

Dec. 12, 1967

MITITAKA YAMAMOTO ET AL

3,357,530

CODED TAPE CONTROLLED VENDING MACHINE

Filed July 19, 1966

Fig 1

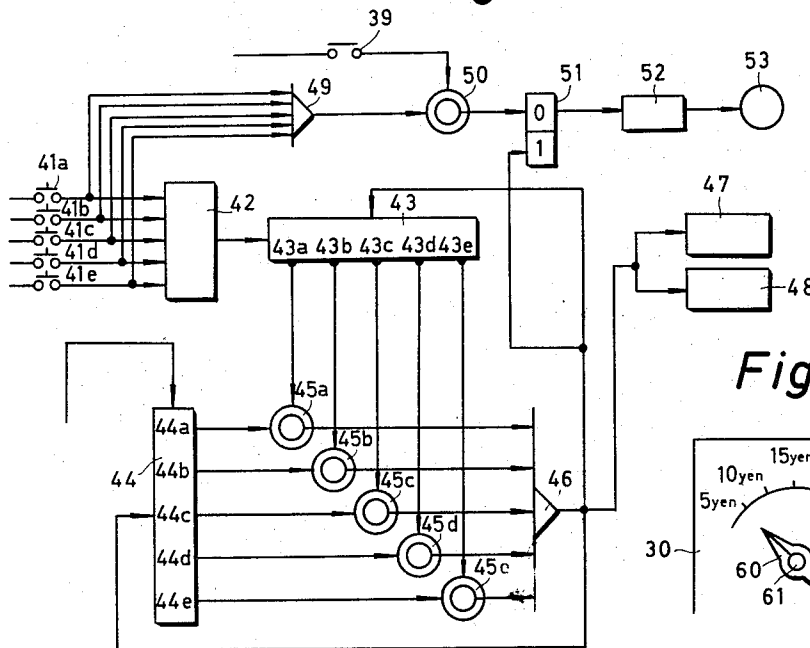


Fig 4

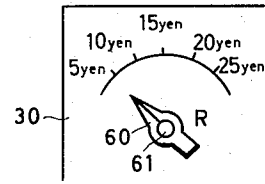


Fig 3

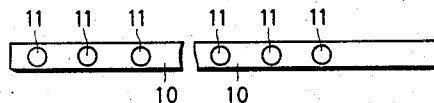
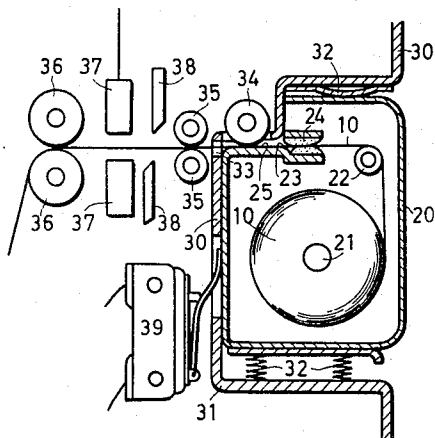


Fig 2



INVENTORS.
MITITAKA YAMAMOTO
HIROO AKAMATSU
BY Kurt Kelman
AGENT

1

2

3,357,530

CODED TAPE CONTROLLED VENDING MACHINE

Mititaka Yamamoto and Hiroo Akamatsu, Kyoto-fu, Japan, assignors to Tateisi Electronics Co., Kyoto-shi, Japan, a corporation of Japan

Filed July 19, 1966, Ser. No. 566,295

Claims priority, application Japan, July 29, 1965,

40/45,983

5 Claims. (Cl. 194—4)

ABSTRACT OF THE DISCLOSURE

A vending machine which performs functions, such as services or the delivery of goods at different prices, upon the operation of a selector switch and the insertion of a tape casing enclosing tape provided with value marks. The tape is drawn into the machine housing until a sensing unit in the housing counts the number of value units corresponding to the selected function, whereupon drawing-in of tape is terminated, the drawn-in tape portion is cut off, and the machine is released to perform the function paid for by the value marks on the tape.

Background of the invention

This invention relates to vending machines, and particularly to a vending machine which performs functions, such as services and the delivery of articles at different prices.

It has been proposed heretofore to operate such machines by means of cards carrying a plurality of value marks. In operating the known machine, the card is inserted and the desired function is selected, whereupon the machine cancels as many value marks as correspond to the selected function and performs the function, and the card is withdrawn.

