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(54) **Improvements in or relating to ticket issuing machines.**

(57) This invention is concerned with a ticket issuing machine which includes a ticket printing device, a paper feed device for feeding a ticket web past the printing device, a micro processor means, a keyboard for entering data into the microprocessor, a store for retaining information about information to be printed on a ticket which information can be transferred to the microprocessor means to control the ticket printing device under the control of the microprocessor means to determine the information to be printed on the ticket web, and a display panel for displaying information to be entered on the keyboard and information to be printed on the ticket and power means for driving the parts of the ticket issuing machine.

Preferably the power means for driving the parts of the ticket issuing machine is a battery and the ticket issuing machine is capable of being carried.

EP 0 057 080 A2

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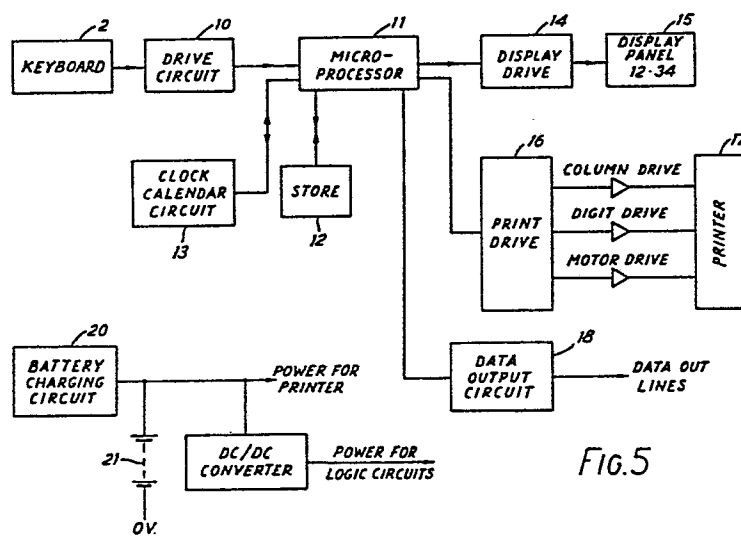


FIG. 5

This invention has reference to Ticket Issuing machines and has particular reference to portable ticket issuing machines, namely those kind of ticket issuing machines which may be carried on a transport vehicle and operated by a machine operator usually by a conductor in order that the conductor may pass around and issue tickets to the passengers in the vehicle.

Such ticket issuing machines are usually of two kinds. The first kind of machine is arranged to issue a ticket bearing preprinted information such as the value of the ticket, the name of the authority issuing the ticket and a consecutive code number.

As the ticket is issued additional information for example the date of issue of the ticket, is also printed on the ticket being issued by the machine.

In the second kind of ticket issuing machine the machine prints on a plain paper web. The information printed on the ticket may include static information such as the name of the issuing authority and

variable information such as a fare value, the date of issue of the ticket and the kind of ticket (single or return; adult or child; etc.). The ticket issuing machine has a plurality of wheels connected by respective concentric sleeves to respective print faces, the faces bearing different information for example the fare value, so that information about

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the fare value to be printed on the ticket may be changed. Such machines perhaps with more modifications may be used for example by to issue tickets as an entry to places of entertainment.

It is an object of the present invention to provide an improve portable ticket issuing machine. It is a further object of the invention to provide a ticket machine capable of printing, preferably on a plain web of paper, a wider number of categories than has been possible heretofor.

According to the present invention a ticket issuing machine comprising a ticket printing device, a paper feed device for feeding a ticket web past the printing device a micro processor means a keyboard for entering data into the micro processor, a store for retaining information about information to be printed on a ticket which information can be transferred to the micro processor means to control the ticket printing device under the control of the micro processor means to determine the information to be printed on the ticket web and a display panel for displaying information to be entered on the keyboard and information to be printed on the ticket and power means for driving the parts of the ticket issuing machine.

Preferably the keyboard includes programme circuit means to determine the function of the ticket issuing machine.

