps as shown in Fig. 16. The operation of the sales account key 3b sets the control unit 20 in the sales account confirmation mode, which follows the same steps as the operation as the mode (1) up to indicating the gross sales amount on the indication unit 4. If in this mode the up-key 3g or down-key 3h is operated, the controller 14 transmits to the control unit 20 key switch data indicative of the operation of the key associated with the column numbered 1, thereby indicating the number on the indication unit 4. The control unit 20 then reads the memory region 43e of the RAM 43 for sales amount of money, and transmits to the controller 14 the data as indication data associated with the article code for the column, thereby indicating the data on the indication unit 4. It should be noted that the column to be confirmed may be designated by reading the bar code 8b printed on the column setting bar code sheet 171.

If the sales account key 3b is operated again with the sales amount displayed for a column, the control unit 20 transmits to the controller 14 the number of articles sold stored in the memory region 43e of the RAM 43 as indication data which is indicated on the indication unit 4. The column may be switched to another one by operating the up-key 3g or down-key 3h, or by reading a bar code for a desired column. A third operation of the sales account key 3b will end the sales account confirmation mode by the control unit 20.

(3) Confirmation of Sales Account for Each Article

This confirmation mode proceeds in steps as shown in Fig. 17. The mode is initiated by a first operation of the sales account key 3b. Following this initiation, the light transmission section 2 of the input unit 1 is set to an article bar code printed on the article 18 for which confirmation is to be made. Receiving from the controller 14 coded article data, the control unit 20 retrieves the corresponding col-

umn number stored in the 43b of the RAM 43 and calculated the number of the article sold, which is transmitted to the controller 14 as indication data, thereby indicating on the indication unit 4 the number of the articles sold.

A second operation of the sales account key 3b with the sales amount of money indicated on the indication unit 4 causes the 20 to calculate the number of articles sold from the column and transmit the number data to the controller 14 as indication data to be indicated on the indication unit 4. The control unit 20 repeats this operation for other columns by sequentially retrieving column numbers stored in the 43b of the RAM 43 for other columns, thereby indicating the numbers of articles sold from other columns on the indication unit 4.

(4) Clearing Sales Accounts

Clearing sales accounts proceeds in steps as shown in Fig. 18. This procedure is initiated by continuous operation of the sales account key 3b over 2 seconds or more during indication of the sales amount of money or number of articles sold. Such operation of the sales account key 3b causes the control unit 20 to clear the memories of the RAM 43 of both the amount of money and the number, and end the mode.

Article Name Registration

The control unit 20 may be used for registering names of articles vendible by the automatic vending machine. The operation for this registration is initiated by scanning an "article name registration" bar code 60 printed on a bar code sheet 173 by input unit 1. Fig. 19 shows control operation for the registration by the CPU 41. The CPU 41 first clears the article code buffer and the article name buffer, and proceeds to step 1.

In step 1, a bar code on the bar code sheet 173 is read, the category of which is identified by the CPU 41 in steps S1, S4, S7, S10, and S13.

If in step S2 the code is found belonging to article codes, the process proceeds to step 3, in which CPU 41 stores the article code in the article code buffer.

If the bar code read in the step S1 is an "article name clear" code (step S4), the process proceeds to a step S5, in which a determination is made whether the article code is stored in the article code buffer. If it is, then the process advances to a step S6, where the memory region 43f of the RAM 43 storing the article code is cleared.

In a step S7, the code retrieved in the step S1 is judged whether it is an "article name confirmation" code. If it is, the process proceeds to a step S8, where a further determination is made whether

the article code is stored in the article code buffer. If it is, then the process proceeds to a step S9 where the CPU 41 reads the article name stored in the article code buffer 43f of the RAM 43 associated with the article code and transmits the article name to the printer buffer in the RAM 43 so that the name of the article defined or changed is printed by the printer unit 23.

In a step S10, a determination is made whether the bar code retrieved in the step S1 is a character code or not. If it is, a further determination is made in a step S11 if the article code is stored in the article code buffer. If it is, the process proceeds to a step S12 where the CPU 41 stores the coded character information in the article name buffer in the RAM 43. Following this step, the name of the article is registered in the article name buffer by scanning the bar code associated with the article name. Every time such character information is input the CPU 41 outputs to the control circuit 33 of the input unit 1 data indicative of the number of the characters as indication data. The control circuit enables indication of the number on the indication unit 4, thereby informing the operator of the position of the character to be input next.

In a step S13 it is determined whether the code retrieved in the step S23 is an "article name confirmed" code. If it is, the process proceeds to a step S15 where the article name stored in the article name buffer is stored at the address associated with the article code stored in the article code buffer (memory region 43f) in the RAM 43. This amounts to registration of the article name in the RAM 43 for the article designated by the input article code.

Vending Mode

Referring now to Fig. 20, a procedure for the automatic vending machine in vending mode is described below.

In a step S20 the CPU 41 determines if data indicative of the amount of deposited coins is supplied from the coin mechanism 22. If it is, the process advances to a step S21 where the current amount of money deposited is added to the amount of money already deposited which is stored in a "deposited money buffer". In the next step S22, it is determined whether an article selection switch S is operated for selection of an article. If it is, the process goes to a step S23, where the memory regions 43b and 43c of the RAM 43 are searched for the article code designated by the article selection switch S. The article code is stored in the article code buffer. In the next step S 25, the memory region 43d is searched for the price of the article based on the article code stored in the article code buffer, which price is compared with

the amount of money stored in the deposited money buffer to thereby determine whether sale is permissible or not.

If the sale is permissible, the memory region 43c of the RAM 43 is searched for the column number in a step S25 based on the article code stored in the article code buffer. In the next step S26 the CPU 41 generates actuation signals to actuate the driving motor of the column so that the article is delivered therefrom in a controlled manner and have the coin mechanism 22 pay off change.

Following the completion of the vending mode, the CPU 41 proceeds to a step S27 where it is determined whether the article code stored in the article code buffer is stored also in the memory region 43e of the RAM 43. If it is, it implies that the address at which the sales account data are stored for the article has been set in the 43e. In this case the process proceeds to a next step S28, where the CPU 41 adds the amount of the current sale to the gross sales amount stored in a sales data memory associated with the article code, after which the process returns to the step S20.

If, however, the article code stored in the article code buffer is not stored in the memory region 43e in the RAM 43, the process advances to a step S29, where the article code is stored along with the sales data in the memory region 43e, and the process then returns to the step S20. The CPU 41 thus establishes a sales data memory region in the memory region 43e and stores the first sales account data therein. In a step S30 the CPU 41 adds to the gross amount of money stored in the memory regions 43g and 43h the current amount of sale, and the number of articles sold is increased by 1.

Sales Account Mode

The sales account data stored in the memory region 43e and the registered article name stored in the memory region 43f may be printed out by the printer unit 23 by operating the sales account key 3b on the input unit 1. Details of the procedure is described below with reference to Fig. 21.

The CPU 41 provides actuation signals to the input unit 1 in a step S50. In a step S51, a bar code article name is read. In a step S52, the CPU 41 determines whether the code read in a step S51 is an article code. If it is, the process proceeds to a step S53 where the CPU 41 checks if the same article code is stored in the memory region 43e of the RAM 43, that is, whether a sales account data memory region is set in the memory region 43e in association with the article code. If it is, the CPU 41 proceeds to a step S54 where the sales account data memory region is searched for the sales account data associated with the article code, which

is transferred, along with the article code and the article name, to the printer buffer in the RAM 43 and output to the printer unit 23. The printer unit 23 prints out a sales account table listing these data as shown in Fig. 24. In this exemplary table the price of the article indicated by the article code is set at 100 yen. The articles are stored in columns numbered 1, 2, and 3. Such vending condition as shown in the printed table may be set in the setting mode by designating the columns numbered 1, 2, and 3 and inputting the price of 100 yen following the read of the article code. Since the CPU 41 outputs the sales account data to the control circuit 33 of the input unit 1 as indication data the sales account data may be confirmed on the indication unit 4 of the input unit 1.

