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Naitou et al.

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[54] **AUTOMATIC VENDING MACHINE INCLUDING A PLURALITY OF CUSTOMER UNITS INTERCONNECTED WITH A SINGLE PROCESSING AND DISPENSING UNIT**

[75] Inventors: **Nobuyosi Naitou; Keizi Baba; Sigehisa Huziwara,** all of Kyoto, Japan; **Takesi Yamanaka,** Mountain View, Calif.

[73] Assignee: **Omron Tateisi Electronics Company,** Kyoto, Japan

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[52] **U.S. Cl.** **194/10**

[51] **Int. Cl.** **G07f 11/02**

[58] **Field of Search** ..... 194/10, 4; 221/129, 131, 221/125, 132, 123; 222/2; 133/8; 186/1 A, 1 B

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Primary Examiner—Stanley H. Tollberg
Attorney, Agent, or Firm—Christensen, O'Connor, Garrison & Havelka

[57] **ABSTRACT**

An automatic vending machine which comprises at least two customer serving units which are individually used by customers to input purchase data into the machine and a single processing unit commonly serving the customer serving units so that in accordance with the input data the processing unit causes an article to be dispensed through the outlet of that customer serving unit through which the purchase data have been entered.

10 Claims, 8 Drawing Figures

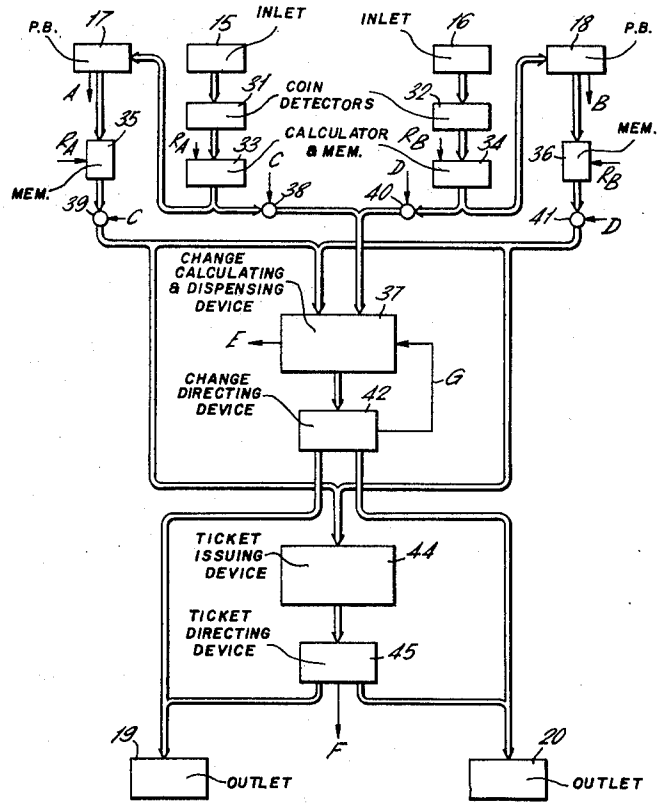


FIG. 1.