A ticket issuing machine in accordance with the present invention will now be described by way of example with reference to the accompanying drawings wherein

Fig 1 is a perspective view of the ticket issuing machine

Fig 2 is a plain view of the ticket issuing machine

Fig 3 is a detailed view of the keyboard

Fig 4 is a view of a ticket printed by the ticket issuing machine and

Fig 5 is a circuit diagram

Referring to Figs 1 and 2 of the drawings there is shown a portable self contained ticket issuing machine 1 and includes a keyboard 2 and a display panel 3 and a security lock 4. The security lock is to receive a key which when inserted and turned enables the machine to be operated. The machine capable of receiving strips whereby the machine may be carried on the chest of a conductor or the operator. The casing of the machine has an aperture 5 for enabling a connection to be made to circuits of an external processor and also houses batteries of the rechargeable type driver circuits and control circuits as hereinafter described.

One aperture may be provided for making a connection for re-charging the batteries in the machine or to supply power direct to the machine in which case a transformer and associated power circuits replace the batteries and the other connection may be made for transferring information from the store of the machine or from for example a store of an external computer. The top of the machine casing as shown in Fig 1 has an elongated aperture 6 through which a paper ticket web is fed. The web is fed from a reel in the machine past a 12 (twelve) column thermal ticket printing device under the action of a paper web feed device. One of the sides of the aperture may be serrated to facilitate the tearing off of a printed ticket from the paper web. The paper roll is mounted under a quick release captive cover 7 provided so that the roll may easily be located in and replaced in the ticket issuing machine. The paper of the web roll is heat sensitive and preferably has a thickness of 0.002" to 0.003" and is wound on a plastic centre core. The trailing end of the web roll is printed with a stripe to give a warning of near exhaustion of the roll.

The ticket to be issued to the passenger will have a size of 57mm wide and can be of any length but typically as follows :-

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- (a) Passenger classification - up to 12 characters
- (b) Serial number - 4 digits
- (c) Route - 3 digits
- (d) Boarding stage - 2 digits
- (e) Time - 4 characters
+ decimal point
- (f) Date : - 5 characters
+ decimal point
- (g) Machine numbers - 4 characters
- (h) Fare - 4 characters
+ decimal point
+ £ sign

If desired the items may be changed according to country of sale. Thus if a machine is to be used in a country having a different currency value the position of the decimal point may be changed to give the best range of ticket values. Normally the sterling fare value will refer to tens and units of pounds and tens and units of pence. The keyboard (2) has twenty keys on a five by four matrix with moulded keytops co-operating with respective dome click type contacts. The keys of the keyboard have the following designations:-

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<u>KEY</u>	<u>FUNCTION</u>
0-- 9 incl.	Fare and special functions
A	Data entry
B	Classification entry
C	Passenger classification
D	Clear
E	Passenger classification
ALTERNATE	Change to different code (Top Case)
+	Add
-	Subtract (stage numbers)
CLEAR	Clear Information from Store
ADD	Additional
ISSUE (Distinctive colour)	Issue Ticket

The keyboard (2) is used to:-

- (a) Enter, increment or decrement stage number up 99 stages.
- (b) Enter fare values up to £99.99
- (c) Enter route and journey numbers
- (d) Select up to 10 classifications of ticket
- (e) Enter operators duty number, roll number and start/finish of shift
- (f) Reset clock, enter time and date (Service operation only)
- (g) Recall journey and transaction data

By operation of the keyboard according to the function referred to above so the microprocessor to be

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hereinafter described co-operates with a store to enter information, or process information entered or to control the printing of information entered.

