

United States Patent

[11] 3,632,988

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[21] Appl. No. **4,322**

[22] Filed **Jan. 20, 1970**

[45] Patented **Jan. 4, 1972**

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[32] Priorities **Jan. 22, 1969**
Japan
44/4627;
Jan. 23, 1969, Japan, No. 44/4972; Jan. 24, 1969, Japan, No. 44/5078; Jan. 24, 1969, Japan, No. 44/5079

[50] Field of Search..... 340/149 A,
151, 153; 235/61.7 B, 61.7; 221/7

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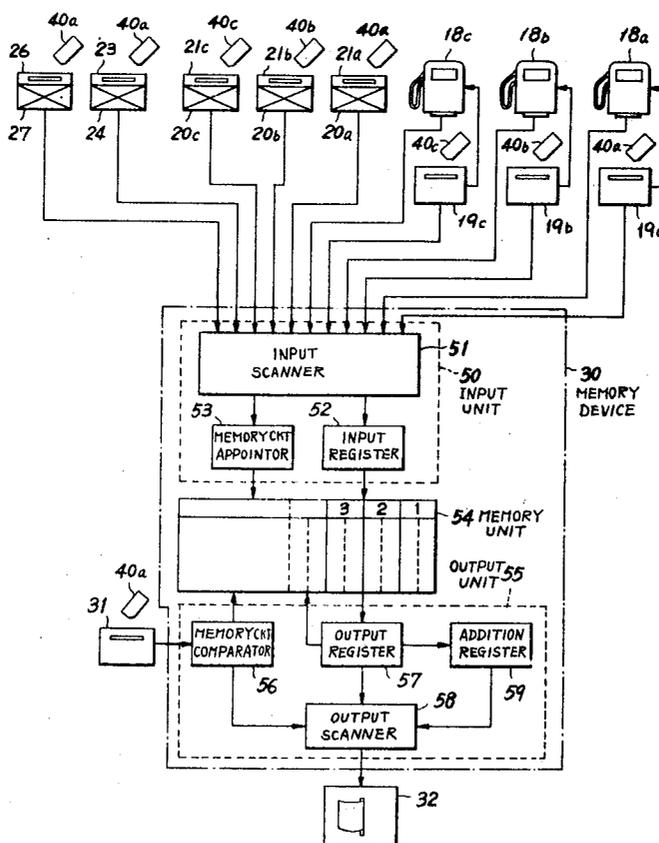
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[54] **CONCENTRIC SALES CONTROL SYSTEM AND APPARATUS IN FUEL SUPPLYING AND SERVICING STATION**
7 Claims, 10 Drawing Figs.

[52] U.S. Cl..... 235/61.7 B,
340/149 A

[51] Int. Cl..... G06k 7/08

ABSTRACT: A concentric sales control system and apparatus in which a fuel supplying and service station is provided with card readers and signal emission devices in respective sales and service areas for the information relating to kind and amount of sales, the signals from the signal emission devices being concentrically stored at one place corresponding to the code number of the customer. The stored information is read through card readers at the exit of the station corresponding to the card of the customer who received fuel and service and the proceeds are collected based on the thusly obtained information.