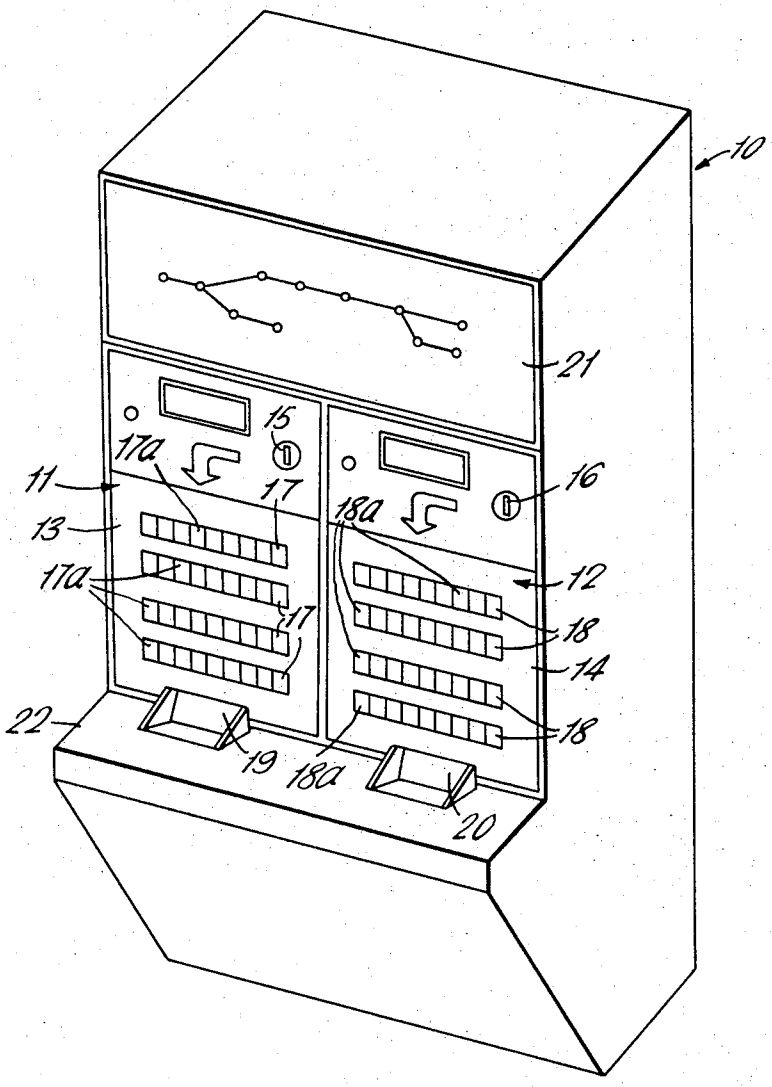


FIG. 2.

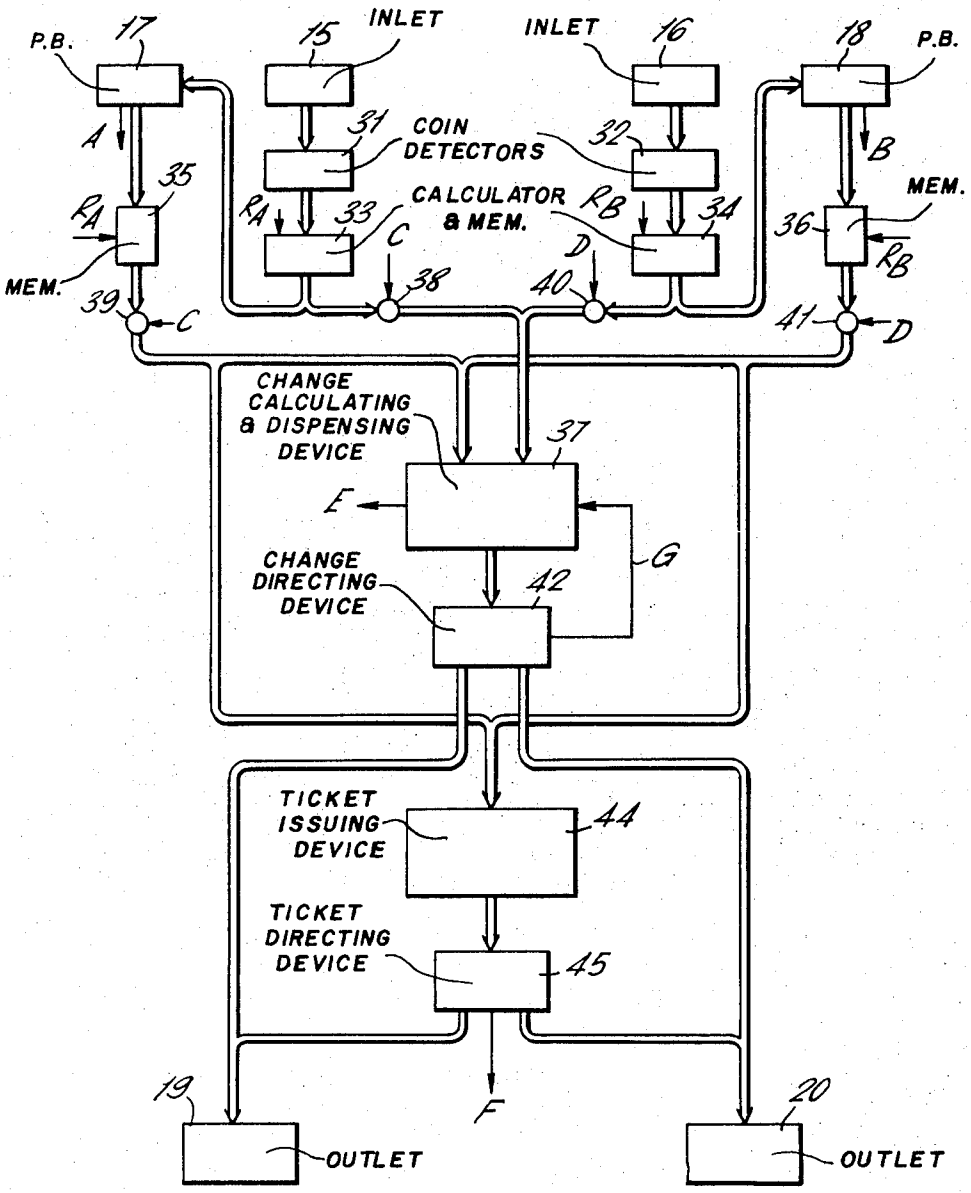

P.B.
17
15
INLET
INLET
16
18
P.B.
A
31
COIN DETECTORS
32
B
35
RA
33
CALCULATOR & MEM.
RB
34
MEM.
36
MEM.
C
D
RB
38
40
39
C
41
D
CHANGE CALCULATING & DISPENSING DEVICE
37
E
G
CHANGE DIRECTING DEVICE
42
TICKET ISSUING DEVICE
44
TICKET DIRECTING DEVICE
45
F
19
20
OUTLET
OUTLET