In a step S55 a determination is made whether a second operation of the sales account key 3b is made to end the sales accounting. If it is, the automatic vending machine resumes the vending mode. If, on the other hand, it is not, the process returns to the step 50.

Claims

1. An automatic vending machine, comprising:
 - a hand held type bar code reader having on the surface thereof a set of operational keys for inputting instructions; and
 - an input unit having means for transmitting, via a wired or wireless transmission medium, the information read by said bar code reader or input by said operational keys to a control unit of said automatic vending machine.
2. An automatic vending machine according to Claim 1, wherein said bar code reader is provided on the surface thereof with an indication unit for visually indicating the data read by said bar code reader.
3. An automatic vending machine according to Claim 1, further comprising therein a control unit for controlling the automatic vending machine so as to carry out predetermined modes of operations based upon the data read by said bar code reader or input via the operational keys, and for transmitting to said indication unit indication data required for indication of said data read by the bar code reader and relevant information for said operations.
4. An automatic vending machine according to Claim 3, wherein said control unit has means for controlling delivery of articles designated by corresponding article codes input from said bar code reader.

5. An automatic vending machine according to Claim 4, wherein said control unit has means for designating articles in setting prices thereof and in confirming the amounts of sales thereof based on the article codes input from said bar code reader. 5

6. An automatic vending machine according to Claim 1, further comprising:
input unit for inputting article names; and 10
a memory for storing the names of the articles input from said input unit in association with the corresponding article codes read by said bar code reader.
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FIG. 1

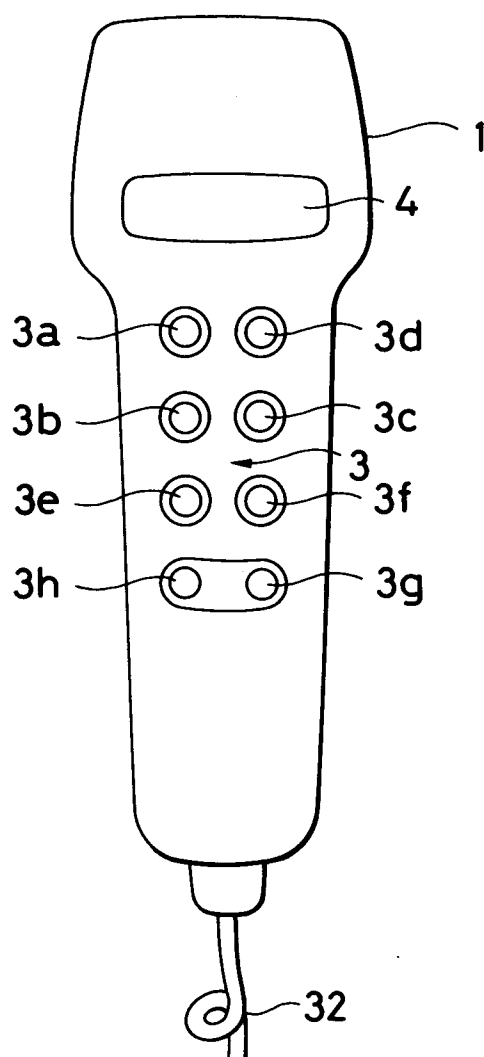
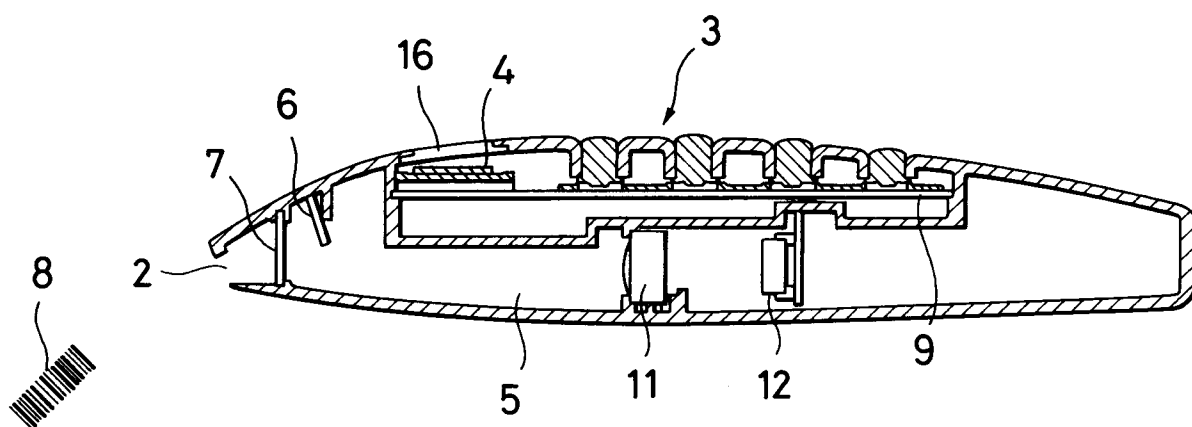


FIG. 2



3. 6. 1. 1.