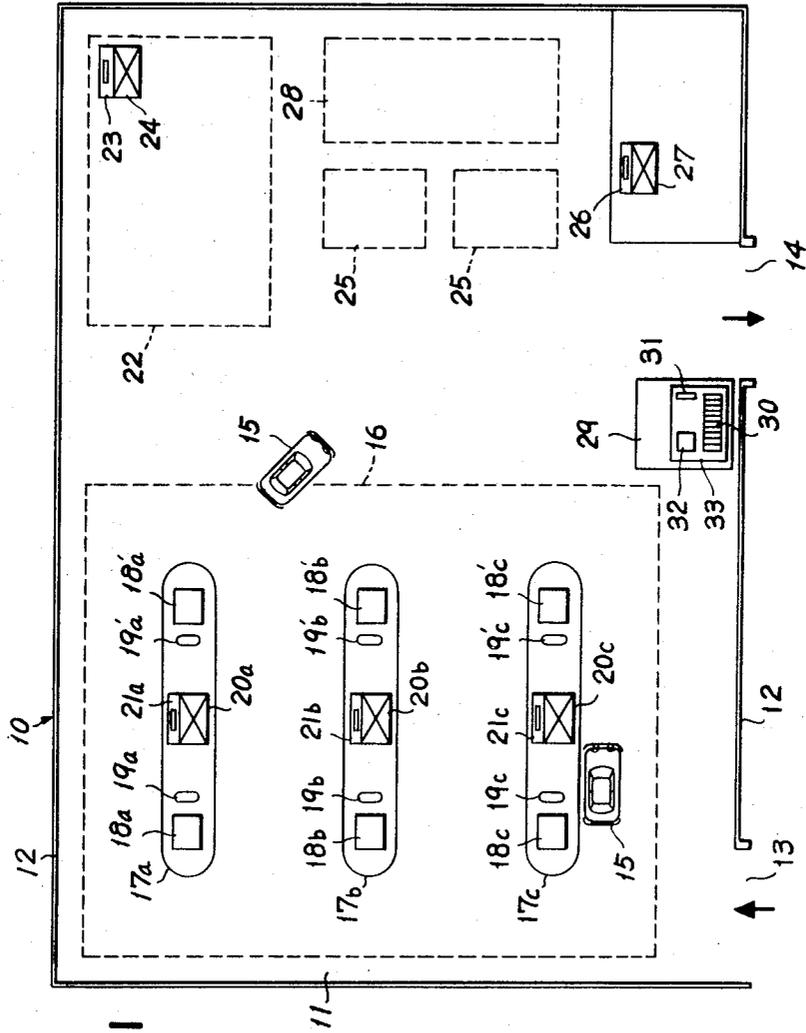


FIG. 1

FIG. 2

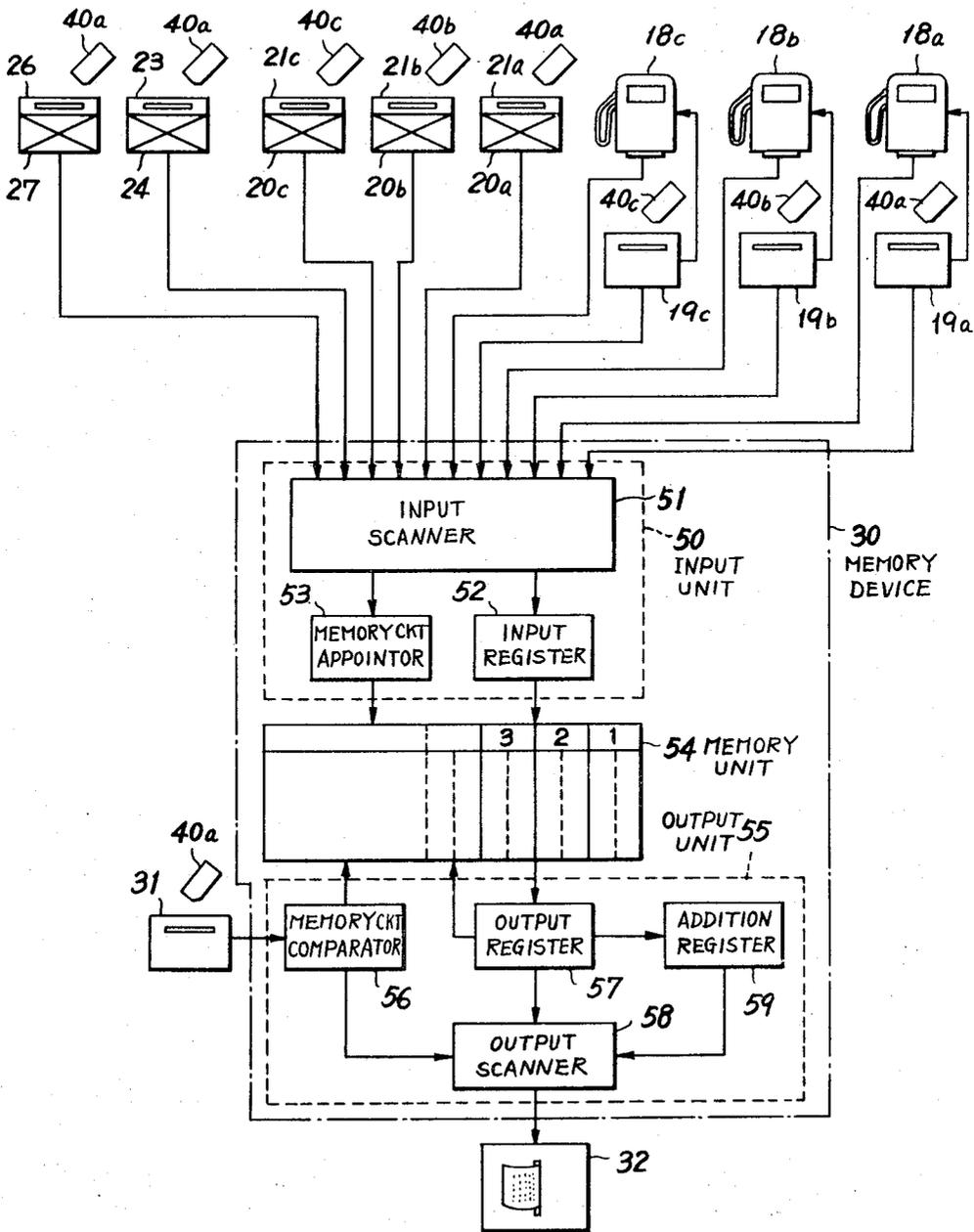


FIG. 3

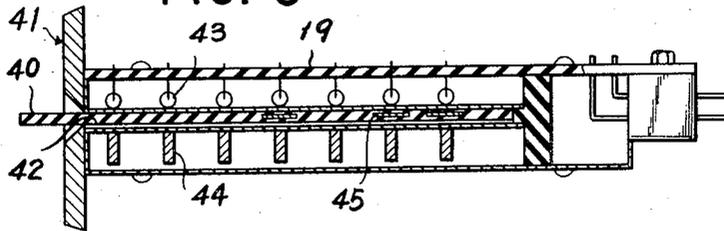


FIG. 4

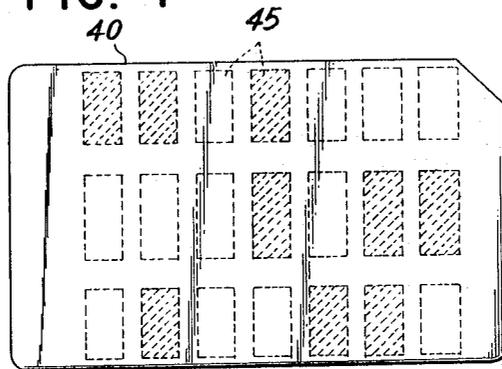
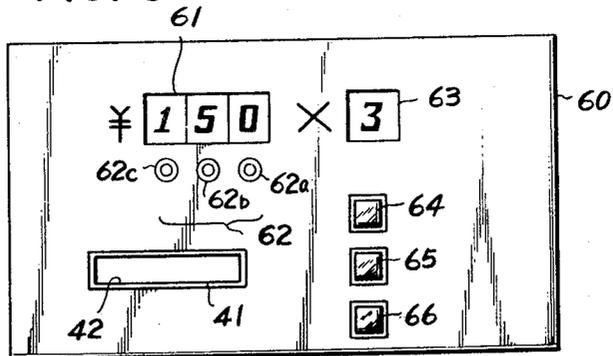