Referring to Fig 5 of the drawings there is shown a block circuit diagram of the ticket issuing machine. As shown the keyboard is connected to a keyboard drive circuit 10 to enable the information entered on the keyboard to be entered into the microprocessor 11. The microprocessor 11 also has a connection to the store 12 wherein information relating to the ticket issuing machine is stored. A clock calendar circuit 13 is also connected to the microprocessor circuit 11 to provide provision for the time/date to be entered on the display panel 3. The quartz clock circuit 13 includes a time oscillator circuit which emits a pulse once during every predetermined time period (e.g. every minute) to change the time which is normally displayed on a display panel 3 (when no other information is displayed on the panel 3). The microprocessor 11 has a further connection through a display drive circuit 14 to the display panel 3. Normally the display panel displays the time but for example if a ticket is being issued information about the ticket appears on the panel to displace the time displayed on the panel. Still

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further connection is made from the microprocessor to a print drive circuit 16. This print drive circuit has a series of connections to a thermal printer 17 through a series of line connections 18. The first set of line connection relates to five (5) column drive connections by means of which the thermal printer may cause a dot to be formed on the thermal paper a selected one position in order that a plurality of dots makes up a digit or character across the thermal paper as the paper is fed past the thermal printer. The digit drive determines which of the twelve digits is to be operative at a particular position so that a dot may be printed at that position. The print drive circuit operation is initiated by operation of the ticket issue key. The third line connection 18 is a connection to the motor drive of the printer stepping motor to drive the thermal printer and the paper web in synchronism in order that the dots representing numbers or letters may be properly spaced when printed.

A further connection from the microprocessor is made to a data output circuit 18 and thence to a data out line. This connection is made in order that information stored in the microprocessor and store may be transmitted to an external computer. The connection also enables a waybill to be issued in a manner to be hereinafter described.

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Operation of the keys of the keyboard serves to enter information into the microprocessor but also serves to initiate operation of the machine under the control of the microprocessor.

The microprocessor and store receive information from the keyboard in accordance with the code entered on the keyboard and in accordance with numerical information entered on the keyboard to update the information in the store. Thus as a ticket is processed the part of the store relating to the number of tickets issued is increased by one, the value of the tickets issued is increased by the amount of ticket being issued and other categories are also updated.

There is also shown in Fig 5 a circuit including a battery charging circuit 20 - which may be conveniently derived from a 24 volt supply of the omnibus or other transport vehicle on which the ticket issuing machine is being used. This battery charging circuit is employed to charge the re-chargeable batteries 21 of the ticket issuing machine. The voltage from the batteries 21 is applied direct to the thermal printer to give the required power to drive the printer and is also

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connected to a DC/DC converter to supply the required power for the microprocessor and associated logic etc. circuits.

In order that operation of the machine may be understood a description of the various functions of the machine, will now be described.

Preliminary Checks

Before operating the machine the operator ensures that the battery has been fully charged and checks that the display is showing correct time by pressing the "clear" key. If the time is incorrect adjustments are made by a service engineer.

The back printer cover is hinged and a check made that the machine has a full roll of paper inserted correctly through the printer with the coated side adjacent to the print head.

At this time the security switch is "OFF" which inhibits the working of the keyboard and printer. To prime the machine for ticket printing the switch is turned "ON", the key is removed and the printer cover closed.

Operator Start of Duty Routine

Before ticket issuing can commence the operator, route and stage data are entered into the machines memory via the keyboard.

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Items to be entered are Route No., Initial Stage No., Journey No., Duty No. and Operators Roll No. Numbers are entered together with a data code in any order and may be omitted or substituted with other information such as mileage or petrol readings to suit individual requirements.

The numbers are entered as follows:-

DATA KEYS	NUMERIC KEYS	
A.1	Route Number	(3 digits)
A.2	Initial Stage Number (Route Direction	(2 digits) (1 ")
A.3	Journey Number	(2 digits)
A.4	Duty Number	(3 digits)
A.5	Operators Roll Number	(4 digits)

The journey number may be entered by the driver at the start of each journey to be recorded on the waybill.

Other data such as time, date and machine number is programmed into the machine initially and altered only as a service operation.