However, the number of value marks that can be provided on such a card is relatively small, the mechanism necessary for cancelling the marks is complex, and the cards are readily damaged when carried by the owner so as not to operate the vending machine properly.

It has now been found that the shortcomings of the known devices can be overcome by the use of a continuous tape as a carrier of value marks.

Other features and advantages of the invention will hereinafter become more fully apparent from the following description of the annexed drawing which illustrates a preferred embodiment, and in which:

FIG. 1 is a schematic of the control circuit of a vending machine of the invention;

FIG. 2 shows the vending machine in fragmentary side elevational section;

FIG. 3 illustrates a tape for use with the vending machine in plan view; and

FIG. 4 illustrates a modified tape drawing device for the machine of FIG. 2 in front elevation.

Referring initially to FIG. 3, there is shown a tape 10 carrying uniformly spaced marks 11 of contrasting shading. By way of example, it will be assumed that each mark represents a value of 5 yen.

As is shown in FIG. 2, the tape 10 is normally coiled on a shaft 21 in a magazine or case 20. The free end of the tape coil is trained over a guide roller 22 and extends outwardly of the case 20 through a slot 23. Two felt pads 24 in the case 20 near the slot 23 frictionally engage the tape 10 to prevent its spontaneous discharge. The discharged tape passes over an external face 25 of the case 20.

During operation of the vending machine, the case 20 is inserted in an outwardly open receptacle or cavity 31

of the vending machine housing 30, and is releasably retained in the cavity by springs 32.

An inlet slot 33 of the housing 30 is aligned with the face 25 of the inserted case 20, and a drive roll 34 clamps the free tape end against the face 25. When the roll 34 is turned, the tape is drawn from the case 20 and fed to the vending machine proper. In the housing 30, the tape passes in sequence between guide rolls 35, the blades 38 of a cutting device, the elements of a photoelectric sensing device 37, and additional drive rolls 36. The operating arm of a microswitch 39 projects into the cavity 31 so that the switch is closed by insertion of a case 25.

FIG. 1 shows the control circuit of the vending machine, which is not otherwise illustrated since it may be entirely conventional. Five push button selector switches 41a-41e are mounted on a front panel of the housing 30 and are labeled 5 yen and so on in increments of 5 yen to 25 yen, as shown with reference to the device of FIG. 6. The switches are connected to a pulse generator 42 and to an OR gate circuit 49. When one of the switches 41a-41e is closed, the generator 42 releases one pulse for each unit of 5 yen to a counter 43 having five output terminals 43a to 43e.

The photoelectric sensing device 37 is connected to a similar counter 44 having output terminals 44a-44e, and transmits a pulse to the counter 44 in response to each sensed value mark on the tape 10. Five AND gate circuits 45a-45e are connected to the corresponding output terminals of the counters 43, 44. They are conditioned by a signal from the corresponding terminal of the counter 43 to respond to a signal from the connected terminal of the counter 44 by transmitting a signal to a common OR gate circuit 46. The latter is connected to the counters 43, 44 to reset the same to zero in response to the received signal, and also to emit signals to a function releasing mechanism 47 of the vending machine, to the magnetic actuator 48 of the afore-mentioned blades 38, and to a flip-flop circuit 51.

The microswitch 39 and the afore-mentioned OR gate circuit 49 are connected to the input of an AND gate circuit 50 whose output is also connected to the flip-flop circuit 51 which energizes the drive motor 53 for the rollers 34 and 36 through an amplifier 52.

The afore-described apparatus operates as follows:

When the vending machine is to perform a service, such as washing laundry, or to deliver an article sold, the customer inserts his tape case 20 into the cavity 31 of the machine whereby the switch 39 is closed, and the gate circuit 50 is conditioned to energize the motor 53 as soon as one of the switches 41a to 41e is thereafter closed by the customer. Tape 10 is drawn from the case 20 by the drive rollers in the housing 30, and the value marks on the tape are sensed by the photoelectric cell of the device 37. Let it be assumed that switch 41d, corresponding to 20 yen, was closed.