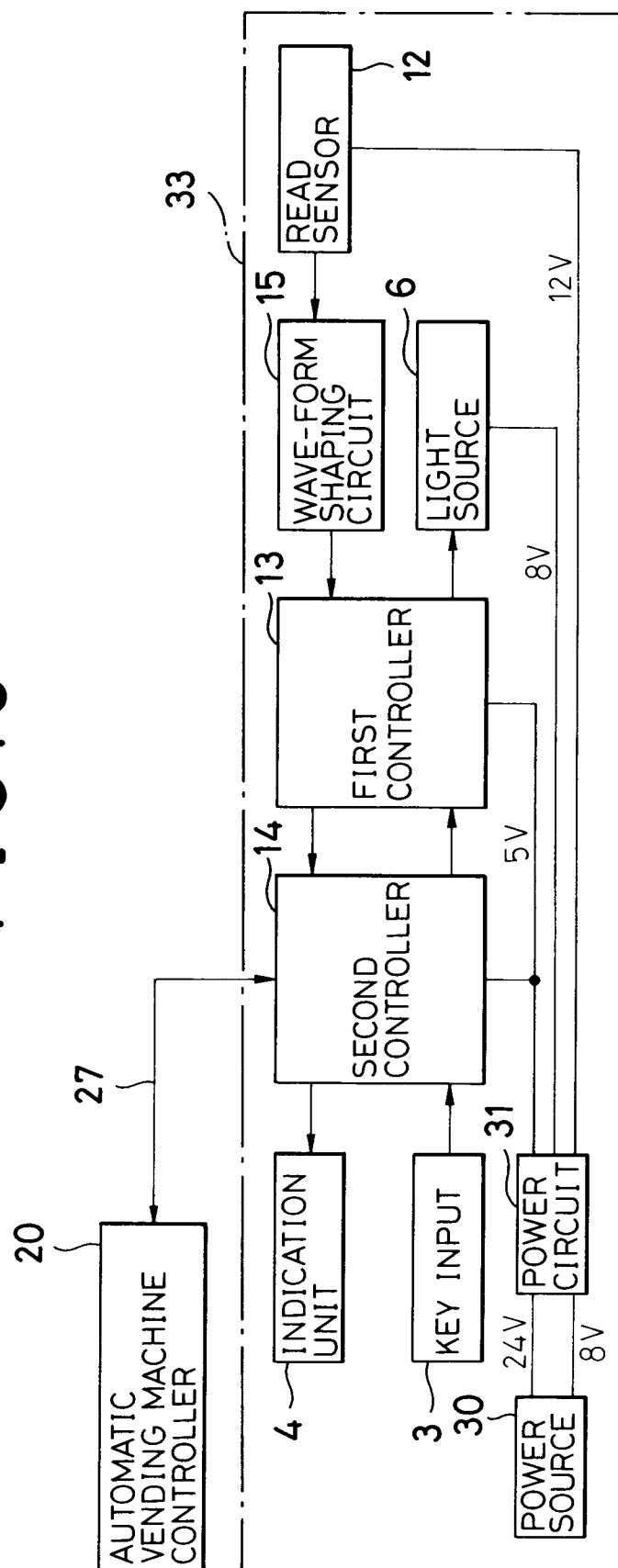


FIG. 4

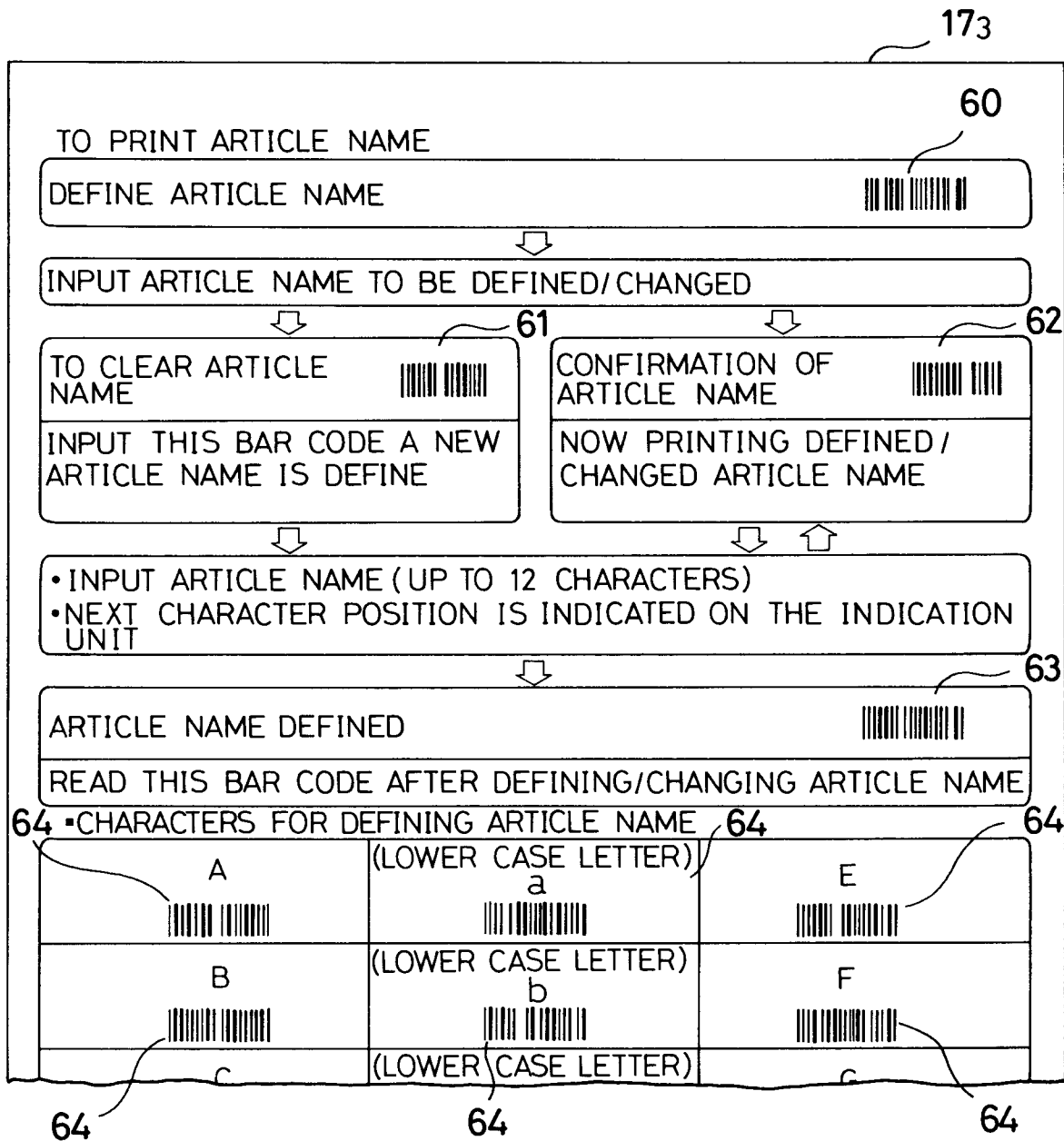


FIG. 5

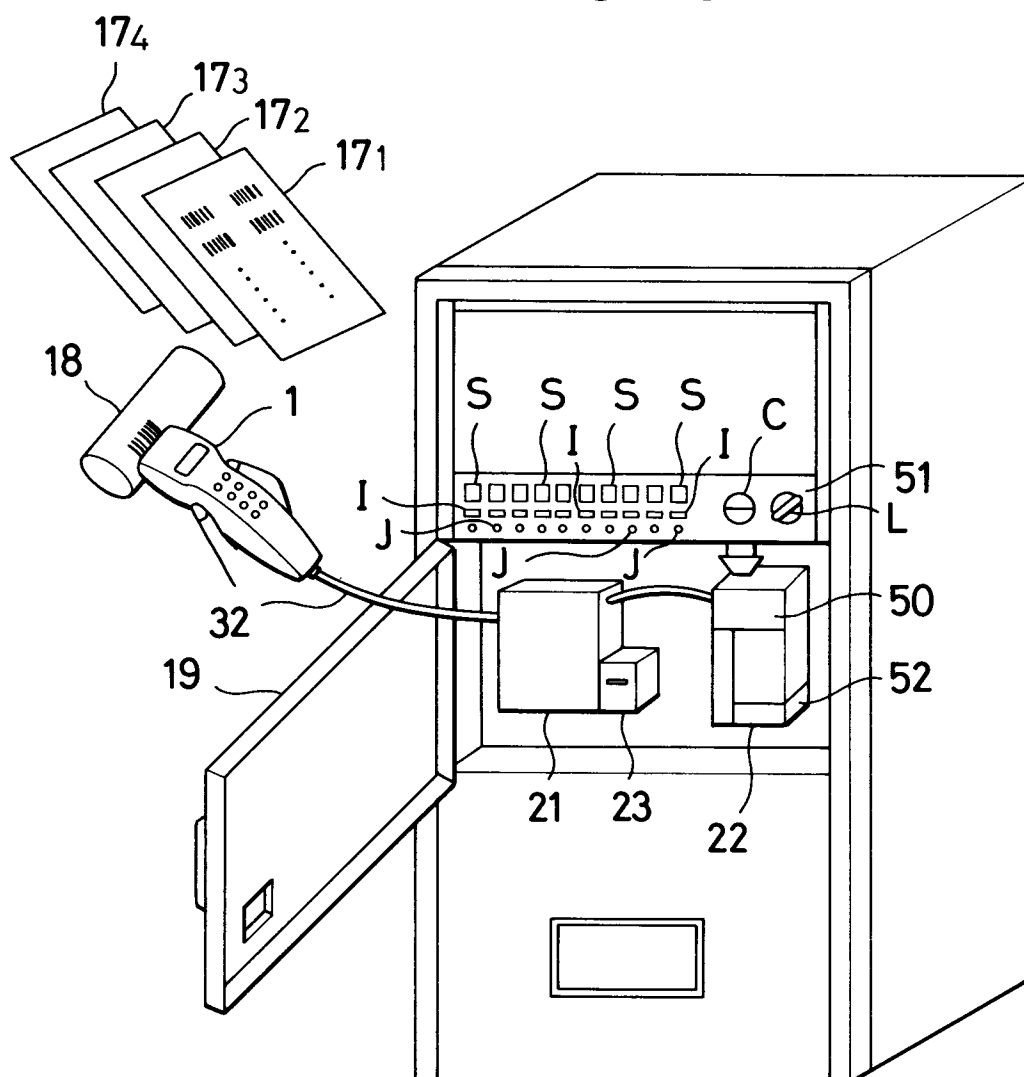


FIG. 6

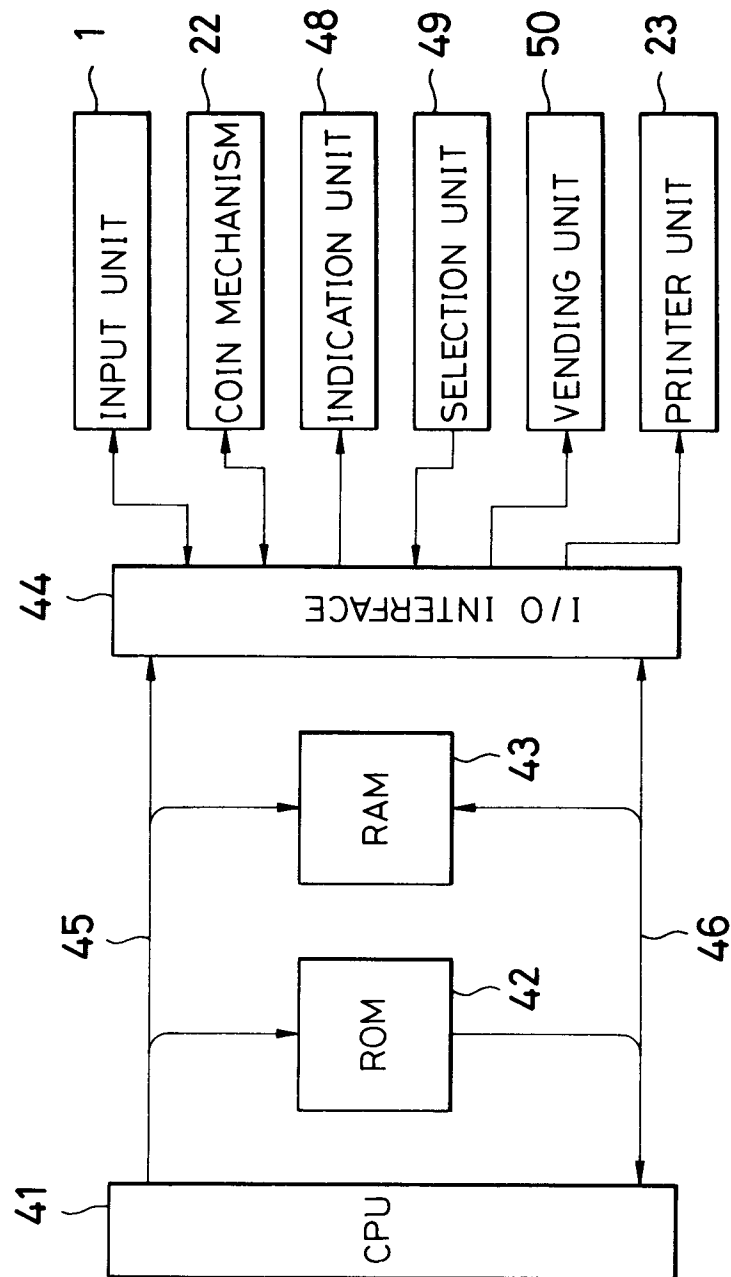


FIG. 7A

43

ARTICLE CODE BUFFER	43a
COLUMN INDICATOR BUFFER	
SELECTION INDICATOR BUFFER	
DEPOSITED COIN BUFFER	
PRINT BUFFER	
ARTICLE NAME BUFFER	

ARTICLE CODE 1	SALES ACCOUNT DATA
ARTICLE CODE 2	SALES ACCOUNT DATA
⋮	

43e

ARTICLE CODE 1	ARTICLE NAME
ARTICLE CODE 2	ARTICLE NAME
⋮	

TOTAL SALES AMOUNT OF MONEY	43g
TOTAL SALES NUMBER OF ARTICLES	43h

FIG. 7B

43

ARTICLE SELECTON SWITCH 1	ARTICLE CODE	43b
ARTICLE SELECTON SWITCH 2	ARTICLE CODE	
ARTICLE SELECTON SWITCH 5	ARTICLE CODE	