Entry into the keyboard of the operators duty number will also record his start of duty time. Items such as Duty, Journey and Operators number could be replaced by other data, i.e. petrol and mileage readings or vehicle number.

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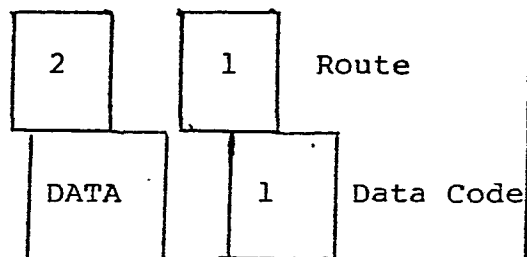
Each number is limited to a pre-determined number of digits and if this is exceeded on entry only the last digits will be recorded. As each number is entered it will appear on the display for checking. If a keying error is made the entry may be erased by pressing the "CLEAR" key.

Data Entry - Examples

Route Number - Maximum number - 999 Display Shows

This example Route 21

Press keys



00.21

Time

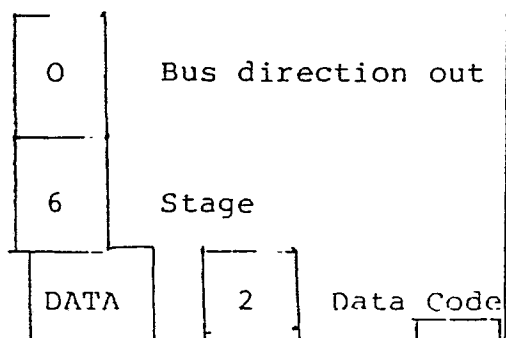
Initial Stage number and Direction

Maximum number - 99

This example: Stage 6

Bus direction "OUT"

Press keys



00.00

00.06

Time

Note: If bus direction is IN press

1

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Journey Number

Maximum Number - 99

This example: Journey No.12

Press keys	1	2	Journey No.
	DATA	3	Data Code

Display Shows

00.12

Time

Duty No. & Start of Duty Time

Maximum No. - 999

This example: 7

Press key	7	Duty No.
	DATA	4 Data Code

00.07

Time

This data number will in addition to the duty number, record the operators start of duty time.

Operators Roll Number

Maximum No. - 9999

This example: 2357

Press keys	2	3	5	7	Roll No.	23.57
	DATA	5	Data Code	Time		

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Interim Waybill

To check the printer operation, data, time and start of duty routine entry, an interim waybill can be issued. This waybill may be issued at any time and show current ticket and cash totals etc. without erasing memory, by pressing

Check from the waybill that all start of duty routine entries are correct and re-enter any item if required.

Check date if incorrect adjustments require service engineer.

Ticket and cash counters should read zero and end of duty time should be dashes.

Ticket Issuing

The machine will issue Single and Return tickets for five passenger classifications, for example, Adult, child, Senior Citizen, Economy and Special.

Fare capacity is £99.99 and any ticket up to this amount can be issued for all passenger classifications.

The following information must be entered via the keyboard to issue any ticket.

- a) Price
- b) Passenger Classification
- c) Single or Return

In some circumstances where a wide range of tickets are not required for example a fare of a specific value may be issued on depression of a single key.

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The final operation for any ticket is to press the "ISSUE" key. Prior to this action any keying error can be erased by pressing the "CLEAR" key which will clear the complete ticket entry.

By default the machine will issue in adult and single modes.

Ticket Issuing Examples

25p Adult Single

Display

Press keys	2	5	ISSUE	00.25
------------	---	---	---	-------

60p Adult Return

Press keys	6	0	RETURN	ISSUE	00.60
------------	---	---	--	---	-------

40p Child Return

Press keys	4	0	CHILD	RETURN	ISSUE	00.40
------------	---	---	---	--	---	-------

To Change Stage Number

As the stage number is recorded on the ticket the machine setting must be adjusted between each stage. Depending upon the direction along the route, the stage will either be incremented by pressing

+

 or decremented by pressing

-

On entry the amended stage number will be displayed for checking.