The gate circuit 45d which is conditioned by the counter terminal 43d supplies a terminating signal as soon as a signal corresponding to four counted value marks is received from the terminal 44d of the counter 44. The signal causes the counters 43, 44 to be reset to zero. The flip-flop 51 is switched to deenergize the motor 53, the tape 10 is cut by the blades 37 operated by the magnetic actuator 48, and the releasing mechanism 47 permits the machine to deliver an article whose price is 20 yen or to perform a corresponding service, the article and service not being themselves relevant to this invention.

The free end of the tape carrying four value marks drops into a non-illustrated receptacle in the housing 30, and the customer may remove his tape case 20 from the cavity 31. It will be understood that the machine performs a function worth 5, 10, etc. yen when suitably set by

means of one of the push button switches 41a to 41e, and that it stops drawing tape from the case 20 and cuts the drawn tape whenever value marks corresponding to the selected value have been drawn into the housing 30.

The visible marks 11 on the tape 10 may obviously be replaced by marks in magnetic ink, and the photoelectric sensing device 37 may be replaced by a conventional magnetic tape head. Tape may also be provided with value marks by punching, and the punched holes may be sensed in a conventional manner. The tape may also be assigned a specific value per unit of length, and its length may thus constitute a value mark which can be sensed.

In the embodiment of the invention described hereinabove, the tape 10 is drawn into the housing 30 by means of the motor 53, but the vending machine of the invention is readily modified to avoid the use of a drive motor for the tape.

As is shown in FIG. 4, a drive shaft 61 may be journaled in the vending machine housing 30 and coupled to the rollers 34, 36 in a manner not further illustrated. A knob 60 on the shaft 61 permits the rollers to be turned manually, and a scale R on the vending machine indicates the value of the tape drawn into the machine by the turning of the shaft 61. The value marks on the tape are sensed as described above and make the apparatus ready to operate when the customer closes the appropriate switch 41a-41e.

As mentioned above, the disclosed mechanism may be employed for delivering articles sold or for performing services, such as those of a washing machine, or it may serve in an automatic ticket checking machine to control the opening and closing of an automatic door.

Operation of a vending machine of the invention merely requires the customer to insert his tape case and to push one button and perhaps to turn one knob. The unused portion of the tape is well protected in the case 20 and cannot be damaged in a manner that could interfere with smooth operation of the mechanism.

It should be understood, of course, that the foregoing disclosure relates only to preferred embodiments of the invention, and that it is intended to cover all changes and modifications of the examples of the invention herein chosen for the purpose of the disclosure which do not constitute departures from the spirit and scope of the invention set forth in the appended claims.

What is claimed:

1. A vending machine for selling the performance of functions at a plurality of selling prices, said machine

comprising in combination, a tape case enclosing a tape having specified value marks thereon, a receiving cavity portion adapted for receiving the tape case, said receiving cavity portion being formed on a housing of the machine, a plurality of selecting switches corresponding to the selling prices of the desired functions, a tape drawing means to draw out the tape from the tape case responsive to operation of one of the selecting switches, sensing means to sense and count the value marks on the tape being drawn out, a terminating means to terminate the operation of the tape drawing means, said terminating means conditioned by the operation of a selected switch and actuated by the sensing means, whereby operation of the tape drawing means is terminated when value marks corresponding to the selling price of the desired function are sensed and counted by the checking means, a cutting means to cut the tape drawn out and function releasing means to release the desired function, said last two means controlled by the operation of the terminating means.

2. A vending machine for selling the performance of a function at a plurality of selling prices, said machine comprising, in combination, a tape case enclosing a tape having value marks thereon, a receiving cavity adapted for receiving said case, said cavity being formed in a housing of the machine, a plurality of selecting switches corresponding to the selling prices of the desired functions, tape drawing means to draw tape from said tape case, sensing means to sense and count the value marks on the tape being drawn, terminating means conditioned and actuated by the operation of a selected switch and by said sensing means when the value marks sensed by said sensing means corresponding to the selling price corresponding to the selected switch, cutting means to cut the tape drawn, and function releasing means to release the desired function, said last two means being controlled by the operation of said terminating means.

3. A vending machine as set forth in claim 2, wherein said function is the delivery of an article.

4. A vending machine as set forth in claim 2, wherein said function is a service.

5. A vending machine as set forth in claim 2, further comprising manually operated means for actuating said tape drawing means, and indicating means for indicating the amount of tape drawn.

No references cited.

SAMUEL F. COLEMAN, *Primary Examiner.*