FIG. 3

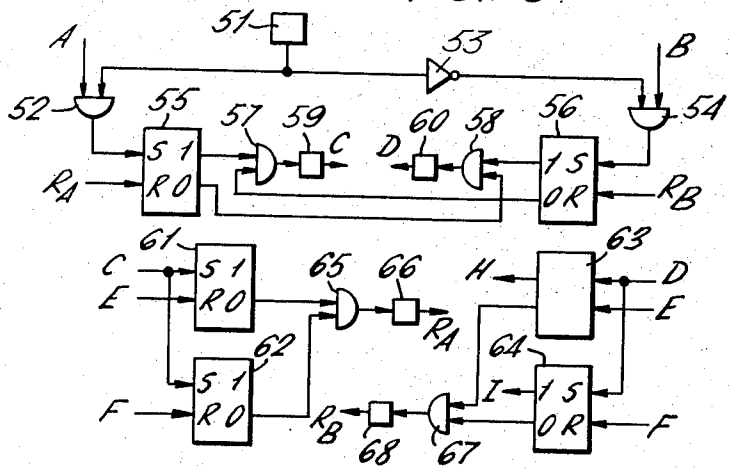


FIG. 4

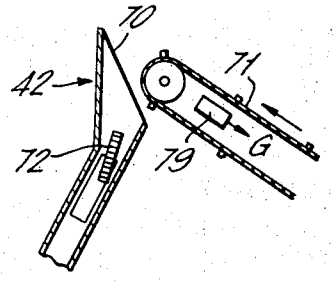


FIG. 5

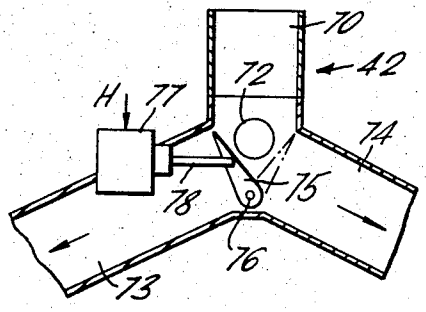
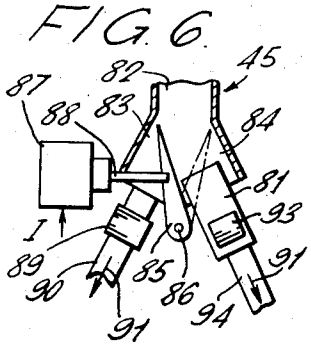


FIG. 6



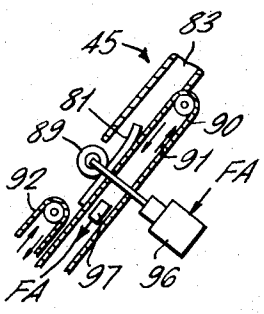
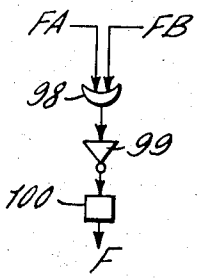


FIG. 7

FIG. 8



AUTOMATIC VENDING MACHINE INCLUDING A PLURALITY OF CUSTOMER UNITS INTERCONNECTED WITH A SINGLE PROCESSING AND DISPENSING UNIT

This invention relates to an automatic vending machine and more particularly to those which deal with railway tickets or other articles.

Generally, the essential components of an automatic vending machine comprise means for calculating the value of the coins introduced by a purchaser and means for dispensing an article whose value does not exceed that of the coins introduced. Those automatic vending machines which are in wide use at present are additionally provided with means for dispensing change when the article purchased has been overpaid. Some machines are capable of vending different kinds of articles. Other machines are provided with such change dispensing means and article selecting means.

Known vending machines of the above-mentioned types comprise a single box or housing which have provided at the front panel thereof a customer serving unit by which the customer operates the machine and inputs thereinto purchase information or data such as the kind or price of the article he or she wishes to purchase from the machine. Inside the housing there are provided means for handling the money introduced, means for processing the input purchase data, means for dispensing an article in accordance with the money and data, and so forth. All these interior means may be referred to comprehensively as the processing unit, and the customer serving unit will be referred to as the customer unit.

Known vending machines comprise a single housing, single customer unit and a single processing unit. At a place where many people swarm there usually are many such vending machines installed side by side. In such a case, however, there is no relation between adjacent machines. In other words, each of the machines operates independently of the others. Even at the busiest hours, however, each one of the machines as observed individually is not always used incessantly.

Suppose that there are five machines installed at one place. It seldom happens that more than five persons simultaneously use the machines. Experience shows that in most cases less than four people use the machines at one time. Therefore at least one machine stands idle at that time.