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To Change Route Direction

To change route direction re-enter new direction together with stage number.

End of Duty

To record the operators finishing time on the waybill

Press keys

DATA	0
------	---

Final Waybill

On completion of a shift or duty a waybill of operator, transaction and journey data will be printed by pressing keys

DATA

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 This operation in addition to printing the waybill will subsequently clear all previous shift memory and operator data, with the exception of the running total (Item 32) in preparation for the next shift.

The sequential numbers 01-33 in the left hand column of the waybill refer to the following items printed in the right hand column.

Stage Number	18	Economy Single - Tickets Sold
Time of Waybill Issue	19	" " - Cash Taken
Start of Duty Time	20	Economy Return - Tickets Sold
Date	21	" " - Cash Taken
Machine Number	22	Senior Citizen - Tickets Sold Single
Duty Number	23	Senior Citizen - Cash Taken Single
Operators Roll Number	24	Senior Citizen - Tickets Sold Return

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Route Number	25	Senior Citizen - Cash Taken Return
Journey Number	26	Special Single - Tickets Sold
Adult Single - Tickets Sold	27	" " - Cash Taken
" " - Cash Taken	28	Special Return - Tickets Sold
Adult Return - Tickets Sold	29	" " - Cash Taken
" " - Cash Taken	30	Total Tickets Sold
Child Single - Tickets Sold	31	Total Cash Taken
" " - Cash Taken	32	Grand Running Total
Child Return - Tickets Sold	33	End of Duty Time
" " - Cash Taken		

Extended Facilities

Machines may register operations from external equipment on the waybill.

To supply an outside data processor with stored information from the machine's output data socket

press

DATA

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Engineers Setting Up Procedure

The initial setting up of the devices individual machine number, data, year, time and setting to zero the grand running total, can only be performed by a service engineer.

Before keying in any data the service switch must be switched to "ON".

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Machine Number

Maximum Number - 9999

This example - 1297

Press keys	1	2	9	7	Machine Number
		DATA	4		Data Code

Clock Setting - Year

Press keys	8	0	Year 1980
	DATA	3	Data Code

Clock Setting - Date

Example - September 12th

Press keys	1	2	Date
	0	9	Month
	DATA	2	Data Code

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Clock Setting Time

Example - 3.40 p.m.

Press Keys	<table border="1"><tr><td>1</td></tr></table>	1	<table border="1"><tr><td>5</td></tr></table>	5	<table border="1"><tr><td>4</td></tr></table>	4	<table border="1"><tr><td>0</td></tr></table>	0	Time
1									
5									
4									
0									
			<table border="1"><tr><td>DATA</td></tr></table>	DATA	<table border="1"><tr><td>1</td></tr></table>	1	Data Code		
DATA									
1									

Time setting must always be the last clock entry.

Provision is included for putting the clock forward or backward by exactly one hour for setting the clock when time changes (Greenwich Time to Summer Time or vice versa are made).

Zero Setting - Cash Grand Running Total

To clear all memory functions and reset grand running total to zero.

Press Keys	<table border="1"><tr><td>DATA</td></tr></table>	DATA	<table border="1"><tr><td>0</td></tr></table>	0
DATA				
0				

After altering any of the above settings reset service switch to "OFF."

Data Code Reference

List of keyboard entry data codes.

<u>Data Code</u>	<u>Operator Functions</u>
------------------	---------------------------

0	End of duty time
1	Route Number
2	Stage number and route direction
3	Journey number
4	Operators duty number
5	Operators Roll number
6	Final waybill
7	Interim waybill
8	Data to external processor

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<u>Data Code</u>	<u>Engineers Functions</u>
0	Reset grand cash total
1	Clock setting - Time
2	" " - Date
3	" " - Year
4	Machine number setting
5	Change from British Summer time to Greenwich Mean Time
6	Change from Greenwich Mean Time to British Summer Time.