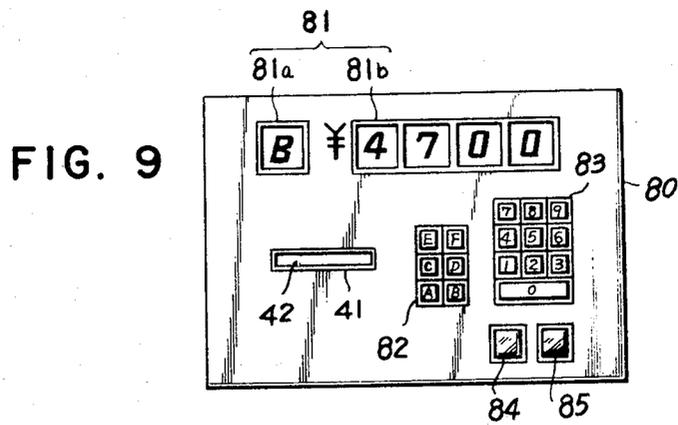
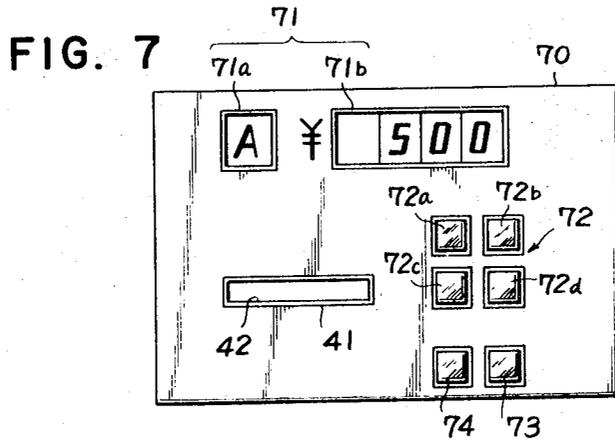
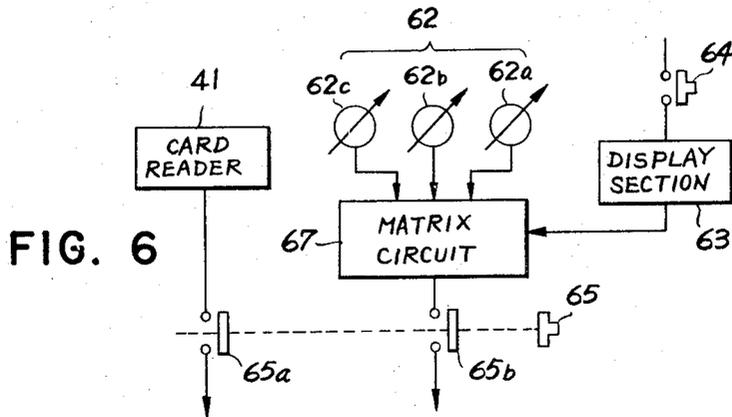
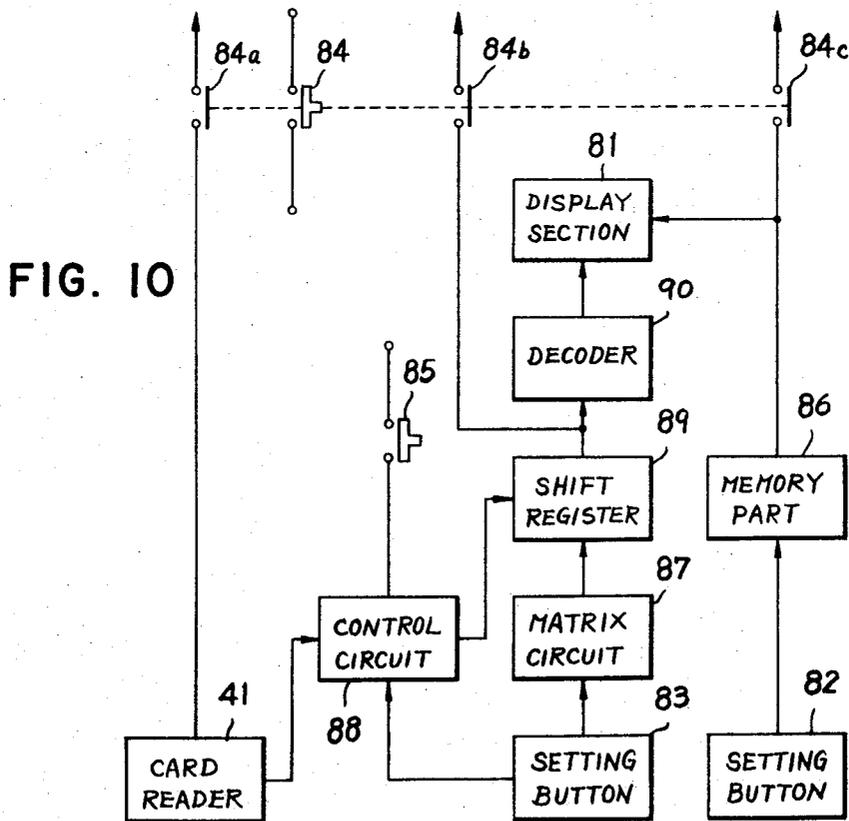
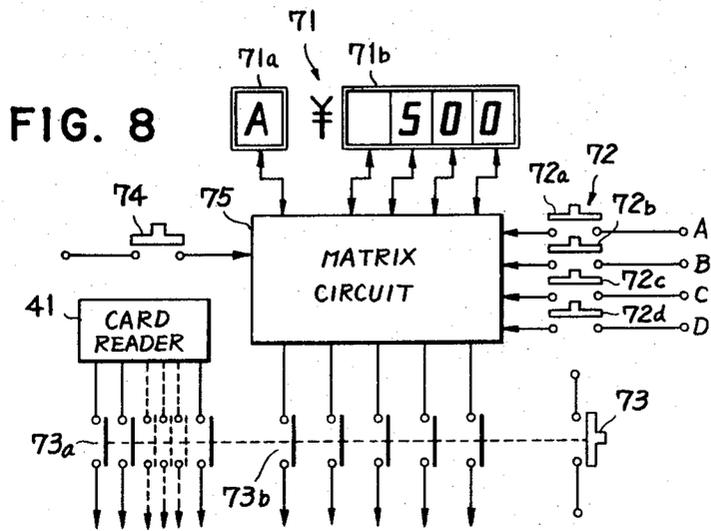