ARTICLE COLUMN1	ARTICLE CODE	43c
ARTICLE COLUMN 2	ARTICLE CODE	
ARTICLE COLUMN 5	ARTICLE CODE	

ARTICLE CODE 1	PRICE	43d
ARTICLE CODE 2	PRICE	
ARTICLE CODE 5	PRICE	

ARTICLE CODE	PRICE	43i
ARTICLE CODE	PRICE	
ARTICLE CODE	PRICE	

FIG. 8

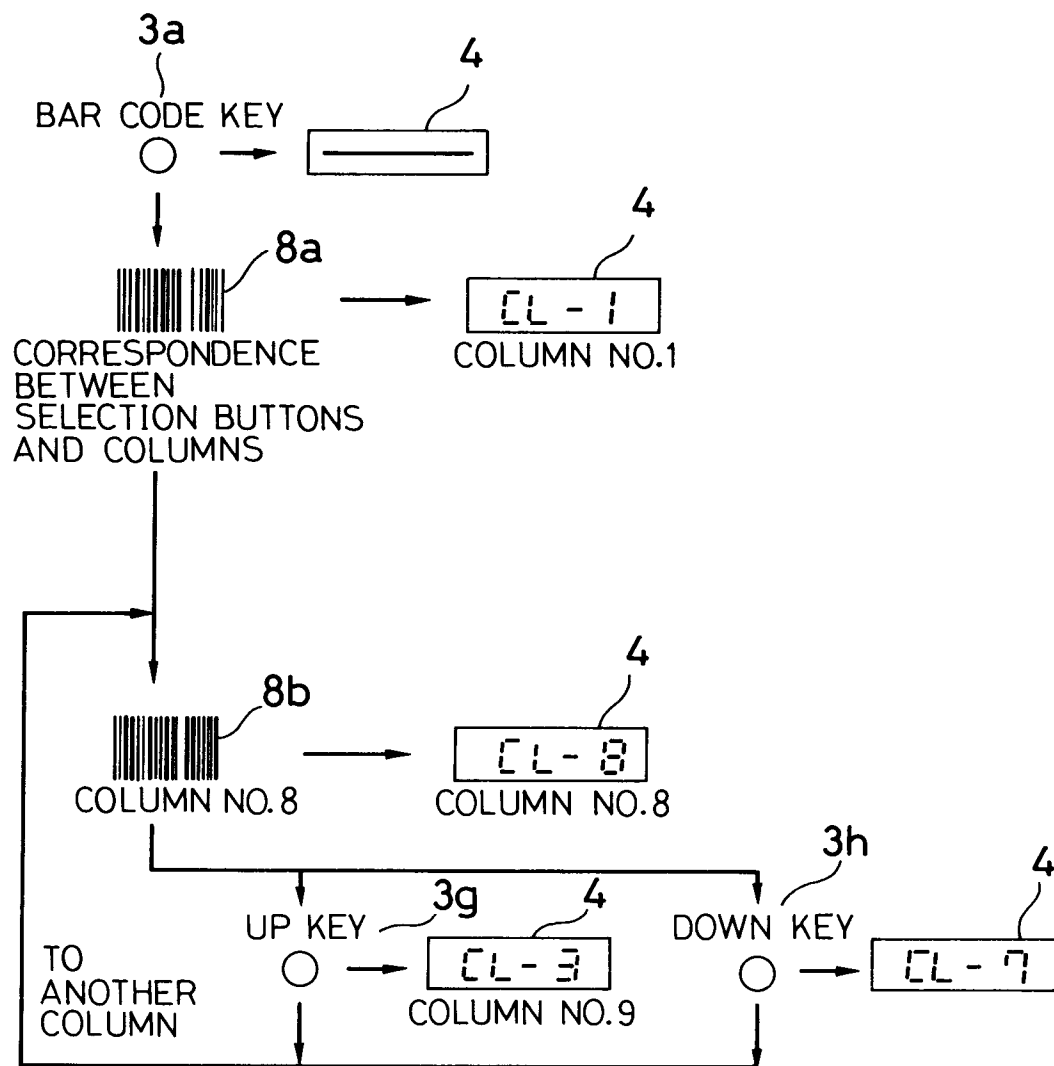