Suppose that five persons use the five machines separately. From the time one person standing in front of the customer unit inputs purchase data into the machine until an article is dispensed out of the machine, the processing unit inside the housing is not continuously operating all the time. In other words, some component means of the processing unit remain idle after they have completed their operations till new purchase data are entered in the next purchasing operation. In short, compared with the length of the time the machine is being used, the length of the time the processing unit operates is considerably shorter, and the various devices constituting such a processing unit are expensive. Therefore, if their working efficiency is low, it certainly is uneconomical.

Accordingly, it is one object of this invention to improve the working efficiency of the processing unit of an automatic vending machine.

Another object of the invention is to provide an automatic vending machine which is provided with a plurality of customer units and a single processing unit commonly serving the customer units, thereby improving the working efficiency of the processing unit.

Another object of the invention is to provide an automatic vending machine which is provided with a plurality of customer units and a single change dispensing device commonly serving the customer units, thereby improving the working efficiency of the change dispensing device.

Another object of the invention is to provide an automatic vending machine which is provided with a plurality of customer units and a single article dispensing device commonly serving the customer units, thereby improving the working efficiency of the article dispensing device.

Another object of the invention is to provide an automatic vending machine which is provided with a plurality of customer units each having an outlet through which change is dispensed, and a single change dispensing device commonly serving the customer units, with a change directing device which directs the change dispensed by the dispensing device to the outlet of that one of the customer units which is now being used.

Still another object of the invention is to provide an automatic vending machine which is provided with a plurality of customer units each having an outlet through which an article purchased is dispensed, and a single article dispensing device commonly serving the customer units, with an article directing device so arranged as to direct the article dispensed by the dispensing device to the outlet of that one of the customer units which is now being used.

A further object of the invention is to provide an automatic vending machine which comprises a single housing or box having at least two customer units and a single processing unit commonly serving the customer units, so that the machine substantially equals a plurality of prior art machines in function and ability and can be manufactured at a far lower cost.

The invention will be described in detail with reference to the accompanying drawings, wherein:

FIG. **1** is a perspective view of an automatic railway ticket vending machine embodying the invention;

FIG. **2** is a block diagram showing the system of the machine;

FIG. **3** is a block diagram of a circuit for controlling the change calculating and dispensing device and the ticket issuing device used in the machine of the invention;

FIG.**4** is a side view of one form of the change directing device used in the machine of the invention;

FIG. **5** is a front view of FIG. **4**;

FIG. **6** is a front view of one form of the ticket directing device used in the machine of the invention;

FIG. **7** is a side view of FIG. **6**; and

FIG. **8** is a diagram of a circuit receiving an output signal from the ticket directing device to produce a signal to reset the ticket directing device.

In the illustrated embodiment, the principle of the invention is shown as applied to an automatic railway ticket vending machine. The machine comprises a housing of box at the front side of which there are provided a pair of customer units each including a purchase information or data input device to be operated by a customer to input into the machine necessary data

for purchase of an article therefrom. Inside the housing there is provided a processing unit which is conditioned to alternately serve the customer units. The arrangement may also be such that the processing unit is always conditioned to serve one of the customer units and when the other customer unit is used, the processing unit is switched over to serve that customer unit. If one of the customer units is used while the other unit is being used at the same time, the processing unit serves only one of the two customer units. In this case, it is possible to input purchase data into the other customer unit which is not operatively connected to the processing unit. The input data, however, are temporarily stored till the operation of the processing unit connected to the one customer unit is finished, whereupon the unit is switched over to the other customer unit and operates in accordance with the purchase data memorized therein.

While the processing unit is serving one customer unit which is being used by one person, another person who is using the other customer unit must wait, but the waiting time generally is only a few seconds so that the customer does not feel being kept waiting a long time. A sign "Wait a moment" may be indicated on the front panel of the customer unit.

In the illustrated embodiment, the processing unit which is commonly used by the two customer units includes a change calculating and dispensing device and a ticket issuing device.

Each customer unit is provided with a set of push buttons for entering purchase data, means for memorizing the data entered corresponding to the pressed push button, and means for calculating and memorizing the value of the introduced coins. When the two customer units are used at the same time, so long as the users and introducing coils into the machine and operating the push buttons on the front panel, the users do not feel like they are being kept waiting since the processing unit will soon finish its operation for one of the customer units and then is switched over to operate for the other one of the customer units. The change dispensed from the change dispensing device and the ticket issued from the ticket issuing device are directed by a change directing device and a ticket directing device, respectively, to the outlet of the customer unit which is being served by the processing unit. Then the processing unit is switched over to the other customer unit, whereupon in accordance with the purchase data entered and the value of the coins introduced by the waiting customer, the change dispensing device and the ticket issuing device of the processing unit again operate. Thus, the processing unit alternately serves the two customer units, with a resulting higher working efficiency of the unit than if the unit serves only one customer unit. If the two customer units are used at the same time and the processing unit first serves one of the customer units, the other customer does not feel like he is being kept waiting. The invention thus provides an automatic vending machine at a low cost which is capable of efficiently and rapidly dealing with many customers.