A switch is included to be operated by insertion and turning of an engineers key in the switch. Operation of this switch opens part of the machine not available to the operator but available to the engineer.

PASSENGER CLASSIFICATIONS

The machine will normally issue "Adult Single" tickets unless instructed otherwise, and "Single" tickets unless instructed to issue "Return"

Five classifications may be nominated by the customer using keys A, B, C & D. Each classification can be single or return.

FARE

The fare will be entered by the numeric keys with the decimal point being programmed in after two entries. If a fare is over 99p, three or four numeric values are entered.

As the fare is entered into the keyboard it will be shown on the display where it will remain for one minute after the ticket is issued before reverting to the time model or before switching itself off.

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REPEAT TICKETS

After the issue of a ticket and during the time the fare is displayed an identical ticket may be issued by pressing the "Issue" key, any number of repeat tickets can be issued in this way. Provision is made for totalising the values of tickets for more than one person (as may be required for example when an adult and two children are travelling together and the adult is to pay for the three tickets).

CANCELLING TICKETS

Provision may be included on the machine for cancelling tickets for example weekly tickets, by using knife mechanism for cutting away part of a ticket or by using an overprinting mechanism to overprint part of the weekly ticket.

COUNTER MECHANISM

A counter mechanism is included to receive pulses from an external source for example a cancelling machine or a turnstile to initiate the issue of a ticket.

END OF PAPER DETECTOR

A detector is included to check when the paper web in the machine is nearly exhausted to prevent operation of the machine when no paper is available.

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END OF SHIFT

At the end of a shift or period of duty the operator will enter into the keyboard function number A0 which will record end of shift time.

STATISTICAL PRINT OUT

At the finish of a shift a waybill of transaction and journey data may be printed by entering function number A6 into the keyboard.

The information will be printed out from information entered by the operators start of duty routine and by data accumulated in the memory

Issue of this waybill will clear all statistical counters and journey data.

The print out will record the following data if previously entered at the start and finish of duty.

- (a) Start of duty time and date.
- (b) Machine and waybill number
- (c) Drivers duty and operators roll numbers (if required)
- (d) Route and journey numbers (if required)
- (e) Opening grand cash total
- (f) Passenger classification, cash and ticket subtotals
- (g) Cash and ticket current totals. (Total cash taken, total tickets sold)
- (h) Grand cash total
- (j) Fare and passenger classification statistical analysis - if required
- (k) Finish of duty time

For identification purposes waybill items will be prefixed by an identification number. For inspection purposes interim waybills may be issued by entering function numbers A7. This application will not offset any entered data.

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DATA OUTPUT

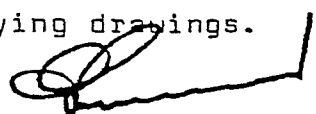
As an optional extra the machine will output all the data in its memory to an external processor through a socket on command from the keyboard.

The data rate will be internally preset.

WHAT WE CLAIM IS:-

1. A ticket issuing machine comprising a ticket printing device, a paper feed device for feeding a ticket web past the printing device a micro processor means a keyboard for entering data into the micro processor, a store for retaining information about information to be printed on a ticket which information can be transferred to the micro processor means to control the ticket printing device under the control of the microprocessor means to determine the information to be printed on the ticket web and a display panel for displaying information to be entered on the keyboard and information to be printed on the ticket and power means for driving the parts of the ticket issuing machine.
2. A ticket issuing machine according to claim 1 wherein the power means is a battery and the ticket issuing machine is capable of being carried.
3. A ticket issuing machine according to claim 1 or 2 wherein the keyboard includes programme circuit means to determine the function of the ticket issuing machine.