FIG. 5







CONCENTRIC SALES CONTROL SYSTEM AND APPARATUS IN FUEL SUPPLYING AND SERVICING STATION

This invention relates to a concentric sales control system and apparatus for use in a fuel-supplying station, and more particularly to a system and apparatus for concentrically controlling sales amount, kind of sales and services, quantities and so forth through memory storing, computing and totalizing for a variety of goods and services in a fuel supplying and servicing station.

It has been common in conventional gasoline stations that the accounting of sales, debiting for payment, and collection of charges are made by operators through manual calculation or cash registers based on recollection of the sales including the recollections of the various kinds and quantities of fuel sold and goods sold after the completion of services.

In stations having more advanced administrating systems, there are sometimes used flow quantity signal transmission equipment and signal receiving devices cooperating therewith the wherein kind and amount of supplied fuel and sales amount are transmitted from the fuel supplying post to an offices room for subsequent calculation and, if required the calculation of additional charges for car washing, accessories sales and so forth in a simple manner.

According to more recent developments of free ways fuel supplying stations tend to provide more services, i.e., the exchange and sale of "TBA" (tires, batteries and accessories) and car washing as well as sale of beverages and magazines in addition to supply gasoline. In large fuel supplying and servicing stations, the variety of sales and services is becoming increasingly diverse so that the fuel supply service is only 30 percent or so of the total sales of these stations. Due to this increase in items of sales and services, a great number of service areas exist for goods and services and these are scattered throughout the fuel supplying stations.

This produces many problems such as, for example, operators are required to spend too much time for the calculation, receipt and payment of amount due since goods vary greatly and there are many customers with the result that operators are unable to do their work. This obstructs the smooth flow of customers and causes a disadvantageous need for more personnel. Additionally, accuracy of the accounting or the desired control cannot be assumed.

The above described disadvantages have been effectively eliminated by the present invention which provides system for concentrically controlling a calculation of charges receipt and payment of cash, and supplying of records of sales and services, preferably in and to office rooms of fuel supplying stations.

A primary object of the present invention is to provide a concentric sales control system and an apparatus for fuel supplying and servicing stations wherein the control and the administration of the affairs and cash registering accompanying sales and work can be accurately, efficiently and concentrically performed and the flow of customers is rationally and rapidly treated in effecting the most efficient operation possible in fuel supplying and servicing stations.

Another object of the invention is to provide a concentric sales-controlling system and an apparatus for controlling the computation of individual accounts and the incidental affairs resulting from diverse sales and service items for a great many customers at one place.

Other object of the invention is to provide a system and an apparatus for storing in a memory different sales and service items, and for the accounting and printing of sales amounts on bills irrespective of the order of registering the items but while individually totaling the sales amount for each customer.

Still other object of the invention is to provide an input device which is simple in construction and adapted for use in the system and the apparatus employed for attaining the above-mentioned objects.