Referring now in detail to the drawings, there is shown an automatic ticket vending machine generally designated at **10** and adapted to be installed adjacent the ticket gates of a railway station. At the front side of the machine there are provided two customer units **11** and **12** arranged side by side. As is customary with this type of ticket vending machines, the unit **11** is provided at its front panel with a coin inlet **15**, a plurality of push buttons **17***a* and an outlet tray **19**. Similarly, the other unit **12** has a coin inlet **16**, a plurality of push buttons **18***a* and an outlet tray **20**. Above both units there is a panel **21** on which the whole stations of the railway line are indicated with the fares to the respective stations, so that the passenger is able to know the fare to his destination.

The push buttons **17***a* and **18***a* are arranged in four rows, each of which is designated generally by **17** and **18**. On the surface of each push button **17***a* there is indicated a monetary value successively different by a unit value from that on the next push button. Suppose that coins of yen 10, yen 50 and yen 100 are acceptable to the machine. If the push button at the left-hand end in the uppermost row has an indication of yen 10, the next one to the right has an indication yen 20 and the third from the left end has an indication of yen 30 and so on. The same is true with the other group of push buttons **18***a*.

Each of the push buttons enclose a lamp so that the lamp of the push button which corresponds to the value of the coins introduced by the customer as well as all the other lower value push buttons are turned on. Suppose that coins of yen 30 have been put into the slot **15**. The lamps of the three left-hand push buttons **17***a* are turned on. With this arrangement, it is possible for the customer to know how much money he has put into the machine. Then the customer pushes that one of the push buttons the value indication on which corresponds to the fare to his destination. The button to be pushed must of course be the one whose the lamp is on at that time. If the customer pushes a button whose lamp is not turned on, no ticket is dispensed. The ticket comes out through the outlet **19** or **20** with or without change. The outlets **19** and **20** project outwardly from the front panel of the units **11** and **12** to make it easier for the customer to pick up the ticket and change and at the same time are depressed in the upper surface of a counter **22** provided at the foot of the units **1** and **12** thereby to prevent the ticket or change from jumping out onto the ground.

Turning to FIG. **2**, the coins introduced through the inlet **15** or **16** are detected by a coin detector **31** or **32**, which detects the kinds of the coins and counts their number and applies a corresponding signal to a calculating and memorizing device **33** or **34**. The device calculates and memorizes the amount of value of the coins introduced, and at the same time applies a signal to the group of push buttons **17** or **18** to turn on the lamps of those push buttons up to the value of the introduced coins. When the customer then presses that one of the push buttons the value indication of which corresponds to the fare to his destination, a pressed-button memorizing device **35** or **36** memorizes that push button that has been pressed and provides a corresponding signal. The signal from the calculating and memorizing device **33** or **34** which corresponds to the value of the introduced coils and the signal from the pressed-button memorizing device **35** or **36** are applied to a change calculating and dispensing device **37** through gates **38** and **39** or **40** and **41**, respectively.

The change calculating and dispensing device **37** comprises a pinboard matrix which receives the signal from the pressed-button memorizing device **35** or **36** and converts the monetary value expressed by the signal to a corresponding, say, binary code; a first calcu-

lating device which subtracts the binary code value from the value of the coins that have been introduced; a change dispenser which dispenses as change coins the value of which corresponds to the result of the subtraction; and a second calculating device which subtracts the value of each coin as it is dispensed from the above-mentioned result of the subtraction whenever the device receives a signal G produced by a change directing device (to be described later) in response to each coin that is dispensed, and produces a signal E when the result of this subtraction becomes zero. All these devices per se are well known so that no detailed description will be required.

A change directing device **42** directs the coins dispensed out of the change calculating and dispensing device **37** to the outlet **19** or **20** of that unit **11** or **12** that has been operated by the purchaser. A ticket issuing device **44** receives from the pressed-button memorizing device **35** or **36** the signal corresponding to the value indicated on that one of the push buttons that has been pressed by the purchaser and prints the value on a ticket and then sends the ticket to a ticket directing device **45,** which operates to direct the ticket to the outlet **19** or **20** of that unit **11** or **12** that has been operated by the purchaser.