FIG. 9

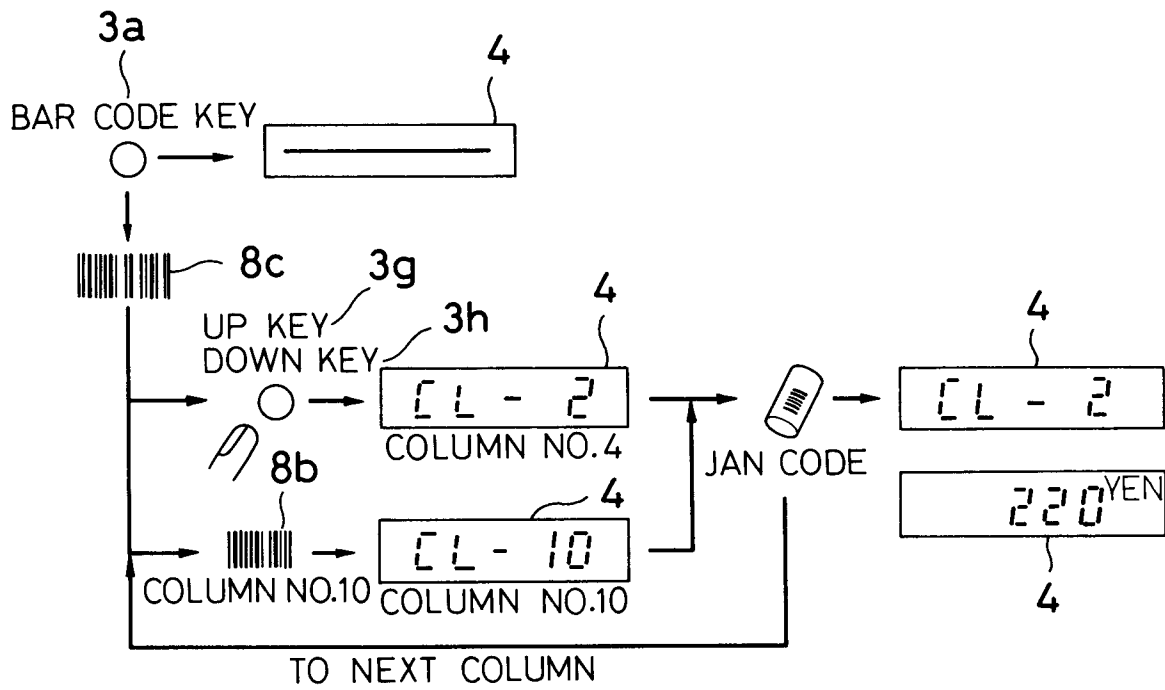


FIG. 10

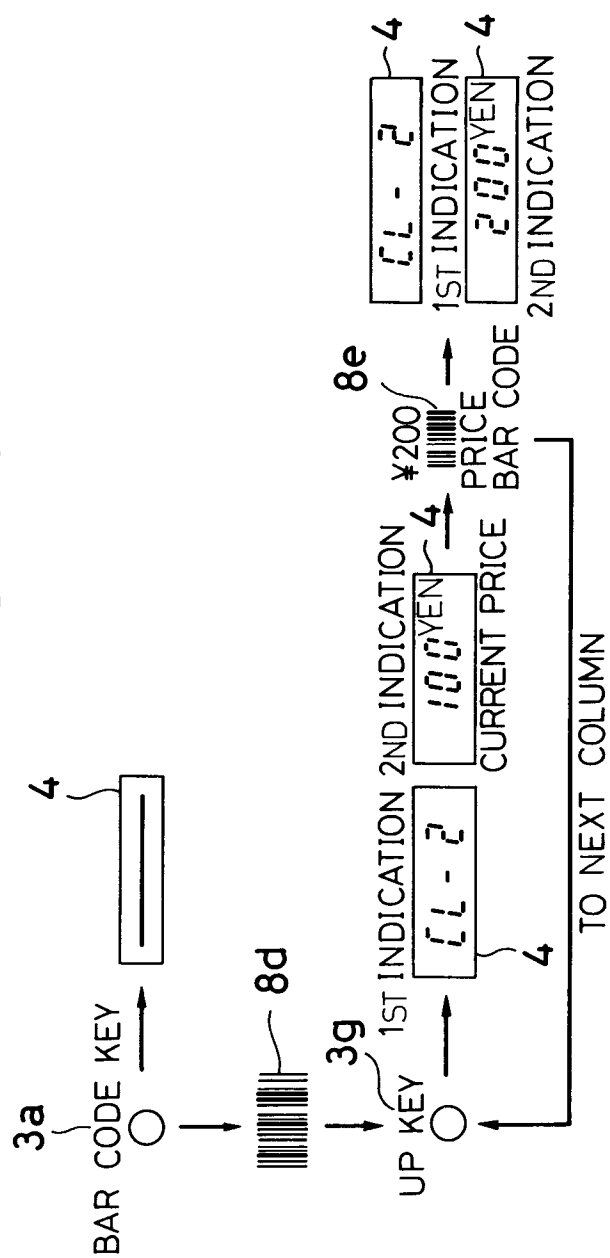


FIG. 11

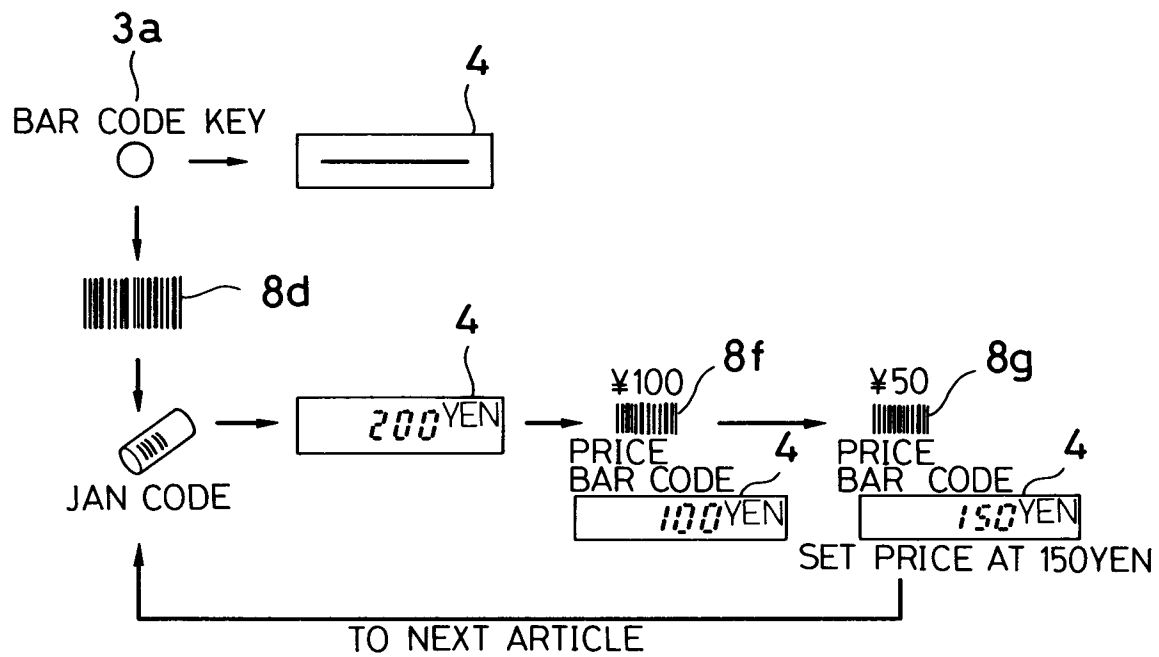


FIG. 12

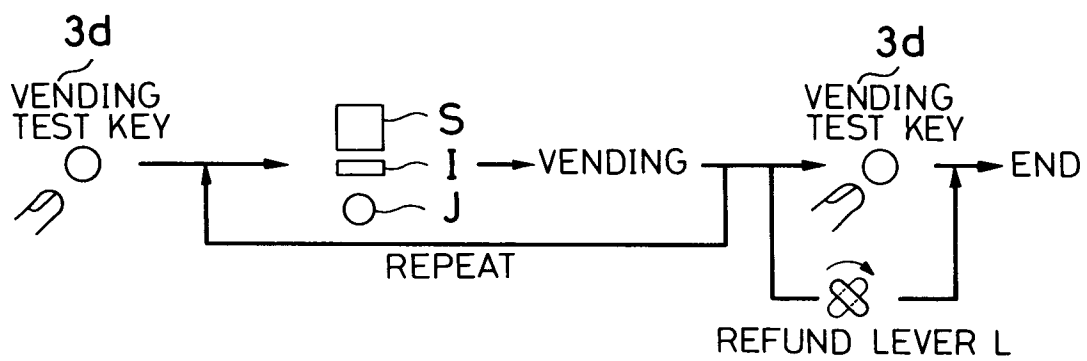


FIG. 13

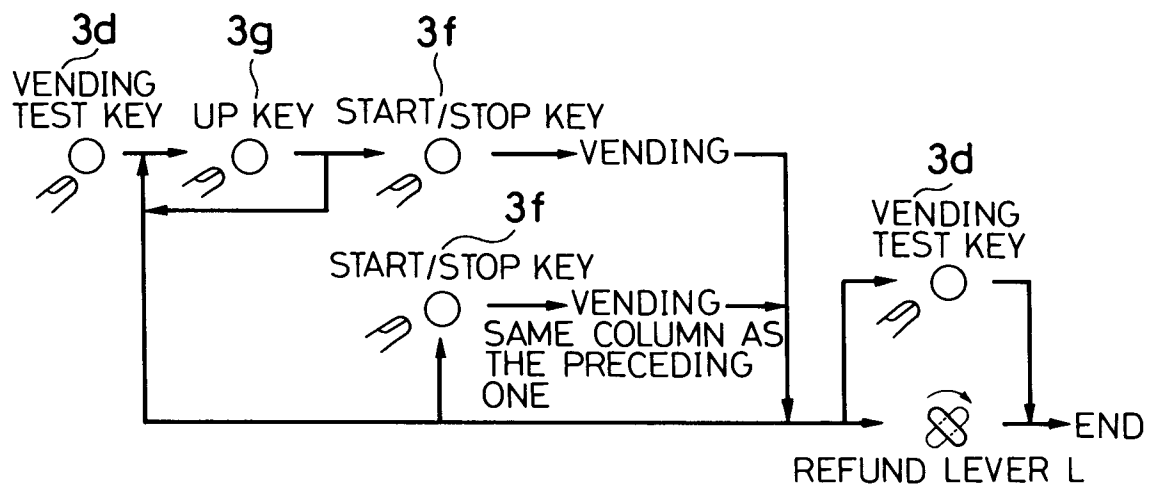


FIG. 14