4. A ticket issuing machine according to any one of the preceding claims wherein the printing device is a printer on thermal sensitive paper.
5. A ticket issuing machine according to any one of the preceding claims wherein the display panel can alternatively display clock information instead of the keyboard information
6. A ticket issuing machine having at least one security lock to prevent unauthorised use of the ticket machine by a person other than a keyholder.
7. A ticket issuing machine according to any one of the preceding claims wherein the store in the machine stores information about the tickets issued and means are provided to enable the information about tickets issued to be transferred on external store.
8. A ticket issuing machine constructed arranged and adapted to operate substantially as herein described with reference to the accompanying drawings.



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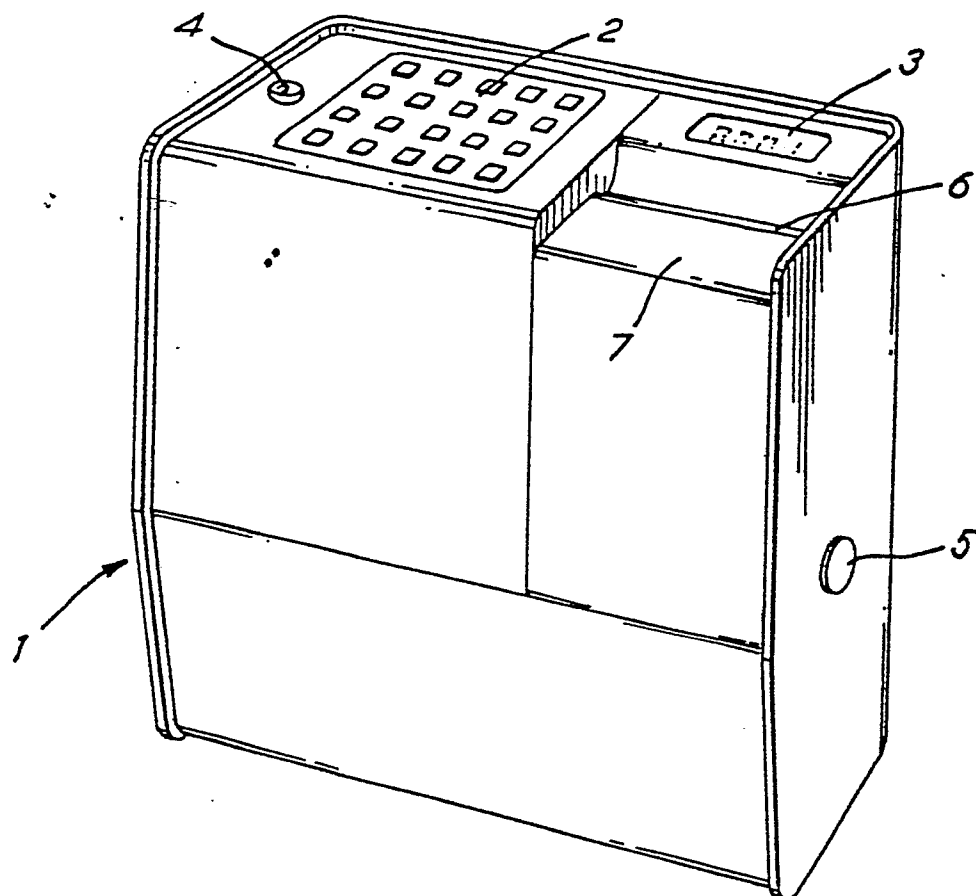


FIG. 1

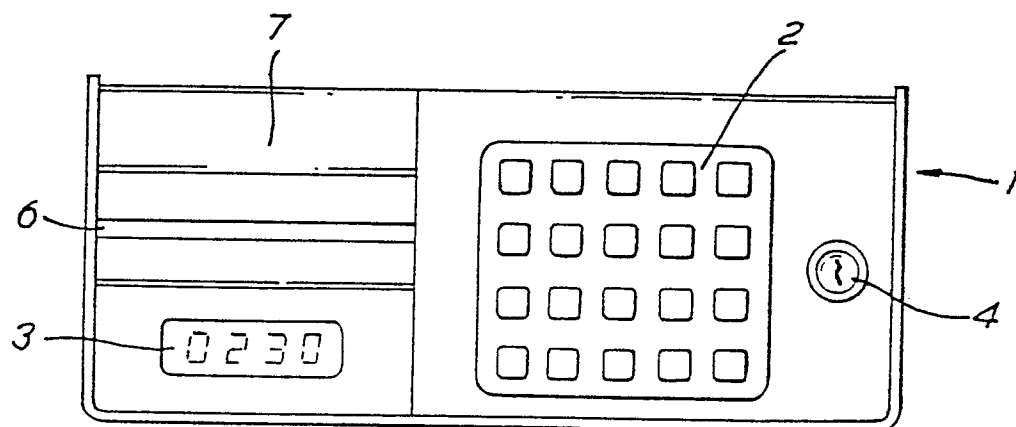


FIG. 2

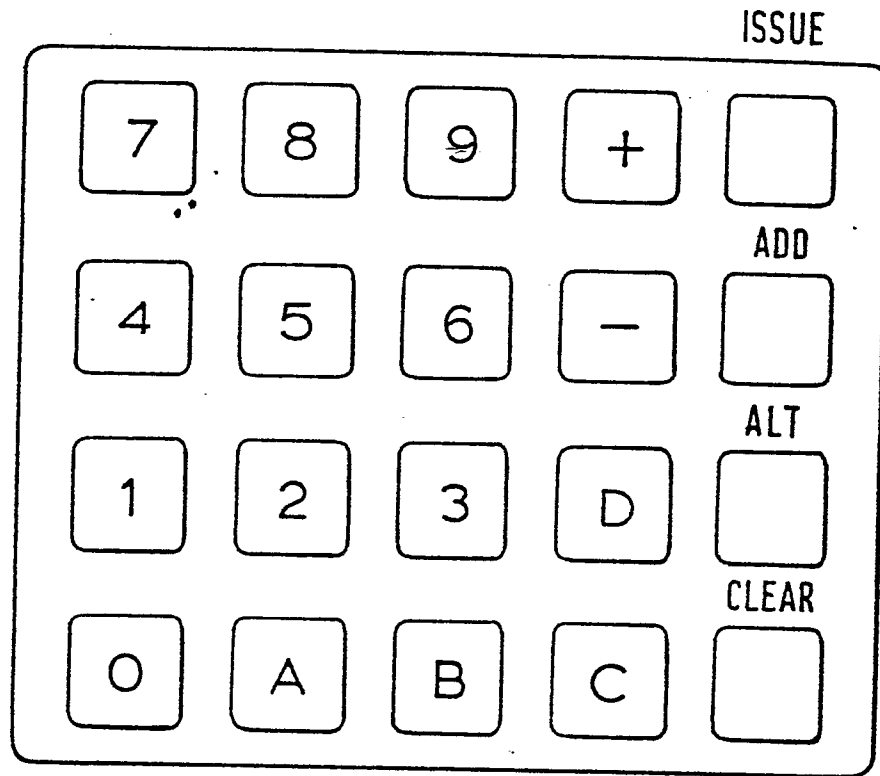


FIG. 3

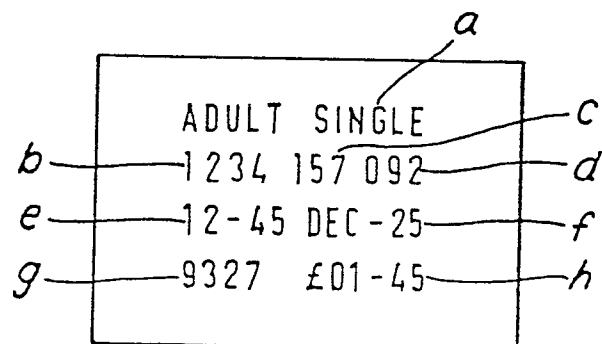


FIG. 4