Further objects and features of the invention will be more clearly understood from the following description in conjunction with the accompanying drawings, in which:

FIG. 1 is a diagram showing a layout of a fuel supplying and servicing station in which the present invention has been incorporated;

FIG. 2 is a block diagram of system or the apparatus according to invention;

FIG. 3 is a vertical sectional side view of an embodiment of a card reader employed in said system;

FIG. 4 is a plan view of a card used in the card reader shown in FIG. 3;

FIGS. 5, 7 and 9 are views respectively showing panel boards in input devices according to the invention; and

FIGS. 6, 8 and 10 are respective circuit diagrams for the input devices of FIGS. 5, 7 and 9.

Referring to FIGS. 1 and 2, an entire control system and apparatus of the invention are next described.

In FIG. 1, a fuel supplying and servicing station 10 has a site 11 surrounded by walls 12, an entrance 13 and an exit 14 for vehicles. A vehicle 15 shown by way of example can only enter one way via entrance 13 into the site 11 of the station and an leave solely through the exit 14 from the station.

In a fuel supplying area 16 are provided islands 17a-17c for the supply of fuel. In each island are provided gasoline or fuel supplying posts 18a, 18a', 18b, 18b', 18c and 18c' connected to an underground reservoir and card readers 19a, 19a', 19b, 19b', 19c and 19c' corresponding to the respective fuel supplying posts 18a-18c'. Signal emission devices 20a, 20b and 20c for sales of engine oil are also provided in these posts. These signal emitters 20a-20c have also card readers 21a-21c respectively.

In a service area 22, for example, for car washing, lights and the like is also provided a signal emission device 24 having a card reader 23.

In areas 25 are carried on the sales of goods such as tires, batteries and accessories as well as magazines and beverages and so forth. In the area 25 or adjacent thereto, there is provided a signal emission device 27 having a card reader 26. An area 28 is used as a resting place for customers who have received or are receiving above services.

Near the exit 14, there is provided a charge collection room 29 having a signal receiver 33 including a memory device 30, a card reader 31 and a printer 32.

Operation of the devices disposed in the arrangement described above with respect to site 11 and the signalling system are next described with reference to FIG. 2.

A customer in the vehicle 15 entering into the site 11 of the service station 10 from the entrance 13 receives a card 40a (or 40b, 40c, which are hereafter generally denoted as 40) with a proper number at the entrance 13. He or an operator may insert the delivered card 40a into a card reader 19 when the car 15 receives fuel, for example, at a fuel supplying post 18. The code number of the card 40a is read by the card reader 19 and forwarded to an input scanner 51 of an input unit 50 in the memory device 30 which consists of a special purpose electronic computer in the collection room 29. Information representing the kind and amount of gasoline supplied is emitted and transmitted to the input scanner 51, when the fuel supplying operation has been completed, through the fuel supplying post 18 by an operation of finishing accompanying the fuel supply, i.e., the hanging up of a fuel delivery nozzle on a hanger at the post.

The input scanner 51 consecutively scans the signals from the respective fuel supplying posts 18 and signal emission devices 20, 24 and 27. The obtained signals are sent to an input register 52 and a memory circuit appointer 53. Said signals are stored in the memory by the register 52. The memory circuit appointer 53 is controlled to pick a memory circuit having an address with number corresponding to the code number of said card 40a in a memory unit 54. The signal from the register 52 is stored in the memory circuit at the address with the number selected in the memory unit 54.

When vehicle 15 receives a supply of engine oil, the card 40a may be inserted into the card reader 21. With a setting of the amount of oil to be supplied, a signal representing the code number, and kind and amount of the oil supplied is emitted

and transmitted to the memory circuit appointer 53 and additionally memorized in the address specified above. In the area 22, when the vehicle 15 receives a car washing or any equipment or service, the card 40a is similarly inserted into the card reader 23 and an appropriate signal will be emitted from the signal emission device 24. Similar is the case with the area 25 in which goods are purchased and the card 40a is inserted into the card reader 26, a signal being emitted from the signal emission device 27. This signal of showing the kind, amount, and value of the goods according is also stored at the address with the number so indicated.

Desirably there may be provided addresses with numbers determined by the memory capacity of the memory unit 54 by which it is theoretically possible to deliver code number cards with numbers corresponding to said numbers.

As the vehicle 15, having received various goods or services as described, leaves via the exit 14, the operator in the collection room 29 requests the customer to present his card 40a and insert the card into the card reader 31. A memory circuit comparator 56 of an output unit 55 in the memory device 30 receives the signal of the code number read by the card reader 31 and is actuated to select the address having the number which is the same as the code number of the card 40a which sends out the signal stored therein to an output register 57. The output register 57 thus receiving the signal from the memory unit 54 forwards the obtained information to the printer 32 through an output scanner 58. The printer 32 types out this information on a bill. The output of the output register 57 is simultaneously fed to an addition register 59 to be summed up. The total amount thus summed up is fed to the printer 32 through the output scanner 58 and is then typed out. When the information is completely sent out through the register 57, a signal showing completion is sent back to the memory unit 54.

Upon the total amount being printed out with particulars on the bill by the printer 32, a cashier may now request the payment of charges by the customer on the basis of the total amount or driver of the bill. Thus the customer of the vehicle 15 will pay the amount requested, give back the card 40a and leave the station through exit 14.