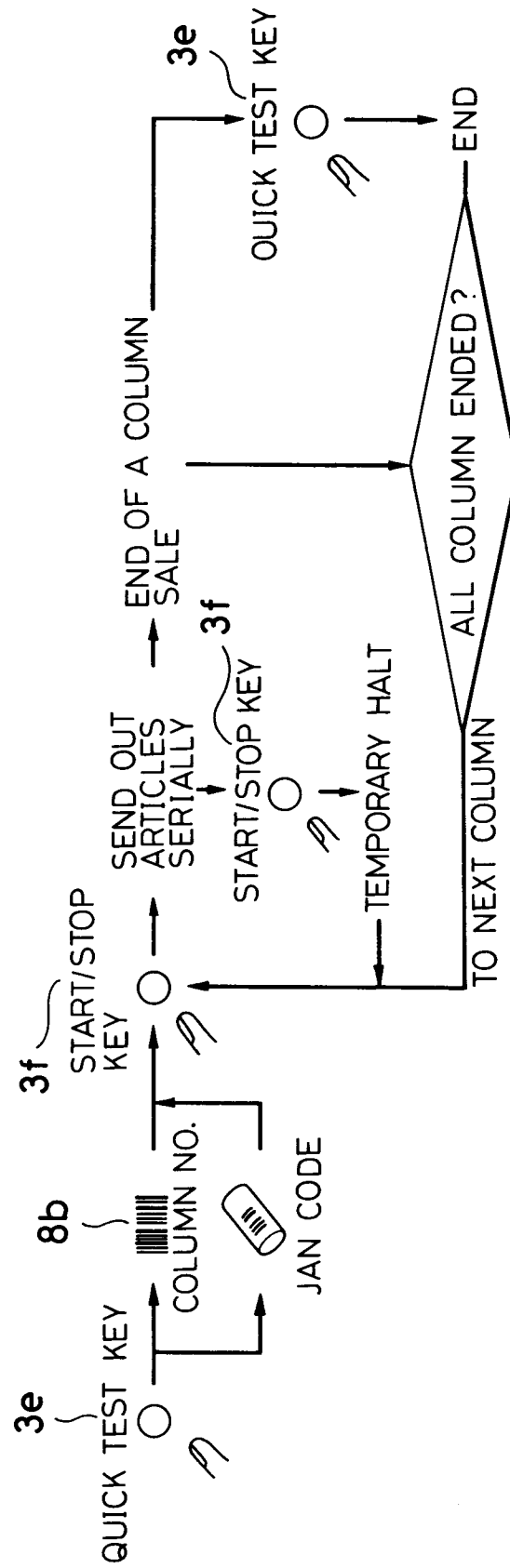


FIG. 15

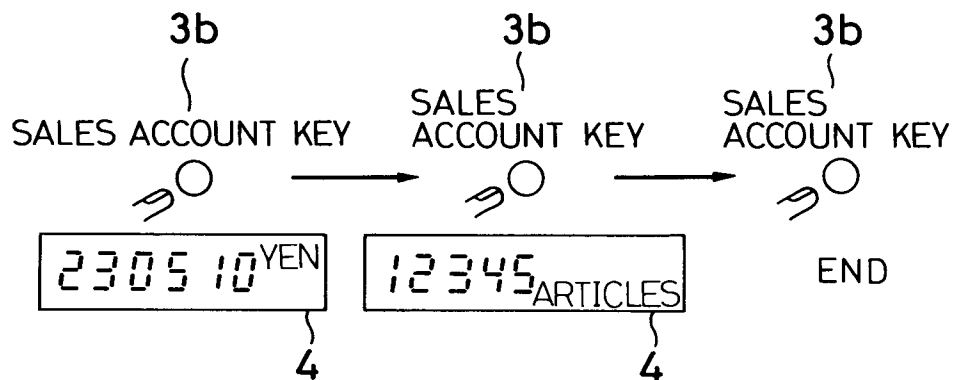


FIG. 16

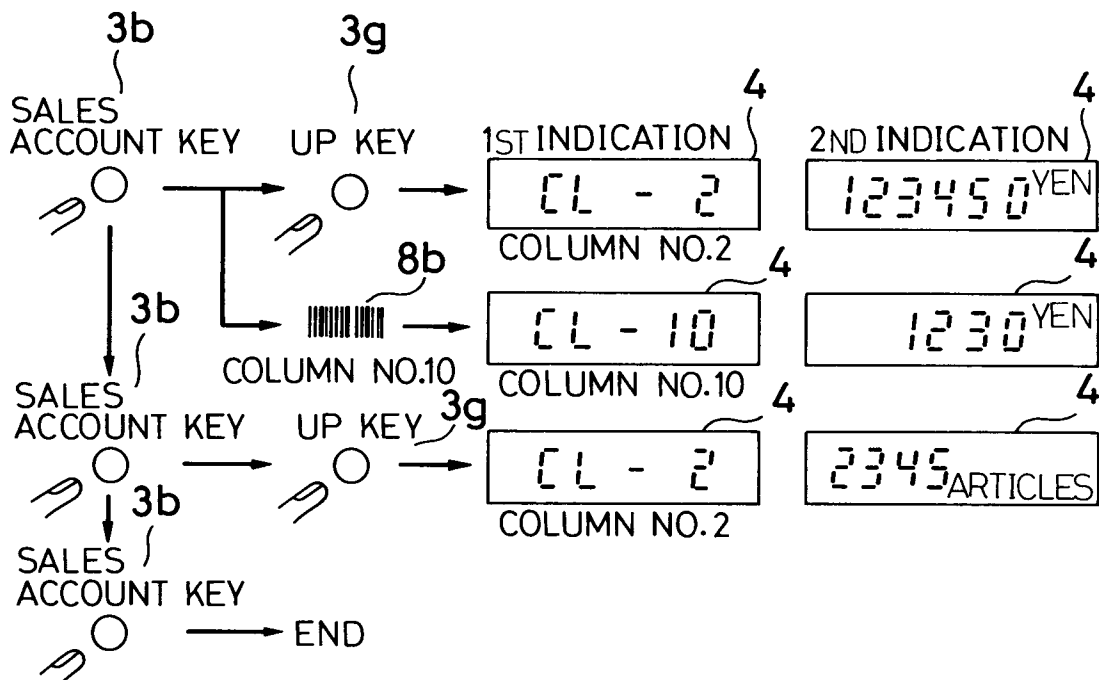


FIG. 17

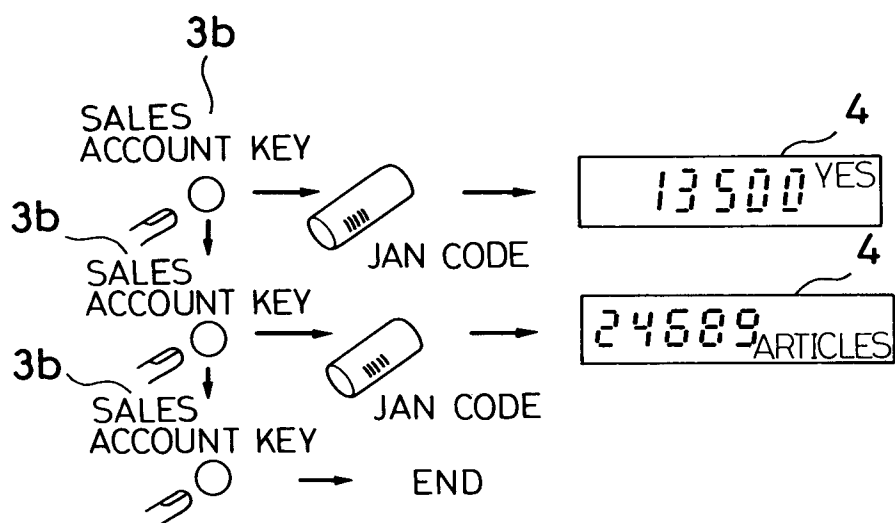


FIG. 18

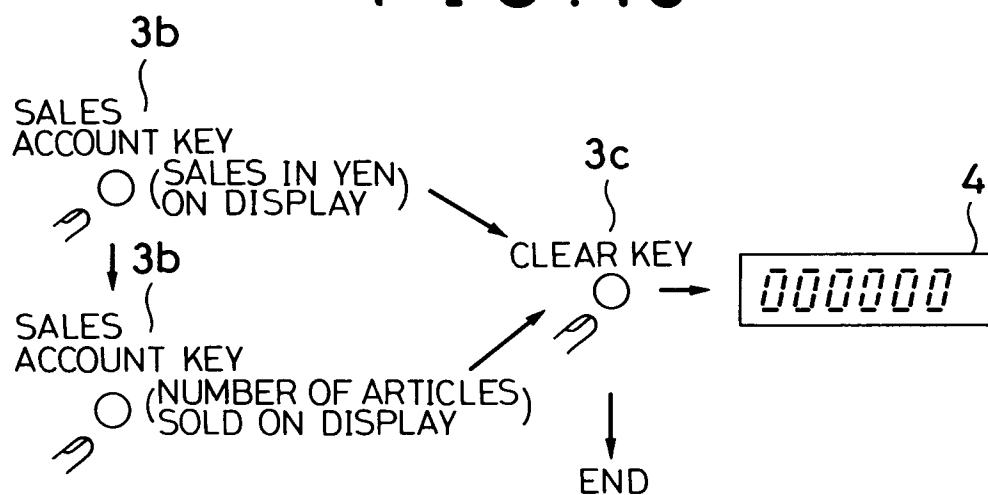


FIG. 19

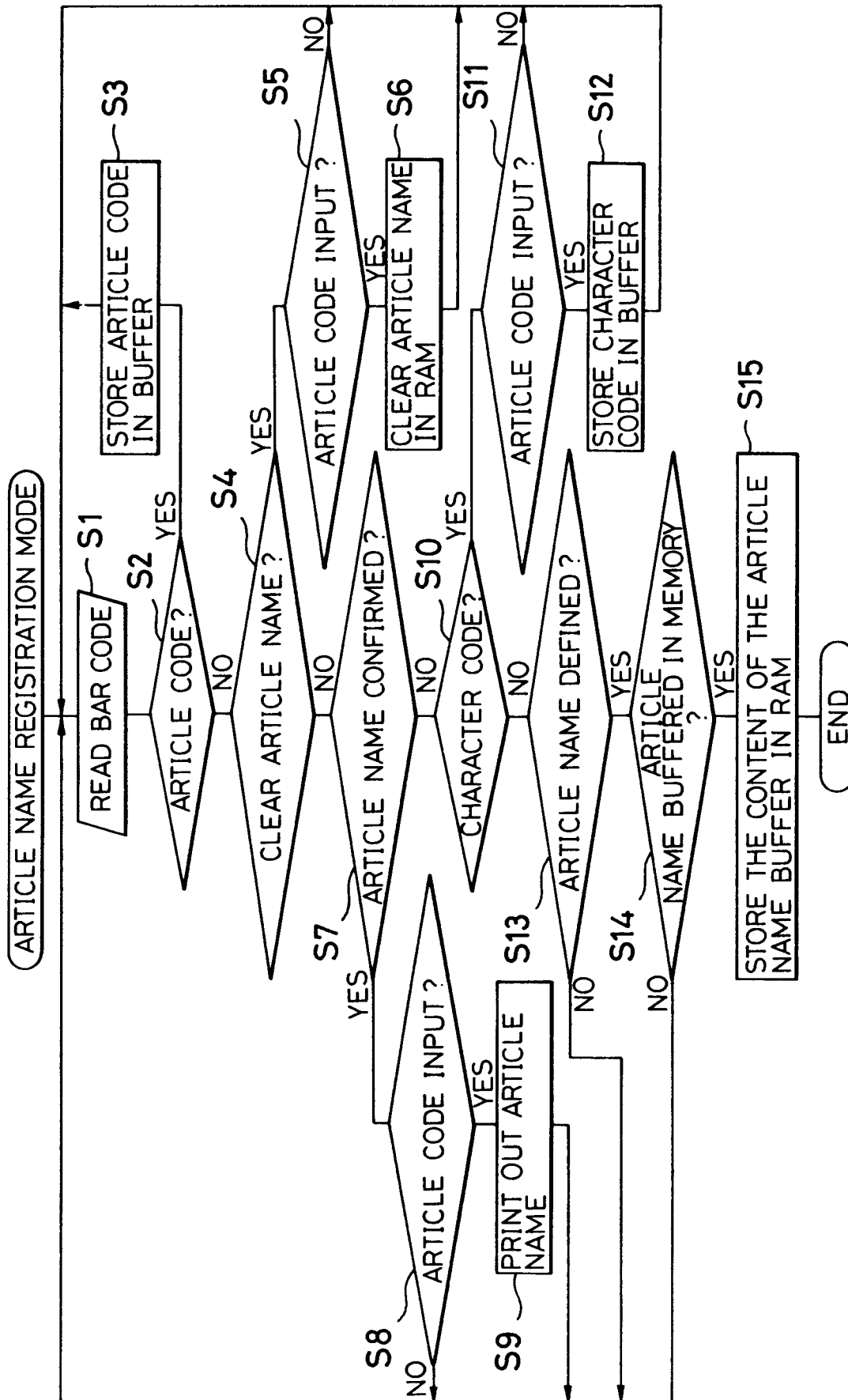