As is easily understood from the above description, the various devices per se included in and utilized by the system of the invention are well known. However, the invention markedly differs from the prior art arrangements in that the two customer units **11** and **12** including the coin detectors **31** and **32,** the calculating and memorizing devices **33** and **34** and the pressed-button memorizing devices **35** and **36** share the single change calculating and dispensing device **37** and the single ticket issuing device **44** with the help of the change directing device **42** and the ticket directing device **45.**

FIG. **3** shows by way of example an electrical circuit for controlling the operations of the change calculating and dispensing device **37** and the ticket issuing device **44.** A pulse generator **51** produces a series of pulses which are applied as one input directly to an AND element **52** on the one hand and through a NOT element **53** to an AND element **54.** With this arrangement, so long as the pulse generator **51** is producing a pulse, the AND element **52** receives one input but the AND element **54** receive no input through the NOT element **53.** When the pulse from the generator **51** has disappeared, the one input to the AND element **52** disappears, but the NOT element **53** produces an output to be applied as one input to the AND element **54.** Thus, as the generator **51** produces a succession of pulses, the two AND elements **52** and **54** alternately receive an input. If the width of the pulses is made equal to their interval, the times during which the two AND elements receive an input become equal. When any one of the push buttons **17***a* of the unit **11** has been pressed, a signal A is produced to be applied as the other input to the AND element **52.** Similarly, when any one of the push buttons **18***a* of the other unit **12** has been pressed, a signal B is produced to be applied as the other input to the AND element **54.** When the AND elements **52** and **54** receive the two inputs, they produce an output. However, even when the two push buttons **17***a* and **18***a* of both units **11** and **12** have been pressed at the same time, both AND elements do not produce an output at the same time since the AND elements do not simultaneously receive an input caused by the pulses from the generator **51.**

The outputs of the AND elements **52** and **54** are applied as a set input to flip-flops **55** and **56,** respectively, the set outputs of which are applied as one input to AND elements **57** and **58,** respectively. Signals RA and RB are applied as a reset input to the flip-flops **55** and **56,** respectively. The reset output of the flip-flop **55** is applied as the other input to the AND element **58** while the reset output of the flip-flop **56** is applied as the other input to the AND element **57.** The outputs of the AND elements **56** and **57** are applied to differentiators **59** and **60,** respectively, which produce output pulses C and D, respectively, corresponding to the rising edges of the outputs of the AND elements **57** and **58.** The signal C is used as a gate signal to the gates **38** and **49** (FIG. **2**) and the signal D is used as a gate signal to the gates **40** and **41.** The signal C is also applied as a set input to flip-flops **61** and **62** and the signal D is also applied as a set input to flip-flops **63** and **64.** The previously mentioned signal E from the change calculating and dispensing device is applied as a reset input to the flip-flops **61** and **63,** and the signal F from the ticket directing device **45** is applied as a reset input to the flip-flops **62** and **64.**

An AND element **65** receives the reset outputs of the flip-flops **61** and **62** and produces an output to be applied to a differentiator **66,** which produces an output pulse RA corresponding to the rising edge of the output of the AND element **65.** Similarly, an AND element **67** receives the reset outputs of the flip-flops **63** and **64** to produce an output to be applied to a differentiator **68,** which produces an output pulse RB corresponding to the rising edge of the output of the AND element **67.** The signals RA and RB are used as a reset input to the flip-flops **55** and **56,** the calculating and memorizing devices **33** and **34,** and the pressed-button memorizing devices **35** and **36.** The set outputs of the flip-flops **63** and **64** are designated by H and I, respectively, while there is no set output from the flip-flops **61** and **62.**

FIGS. **4** and **5** show an example of the change directing device **42** in FIG. **2.** The device comprises an inlet **70,** two passages **73** and **74** connecting to and extending from the inlet **70** and a directing plate **75** at the connecting point of the two passages. A conveyor belt **71** receives the coins to be dispensed as change from the calculating and dispensing device **37** and carries and drops them into the inlet **70** one by one as shown at **72.** The directing plate **75** is pivotable about a pin **76** by means of a solenoid **77** whose plunger rod **78** is connected to the plate **75** for control of the pivotal movement of the plate. When the solenoid **77** is energized by the signal H to pull in the rod **78,** the plate **75** is moved leftward to the real line position in FIG. **5** where it closes the inlet of the passage **73** thereby to direct the coins into the other passage **74.** When the solenoid **77** releases the rod **78,** a spring or the like device not shown causes the plate **75** to pivot to the opposite broken line position where it closes the passage **74** thereby to direct the coins falling through the inlet **70** into the passage **73.** The passages **73** and **74** lead to the outlets **19** and **20,** respectively.

The coins being carried by the conveyer **71** are detected one by one by a coin detector **79** (FIG. **4**), which produces an output G in response to each coin but with a time delay sufficient to allow the coin detected to enter the passage **73** or **74.**

FIGS. 6 and 7 show an example of the ticket directing device 45. The ticket 81 issued by the issuing device 44 is dropped into an inlet 82 which is connected to two passages 83 and 84. A plate 85 is pivotable about a pin 86 by means of a solenoid 87 having a rod 88 connected to the plate 85. When the solenoid 87 is energized by the signal I to pull in the rod 88, the plate 55 is moved to close the passage 83 as shown in FIG. 6. When the solenoid 87 is deenergized, the plate 85 is pulled by a spring or otherwise moved to close the other passage 84.