In the stage prior to entry into the memory unit 54, there may be used converter to change a decimal numbers to binary numbers and, in the output stage, a converter may be used to change the binary numbers to decimal numbers.

In the foregoing embodiment, an address appointing system is employed by which, for the memory system of the memory unit, a signal is stored in the memory circuit of the address corresponding to the code number of a card. The invention may not necessarily be confined to such system instead, signals may be stored consecutively in memory together with the code number in empty addresses. The former system involves a simpler input or output device and is more advantageous in case the card numbers are relatively few. In the latter system, as it is possible to use the memory address in a common way and pick up several numbers in one code, it is still more advantageous even if the items to be stored are many.

Referring next to FIGS. 3 and 4 the card 40 and the card reader 19 (or 21, 23, 26, 31) are illustrated in detail. The card 40 is designed to have embedded therein a plurality of magnetic metal bits 45 in an arrangement of three lines and seven rows as shown in FIG. 4. The arrangement of the metal bits 45 is different for each card according to the code number of each card. For example, if the code number is "17032," the card may have metal bits arranged at the locations shown by oblique broken lines.

The card reader 19, as shown in FIGS. 3, has a card insertion opening 42. On the upper side of the opening 42 there are provided reed switches 43 and, under the lower side thereof, permanent magnets 44 are arranged opposite to said reed switches. The reed switches 43 are normally closed by the magnetic fields of the permanent magnets 44.

Upon insertion of the card 40 into the opening 42 of the card reader 19, only the reed switches opposite the metal bits 41 are shielded from the magnetic fluxes from the permanent magnets 44 and they are opened. The opening of the reed switches establishes the code number.

The card and the card reader need not be restricted to the construction hereinabove described. For example, the card may have perforations at positions corresponding to the code number and the card reader may be designed so that the number is photoelectrically read by means of lights passing through the perforations, also, the card may have permanent magnets or metal pieces embedded at locations corresponding to the code number and the card reader will then be capable of reading the number from the locations of said permanent magnets or metal pieces by means, for example of a high-frequency oscillation means.

In the preceding embodiment, the card 40 is delivered to the customer at the entrance 13 of the station and given back at the exit 14. However, the system may be such that the customer for credit sales is previously given a credit card with a number varied from those of other customers and he may insert such card into the card readers, and keep the same. Combinations of the above may also be used as desired.

Further, the memory device 30 may be provided at some remote place and having the signal emission devices having the at a plurality of fuel supplying stations may be connected via an on-line system so that the memory device is employed common for the different service stations. For this purpose, the signal receiver 33 which is adjacent the exit 14 will be provided merely with the card reader 31 and the printer 32 in on-line connection with the remote memory device 30.

With reference to FIG. 5 and succeeding figures, some embodiments of the input end device are described.

Generally, the sale of engine oil for example is based on cans units and the price of the oil per can is constant so that the storage of the sales amount depends only on the number of cans. FIGS. 5 and 6 show an input device which is adapted for use in the sales of engine oil where the unit price or sales price of oil is constant and only the number of cans varies on each sales occasion.

The panel board 60 of the input device includes a unit price display section 61, unit price setting parts 62a-62c (generally denoted 62), a card insertion opening 42 for the card reader 41, a unit number display section 63, a unit number input button 64, a data transmission button 65, and a cancel button 66.

Assume that a unit price has been preset by the unit price setting parts 62 as when the unit price of oil per can is 150 yen, the figure of ¥"150" is displayed by the display section 61. The card 40 having a proper code number may then be inserted into the card reader 41 from the card insertion opening 42. After the supplying of oil and when the number of cans supplied is three, for example, an operator pushes the button 64 three times and thereby makes an indication of "3" on the display section 63. For the display section 63, there may be used a rotary relay which will advance one step for each pushing of the button 64. When the button 64 is pushed by mistake, the cancel button 66 may be pushed for compensation and the figures displayed on the display section 63 will be brought back to zero.

The displayed value "150" as has been preset by the setting parts 62 and the value "3" of the display section 63 are converted from decimal to binary codes respectively through a matrix circuit 67 shown in FIG. 6 and are thus coded in binary coded decimal form.

By a pushing of the data transmission button 65 and a closing of contacts 65a and 65b, the code number of the card read by the card reader 41 and signals representing of the unit price and number codified into binary signals by the matrix circuit 67 are sent to the input scanner 51 of the above mentioned memory device 30.

These signals are stored in the memory circuit of the memory unit 54 through the input scanner 51 as hereinabove described. When a signal showing the termination of memory

storage is issued from the memory device 30, the indication on the display section 63 is then cancelled and the card is discharged from the card reader 41.

The card reader 41 may also be provided with a confirmation unit which will stop, for example, the data transmission button 65 to preventing it from acting when the card has not been completely inserted locking means can be provided for avoiding the release of the card from the card reader before the date signals are all transmitted and stored.

The input device of this embodiment can be used solely for oil sales without having the unit price setting parts 62, the unit number display section 63, and the unit number input button 64 instead it may be provided with display buttons corresponding for example, 0.51 (litre), 1.0 l, 1.5 l, 2.0 l, etc., and the sales amount may be indicated at the display section 61 by depression of the button for indicating quantities correspond to the number of oil cans supplied.