FIG. 20

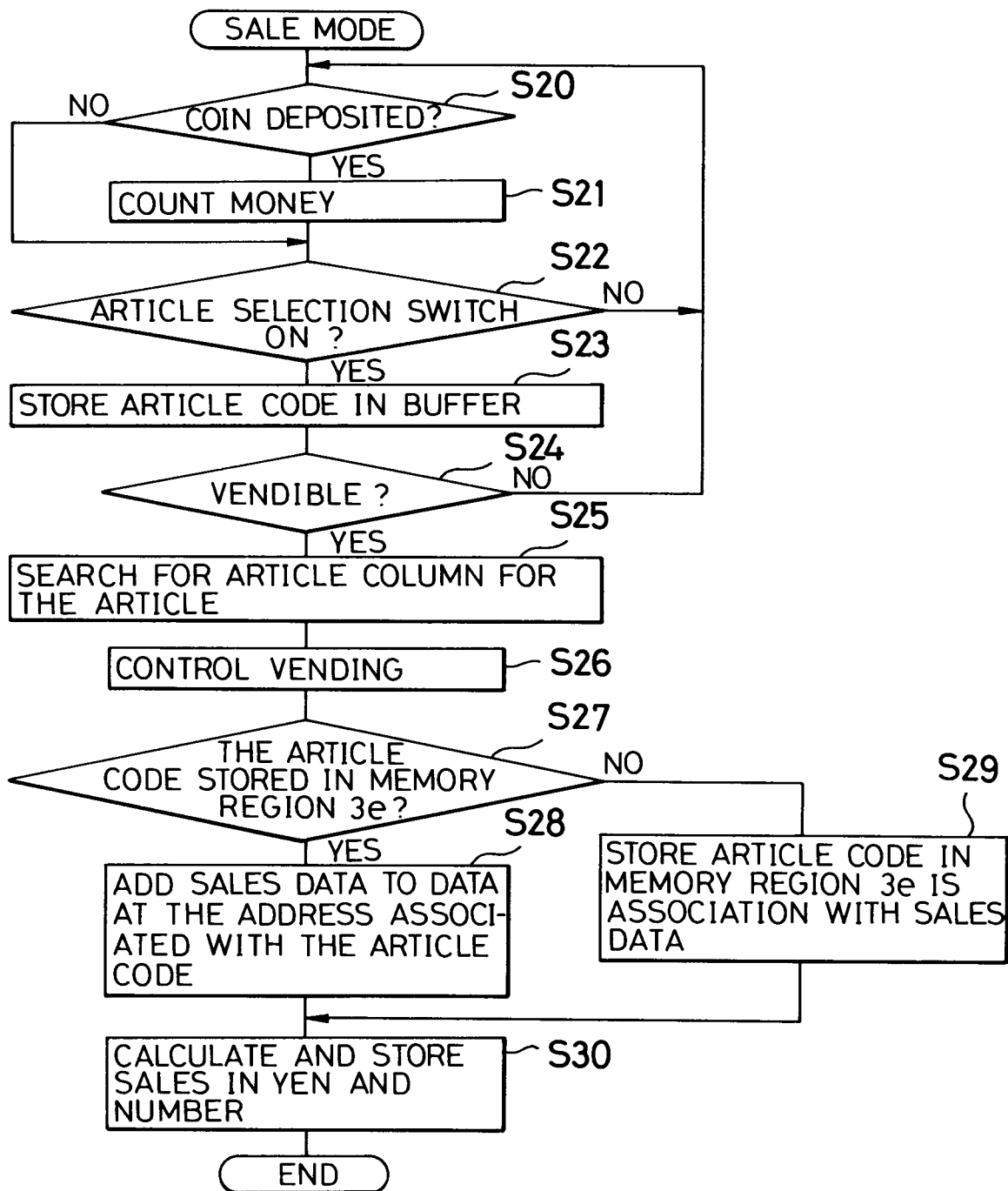


FIG. 21

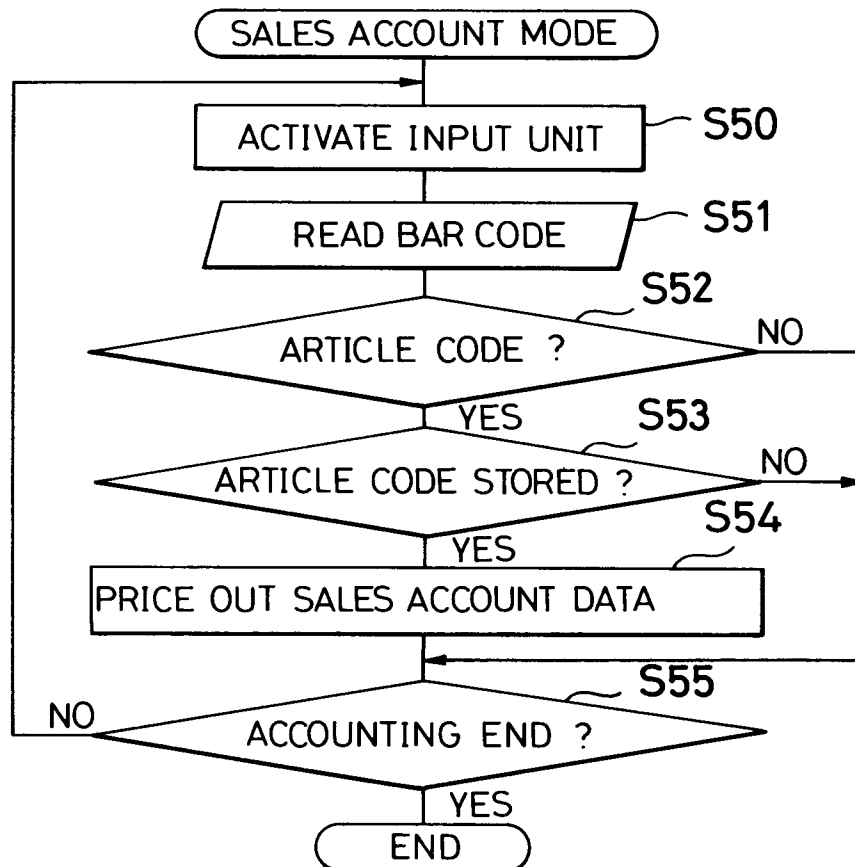


FIG. 22

ARTICLE CODE	ARTICLE NAME	ARTICLE COLUMN	PRICE	SALES IN NUMBER	SALE IN YEN
4923456789123	CANNED COFFEE	NO. 1 · 2 · 3	100 YEN	345 ARTICLES	34 500 YEN