The ticket 81 passing through the passage 83 rides on a conveyor belt 90 with a roller 89 and another conveyer belt 92 facing the upper surface of the belt 90. The belt 90 is always running in the direction of an arrow 91 and the ticket 81 on it passes below the roller 89 and is conveyed by the belts 90 and 91 to the outlet 19. Similarly, the ticket passing through the passage 84 is conveyed by a conveyor 94, a roller 93 and another conveyer corresponding to the above-mentioned conveyer 92 as far as the outlet 20.

A detector 97 detects the ticket 81 on the belt 91 to produce a signal FA to energize a solenoid 96, which pulls the roller 98 toward the belt 90. A similar detector and a solenoid not shown are provided for the same purpose in connection with the belt 94 and the roller 93. The detection signal from this detector will be referred to as FB.

The signals FA and FB which continue until the ticket leaves the detection area of the detector detecting the ticket are applied to an OR element 98 (FIG. 8), the output of which is applied through a NOT element 99 to a differentiator 100. As will be easily seen, the differentiator produces an output pulse F corresponding to the trailing edge of the output of the OR element 98.

The system of the invention operates as follows. Suppose that a purchaser puts into the inlet slot 16 one yen 100 coin and one yen 50 coin. In the coin detector 32 the coins are directed through different passages corresponding to their denominations into different receptacles, not shown. As the coins pass through the passages, they are counted and the calculating and memorizing device 34 calculates the total value of the coins introduced as yen 150 and memorizes the value. In response to this memorized value, the lamps of those push buttons up to yen 150 in the group 18 are turned on thereby to show the purchaser the amount of money he has put into the machine. Suppose that he wishes to have a yen 120 ticket. Then he presses the yen 120 push button 18*a*, whereupon the signal B is produced and at the same time the pressed push button is memorized by the pressed-button memorizing device 36.

The signal B is applied as one input to the AND element 54 (FIG. 3). Since the cycle of the pulses from the generator 51 is set far shorter than the time from the pressing to the releasing of the push button, the AND element 54 produces an output to set the flip-flop 56, the set output of which causes the differentiator 60 to produce the signal D. At this time, no reset output is produced by the flip-flop 56, so that the AND element 57 produces no output even if the signal A is applied to the AND element 52 to set the flip-flop 55. Therefore, when the signal D is produced, the signal C is not produced.

The signal D sets the flip-flops 63 and 64. The set output H of the flip-flop 63 is applied to the solenoid 77 to move the coin directing plate 75 to the real line position in FIG. 5 to communicate the opening 70 with the passage 74. The set output I of the flip-flop 64 is applied to the solenoid 87 to move the ticket directing plate 85 to the real line position in FIG. 6 to connect the inlet 82 to the passage 84.

The signal D is also applied to the gates 40 and 41 to open the gates. When the gate 40 is opened, the value of yen 150 as stored in the calculating and memorizing device 34 is applied to the change calculating and dispensing device 37. When the gate 41 is opened, the value of yen 120 as stored in the pressed-button memorizing device 36 is applied to the change calculating and dispensing device 37 and the ticket issuing device 44. The device 37 subtracts the fare of yen 120 from the value of yen 150 and produces a signal corresponding to the difference of yen 30, in response to which the coin dispenser in the device 37 memorizes the value of yen 30 and dispenses three yen 10 coins.

The coins are carried on the conveyor 71 (FIG. 4) and dropped into the inlet 70 of the directing device 42 from which the coins pass through the passage 74 to come out of the outlet 20. The coins on the coneyer 71 are detected by the detector 79, which produces one pulse G in response to one coin detected. The signal G is applied back to the change calculating and dispensing device 37 so that the value of yen 10 is substrated from the value of yen 30 as stored in the device 37 every time the signal G is applied thereto until the result of subtraction becomes zero, whereupon the signal E is produced. Needless to say, if there is no change to be paid, the signal E is produced immediately. The signal E resets the flip-flop 63.

The information stored in the pressed-button memorizing device 36 is also transferred to the ticket issuing device 44 to issue a yen 120 ticket. On the basis of the information received, the device 44 prints on a ticket the symbols and numerals expressing yen 120 and/or the names of the stations within the section the yen 120 fare can cover. The ticket is then sent to the ticket directing device 45. Since at this time the inlet 82 communicates with the passage 84, the ticket is conveyed by means of the roller 93 and the belt 94 onto the outlet 20.

As the ticket 81 is being conveyed by the belt 93, the ticket detector (corresponding to 97) detects it to produce the signal FB, which is applied through the OR element 98 to the NOT element 99, so that when the signal FB disappears, the differentiator 100 produces the output F to reset the flip-flop 64. When the flip-flop 63 is reset by the signal E to produce a reset output, the reset outputs of the flip-flops 63 and 64 coincide, so that the AND element 67 produces an output. This output causes the differentiator 68 to produce the signal RB to reset both the change calculating and memorizing device 34 and the pressed-button memorizing device 36 to remove the stored values therefrom.