With respect to car washing, an exchange of batteries and other similar services, the input device may be provided one at a time for each vehicle. As the price is constant for this sort of services, it is sufficient to indicate only the kind of service or goods. An embodiment of the input device most adapted for this sort of services is illustrated with reference to FIGS. 7 and 8.

A panel board 70 of the input device of FIGS. 7 and 8 includes a display section 71 having a display part 71a to indicate the kind of services and goods and a display part 71b to indicate the unit price, setting buttons 72a, 72b, 72c, and 72d (generally denoted by 72) for selectively displaying the kind of services and goods expressed by the marks A, B, C and D and the amount thereof expressed in figures in the display parts 71a and 71b, a data transmission button 73, a cancel button 74 for cancelling an erroneous operation of the button 72, and the card insertion opening 42 of the card reader 41.

For instance, the button 72a serves as the button for car washing. When a vehicle is given a washing, an operator may push the button 71a. This will simultaneously display a mark "A" on the display part 71a which shows a car washing and an amount ¥"500" on the display part 71b. The card is inserted into the card reader 41 via the opening 42.

By depression of the transmission button 73 for the data transmission, contacts 73a and 73b will be closed. The code number of the card read by the card reader 41 is transmitted through the contacts 73a and the signal of "A" and "500" in the display section 71 converted into a binary coded decimal signal by a binary coded decimal conversion matrix circuit 75 is transmitted through the contacts 73b respectively to the input scanner 51 of the memory device 30.

In FIGS. 9 and 10 is illustrated an input device which can be used in case the kind and amount of the goods sold vary at each occasion such as high octane gasoline, regular gasoline, LPG, and also tires, batteries, and accessories.

A panel board 80 of the input device of FIGS. 9 and 10 has a display section 81 including a display part 81a showing the kind and a display part 81b showing the amount (unit price or sales price), kind setting buttons 82 which selectively show the kinds respectively by marks A-F in the display part 81a, amount setting buttons 83 having buttons 0-9 and showing the unit price, sales price, and sales amount or the total thereof on the display part 81b, a data transmission button 84, a cancel button 85, and the card insertion opening 42 of the card reader 41, respectively.

By way of example, a customer in the vehicle may buy tires. First an operator will insert a card into the card reader 41. Next, he will depress the setting button 82 to display the mark "B" on the display part 81a. At the instant the information "B" is stored in a memory part 86. By depression of the setting button 83, the number, for example, "4700" will be set digit by digit from the upper column of the figure. Then the amount ¥ "4700" is displayed on the display part 81b. These values will be converted into a binary code through a binary coded decimal conversion matrix circuit 87. At this instant, a figure shifting signal is sent from a control circuit 88 by each opera-

tion of the amount setting button 83. Said signal is then fed to a shift register 89 which will shift the binary signal from the matrix circuit 87. In a decoder 90, the binary signal in each figure is again converted into a decimal signal and together with the signal from the memory part 86 is displayed on the display section 81 as hereinbefore described. When the button 83 is erroneously depressed, the cancel button 85 can be pushed so that each figure of the shift register 89 may be returned to zero through the control circuit 88. The figures displayed on the display part 81b will all return to zero.

The control circuit 88 functions to lock the operation of the input device which will not actuate when the card 40 is not fully inserted into the card reader 41, as well as the function of emitting clock pulses as a shifting signal for setting the amount as described, and cancelling signals to cancel the figures of the shift register, and is forth.

For transmission of these data, the operator may depress the transmission button 84, then contacts 84a, 84b, and 84c will be closed. The code number of the card read by the card reader 41 will be transmitted through the contact 84a, the signal for the amount converted to the binary code of output of the shift register 89 through the contact 84b, and the signal or the kind of output of the memory part 86 through the contact 84c respectively to the input scanner 51 of the memory device 30.

Throughout the foregoing embodiments, the unit of value showing the amount of goods for sale has been denoted in the denomination of Yen (¥) which may be desirably altered to Dollars (\$), Cents (¢), Pounds (£), Guilders (G1), or the like for use as the case may require.

What we claim is:

1. A concentric sales control apparatus for a fuel supplying and servicing station in which there are separately located a fuel-supplying area, a maintenance area, a goods sales area and the like and which has an exit through which a vehicle can leave the station, said system comprising:

a plurality of first card readers which are respectively provided in each of said areas and are adapted to distinguish a card having a code number for a customer, said first card readers being adapted for reading said code number from the card;

a signal-emitting means provided in each of said areas in association with said first card readers, said signal-emitting means emitting signals representing price and quantity of sales and services;

a memory means;

a second card reader provided at the exit of said station, said second card reader being adapted for reading the code number of said card; and

a printer for printing output information on a bill under the control of said memory means,

said memory means comprising an input scanner which receives the emitted signals from said first card readers and said signal-emitting means,

a memory circuit for receiving a signal from said input scanner and storing the signal received from said signal emitting means and the code number from said first card readers,

a deriving circuit for deriving the information corresponding to said code number out of said memory circuit by using the code number read out by said second card reader, and an output scanner which receives the information derived by said deriving circuit and the code number from said second card reader and sends out the same to said printer.

2. Sales control apparatus as claimed in claim 1 wherein said signal-emitting means comprises a unit-price-setting section for setting the unit price of sales goods, a unit-number-setting section for setting the unit number of said sales goods, a matrix circuit for converting a decimal number of said unit price setting section and said unit-number-setting section to a binary signal, and a transmission means for transmitting binary signals from said first card reader in association with said

signal-emitting means and said matrix circuit to said memory means, and means the unit number setting section only may be operated in necessity after the unit price has been set by the unit-price-setting section.

3. Sales control apparatus as claimed in claim 1 herein said signal-emitting means comprises a plurality of kind setting and amount setting means for simultaneously setting the kind of goods or services and a predetermined amount corresponding to the kind, a matrix circuit for decimal to binary conversion of the kind and amount set by said setting means, and a transmission means for transmitting binary signals from said first card reader in association with said signal-emitting means and said matrix circuit to said memory means, wherein the set number and amount are defined simultaneously whereby only a selection of the kind of goods may be sufficient.

4. A sales control apparatus as claimed in claim 1 wherein said signal-emitting means comprises an amount setting means for setting the price of goods or sales amount, a kind setting means for setting the kind of goods or services, a matrix circuit for converting a decimal number set by said amount setting means to a binary signal, a shift register for shifting the binary signal from said matrix circuit, a display means for converting the binary signal from said shift register again to a decimal signal and displaying said signal together with the kind signal set by said kind setting means, a control circuit preventing the operation when the card is not fully inserted into said first card reader in association with said signal-emitting means and emitting a shifting signal to said shift register for each operation of said amount setting means, and a transmission means for transmitting the code number signal from said card reader and a set amount signal from said matrix circuit and a set kind signal from said setting means respectively to said memory means.

5. A concentric sales control apparatus for a fuel supplying and servicing station in which there are separately located a fuel-supplying area, a maintenance area, a goods sales area and the like and which has an exit through which a vehicle can leave the station, said system comprising

a plurality of first card readers which are respectively provided in each of said areas and are adapted to distinguish a card having a code number for a customer, said first card readers being adapted for reading out said code number of the card;

a signal-emitting means provided in each of said areas in association with said first card readers; a memory means for receiving signals from said first card readers and said signal-emitting means and memorizing the signals received therefrom; a second card reader provided at said exit of the fuel supplying and servicing station, said second card reader reading out said code number of the card and deriving the corresponding stored information and code number from the memory means; and

a printer for printing output information from said memory means on a bill, said signal-emitting means comprising

a unit-price-setting section for setting unit prices of sales goods,

a unit-number-setting section for setting the unit number of said sales good,

a matrix circuit for converting a decimal representation of said unit-price-setting section and said unit-number-setting section to a binary signal, and

a transmission means for transmitting binary signals from the said first card readers in associations with said signal-emitting means and said matrix circuit to said memory means, whereby the unit-number-setting section need only be operated after the unit price has been set by the unit-price-setting section.

6. A concentric sales control apparatus in a fuel supplying and servicing station in which there are separately located a fuel-supplying area, a maintenance area, a goods sales area and the like and which has an exit through which a vehicle can

leave the station, said system comprising:

a plurality of first card readers which are respectively provided in each of said areas and are adapted to distinguish a card having a code number for a customer, said first card readers being adapted for reading out said code number of the card;

a signal-emitting means provided in each of said areas in association with said first card readers; a memory means for receiving signals from said first card readers and said signal emission means and concentrically memorizing the signals received therefrom;

a second card reader provided at said exit of the fuel supplying and servicing station, said second card reader reading out said code number of the card and deriving the corresponding stored information and code number from the memory means; and

a printer for printing an output information from said memory means on a bill, said signal-emitting means comprising

a plurality of kind setting and amount setting means for simultaneously setting the kind of goods or services and a predetermined amount corresponding to the kind,

a matrix circuit for decimal to binary conversion of the kind and amount set by said setting means, and

a transmission means for transmitting binary signals from said first card readers in association with said signal-emitting means and said matrix circuit to said memory means, whereby the set number and amount are defined simultaneously so that only a selection of the kind of goods is sufficient.

7. A concentric sales control apparatus in a fuel supplying and servicing station in which there are separately located a fuel-supplying area, a maintenance area, a goods sales area and the like and which has an exit through which a vehicle can leave the station, said system comprising:

a plurality of first card readers which are respectively provided in each of said areas and are adapted for distinguishing a card having a code number for a customer, said first card readers being adapted for reading out said code number of the card;

a signal-emitting means provided in each of said areas in association with said first card readers;

a memory means for receiving signals from said first card readers and said signal emission means and concentrically memorizing the signals received therefrom;

a second card reader provided at said exit of the fuel supplying and servicing station, said second card reader being adapted for reading out said code number of the card and deriving the stored information and code number from the memory means; and

a printer for printing output information from said memory means on a bill; said signal-emitting means comprising an amount setting means for setting the price of goods or sales amount,

a kind setting means for setting the kind of goods or services,

a matrix circuit for converting the decimal number set by said amount setting means to the binary signal,

a shift register for shifting the binary signal from said matrix circuit,

a display means for converting the binary signal from said shift register again to the decimal signal and displaying said signal together with the kind signal set by said kind setting means, control circuit for preventing operation when the card is not fully inserted into said first card readers and emitting a shifting signal to said shift register in each operation of said amount setting means, and a transmission means for transmitting the code number signal from said card reader and a set amount signal from said matrix circuit and a set kind signal from said setting means respectively to said memory means.

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