The signal RB is also applied as a reset input to the flip-flop 56, the reset output of which is applied to the AND element 57. Therefore, if one of the push buttons 17*a* on the other unit 11 has been pressed while the operations caused by the pressing of one of the push buttons 18*a* are being conducted, after the coin directing device 42 and the ticket directing device 45 have finished their respective operations to produce the signal F, the change calculating and dispensing device 37 and the ticket issuing device 44 perform their respec-

tive operations in response to the introduction of coins into the slot **15** and the pressing of one of the push buttons **17***a* on the unit **11.**

When the flip-flops **63** and **64** are reset, their respective set outputs H and I disappear so that the solenoids **77** and **87** are deenergized to bring the plates **75** and **85** to the dashed line positions in FIGS. **5** and **6.** Therefore, when the coins and the ticket come in the next operation of the machine, they are properly directed to the outlet **19** of the unit **11.**

In the above description, the unit **12** alone is used. When the unit **11** alone is used, the flip-flop **55** is set so that the differentiator **59** produces the signal C to set the flip-flops **61** and **62.** The flip-flop **61** is reset by the signal E and the flip-flop **62,** by the signal F. When the two flip-flops **61** and **62** are both reset, the AND element **65** produces an output to cause the differentiator **66** to produce the signal RA. This signal RA resets the calculating and memorizing device **33** and the pressed-button memorizing device **35.** Since the flip-flops **63** and **64** are not set, they do not produce the set outputs H and I. Therefore, the solenoids **77** and **87** are not energized and the plates **75** and **85** are at the dashed line position to communicate the inlets **70** and **82** with the passages **73** and **83,** respectively, so that the change and the ticket are directed to the outlet **19.**

When the push buttons **17**a and **18**a are pressed at the same time, the AND element **52** produces an output if the generator **51** produces an output at that time, whereas the AND element **54** produces an output if the generator **51** produces no output at that time. Therefore, the devices **37, 42, 44** and **45** and the circuit of FIG. **3,** which are comprehensively referred to as a processing unit, operates only for either one of the customer units and not for both of them at one time.

What we claim is:

1. An automatic vending machine comprising:

a plurality of customer units, each customer unit including customer-operated means for entering purchase data into said customer unit, a coin inlet means for entering coins into said customer unit and an outlet for dispensing articles to the customer which are purchased through said machine, and,

a processing unit interconnected with said plurality of customer units, said processing unit including means storing articles to be purchased from said machine, and article dispensing means responsive to said purchase data and the monetary value of the coins entered into any one of said plurality of customer units to dispense articles from said storing means through the outlet of said one of said plurality of customer units.

2. An automatic vending machine as recited in claim **1,** wherein said processing unit further includes control means inhibiting the operation of said article dispensing means in response to the entry of purchase data and coins from any other one of said plurality of customer units until said processing unit has completed the dispensing of articles through the outlet of said one customer unit.

3. An automatic vending machine as recited in claim **1,** wherein each one of said plurality of customer units includes means for detecting coins entered through said coin inlet, means responsive to said detecting means for calculating and storing the value of coins so entered, and means responsive to said customer-operated means for storing purchase data entered through said customer-operated means.

4. An automatic vending machine as recited in claim **1,** wherein said processing unit includes change calculating means responsive to said purchase data and to the value of coins entered into said one customer unit for calculating change to be paid to customer by said one customer unit.

5. An automatic vending machine as recited in claim **4,** wherein said processing unit includes means storing change for purchases from said machine, and change dispensing means responsive to said change calculating means to dispense change from said change storing means through the outlet of said one customer unit.

6. An automatic vending machine as recited in claim **5,** wherein said change dispensing means includes a plurality of passages connecting said change storing means to said outlets of said customer units, a change directing means including plate means for opening that one of said plurality of passages connecting said change storing means to said one customer unit, and means inhibiting said plate means from opening any of the remaining ones of said plurality of passages until said processing unit has completed the dispensing of change through said outlet of said one customer unit.

7. An automatic vending machine as recited in claim **1,** wherein said article dispensing means includes a plurality of passages connecting said article storing means to said outlets for said plurality of customer units, an article directing means including plate means for opening that one of said plurality of passages connecting said article storing means to said one customer unit, and means inhibiting said plate means from opening any of the remaining ones of said plurality of passages until said processing unit has completed the dispensing of articles to said one customer unit.

8. An automatic vending machine as recited in claim **1,** wherein the articles stored and dispensed by said machine are railway tickets.

9. An automatic vending machine as recited in claim **8,** wherein the purchase data entered into any one of said plurality of customer units is the monetary value of a fare for a railway trip.

10. An automatic vending machine as recited in claim **9,** wherein said article dispensing means is responsive to the purchase data entered through said one customer unit to print on the railway ticket to be dispensed through the outlet of said one customer unit numerals expressing said monetary fare value.

* * * * *

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,828,904 Dated August 13, 1974

Inventor(s) Naitou et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In Column 10, line 37, delete "for" and insert --of--

Signed and sealed this 29th day of October 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents