

[54] IMPRINTING MEANS FOR A COMPUTER ACCESS TERMINAL

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[51] Int. Cl.² B41J 1/60

[58] Field of Search 101/45, DIG. 18, 56, 95, 101/99, 110, 269-274; 340/149 R

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3,739,716	6/1973	Barbour	101/269 X
3,771,442	11/1973	Ditman	101/99
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[57] ABSTRACT

An imprinter for a computer access terminal having a keyboard and a transaction key for entering data into said terminal in response to data entered on the keyboard. The imprinter includes a frame for securing the imprinter to the terminal and a plurality of digit amount wheels which are rotatably mounted in the frame for representing a multi-digit number like price, and including various codes. The imprinter also includes a pawl type indexing member for each digit amount wheel, which indexes the associated digit amount wheel one digit position each time the indexing member is actuated by an associated solenoid so that each digit amount wheel is successively indexed a predetermined number of digit positions corresponding to the associated digit entered on the keyboard upon actuation of the transaction key or an on-line imprint signal. When the amount and codes are set on the digit amount wheels, a roller type platen travels over an embossed type credit card and the digit amount wheels to print on a credit card voucher inserted in the terminal which can be operated on-line or off-line.

1 Claim, 7 Drawing Figures

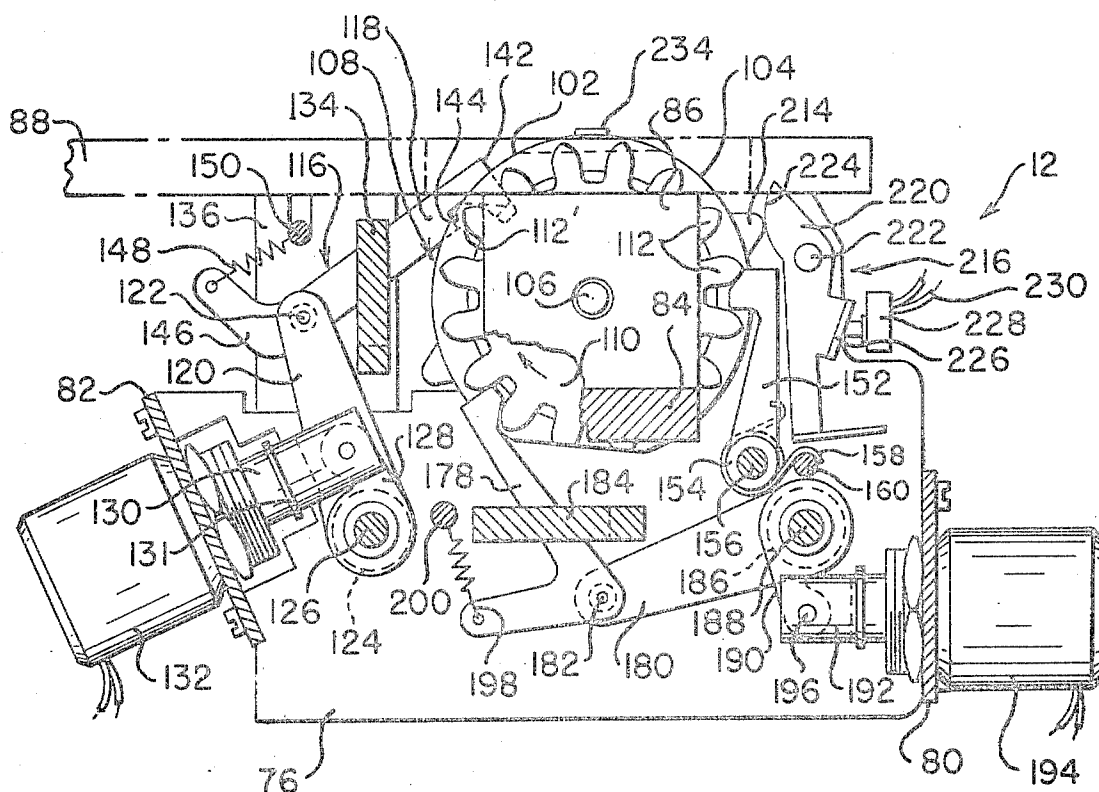


FIG. 1

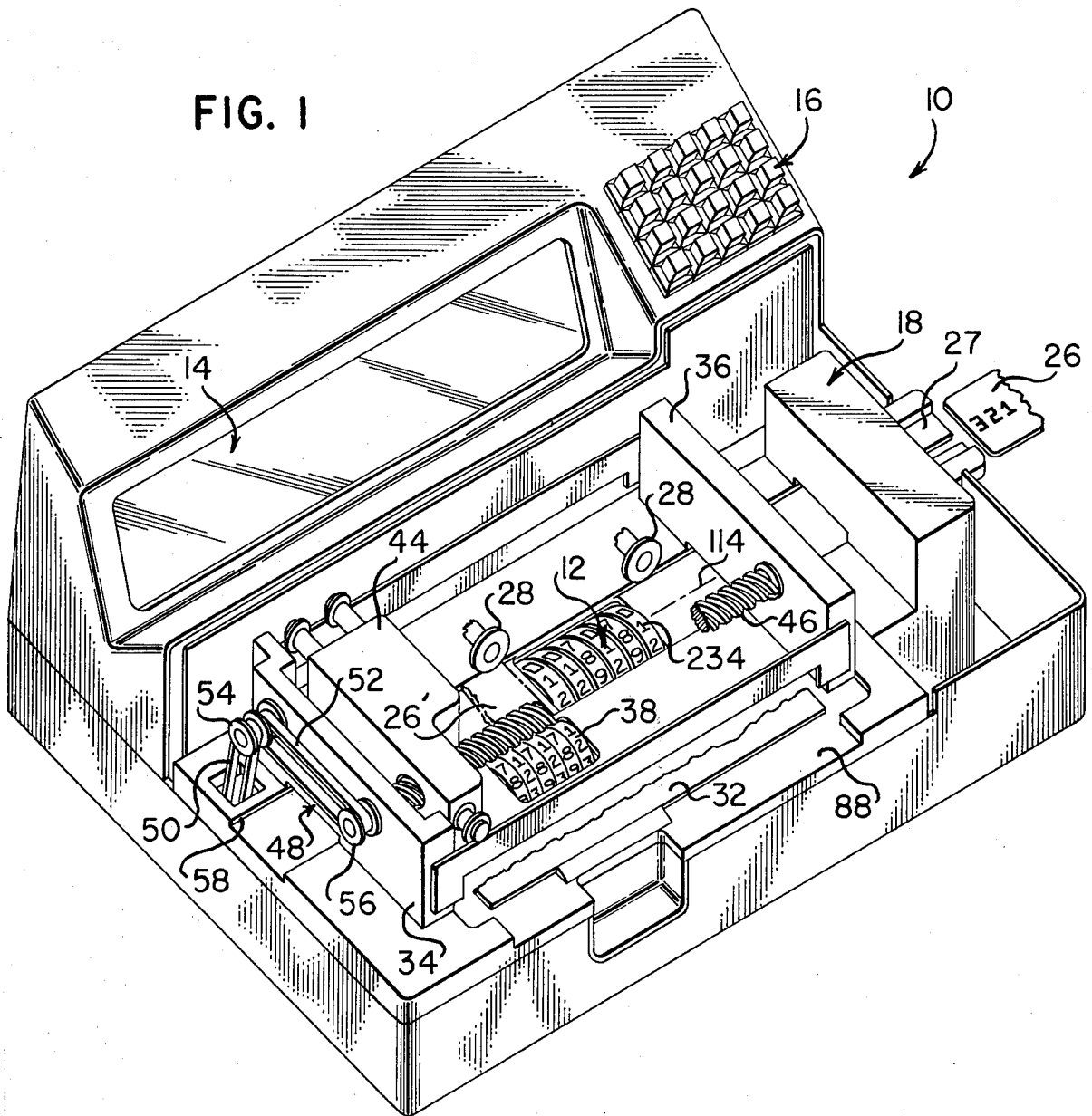


FIG. 2

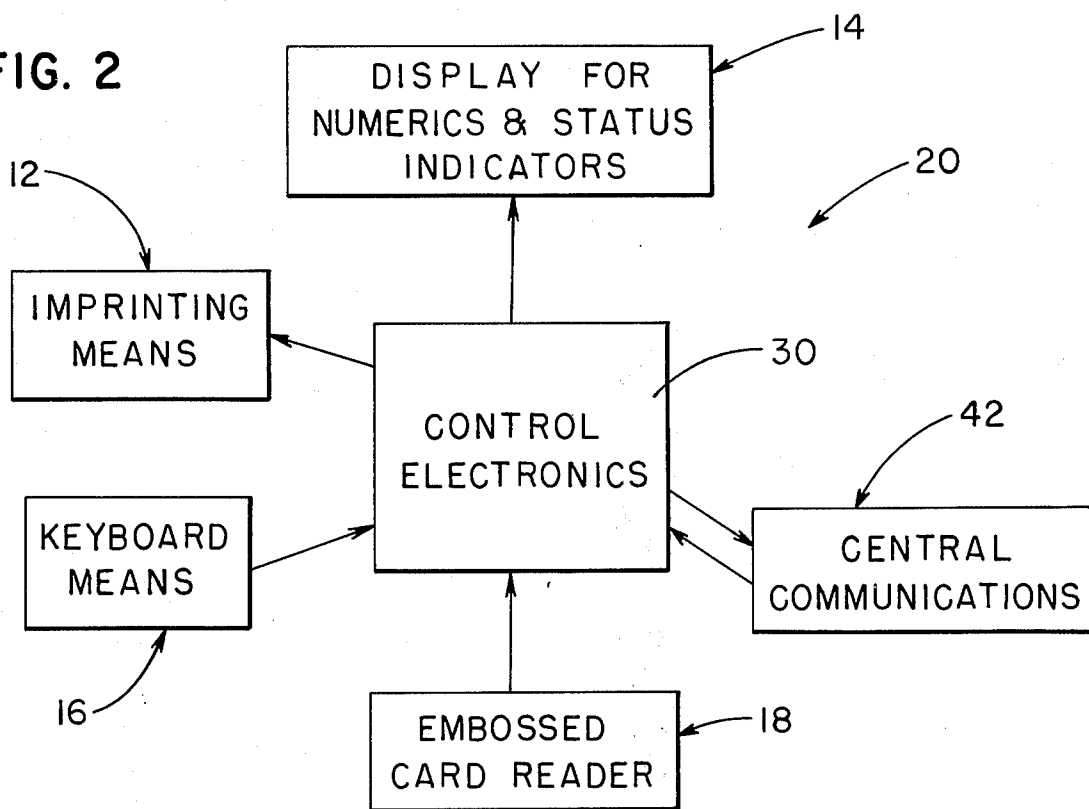


FIG. 3

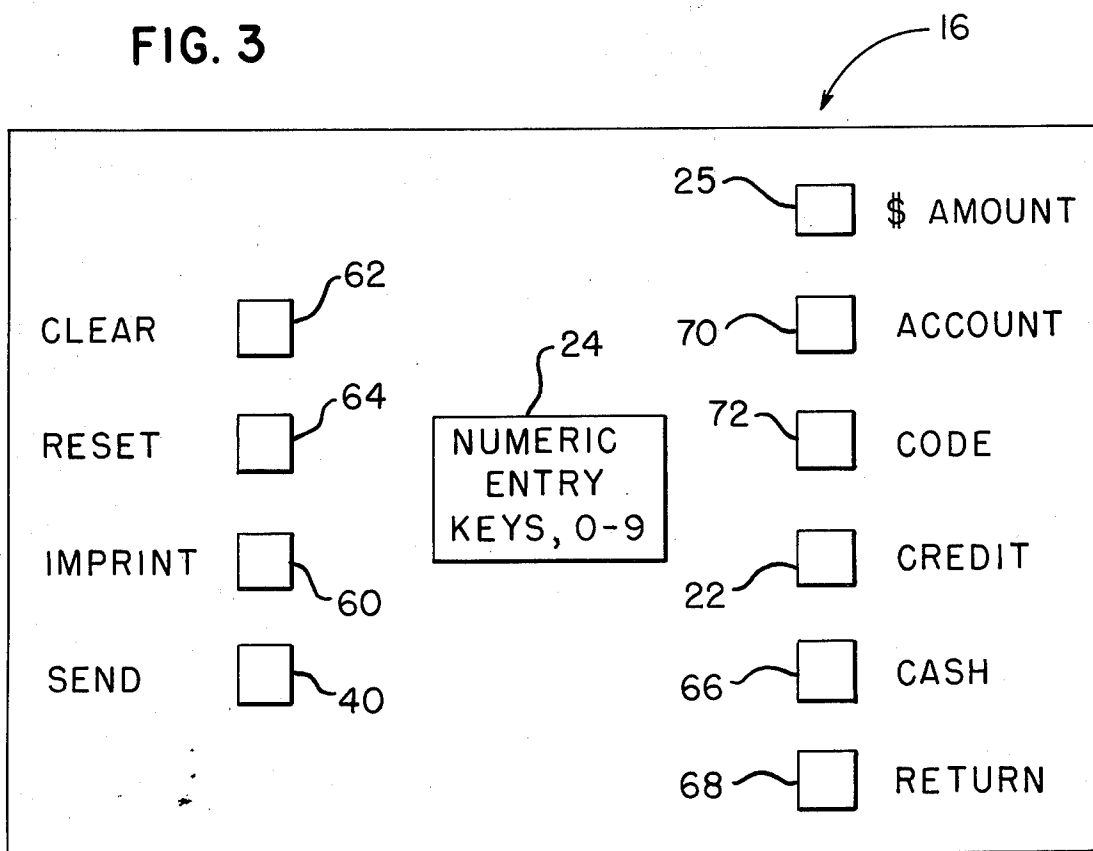


FIG. 4

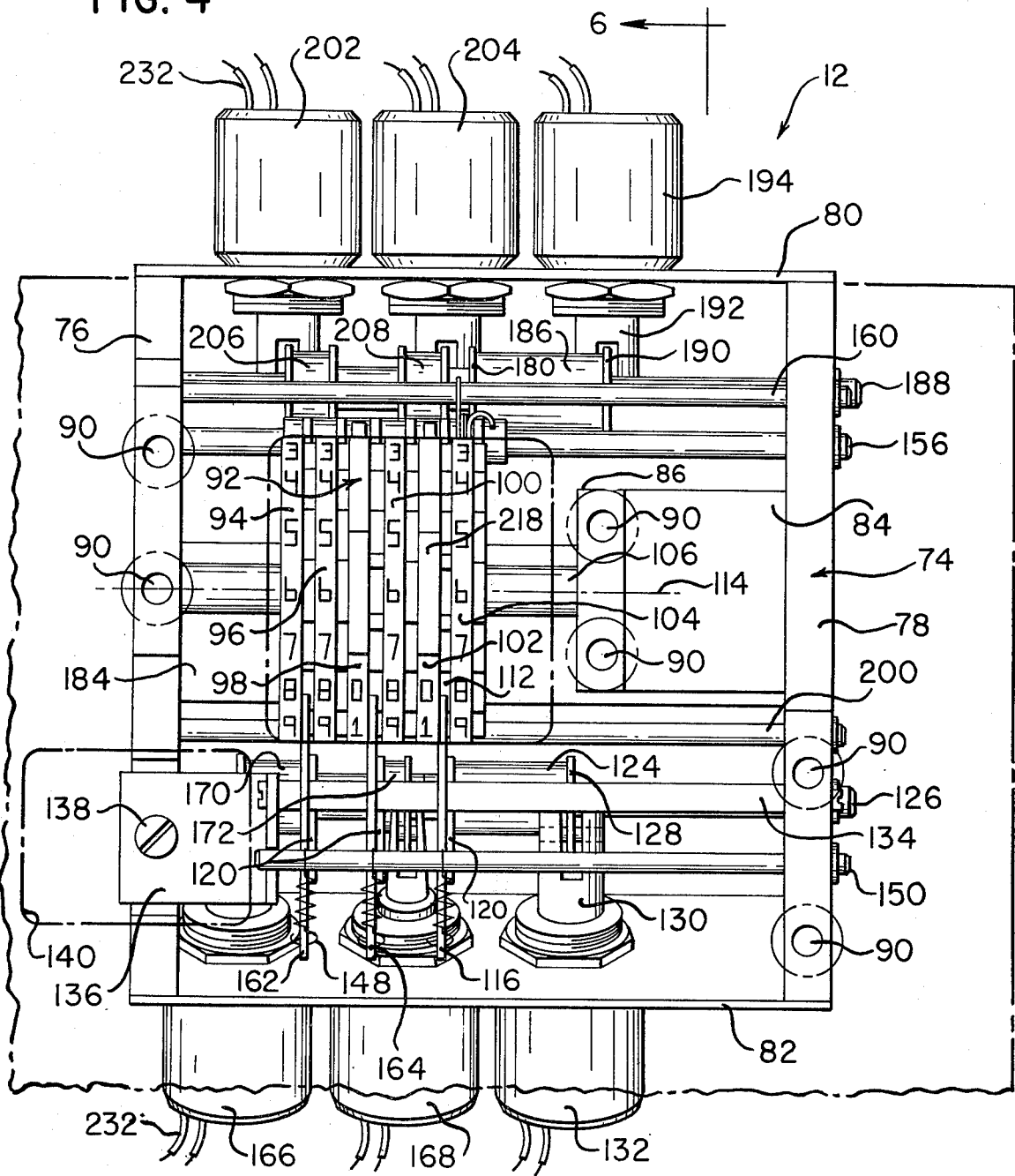
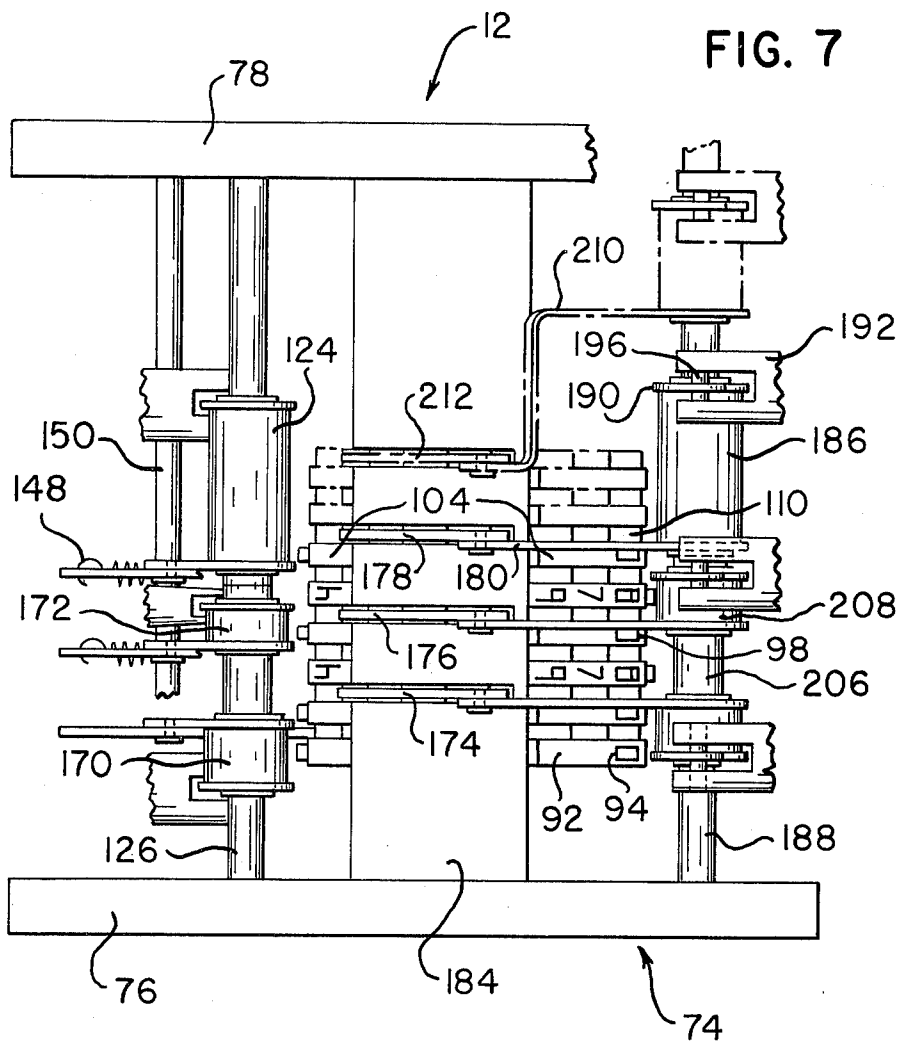


FIG. 7



IMPRINTING MEANS FOR A COMPUTER ACCESS TERMINAL

BACKGROUND OF THE INVENTION

This invention relates to an imprinting means for use in a terminal, which can be operated on-line or off-line, for printing on a credit card voucher inserted in the terminal.

In recent years, there has been a trend to provide retail business establishments with terminals which are interconnected with credit service agencies and banking institutions to provide for on-line credit authorization and on-line funds transfer with automatic sales receipt/credit card voucher imprinting. Additionally, the terminal can be used for other on-line data transfers such as check verification and account inquiries. The terminal can also operate as an off-line sales receipt/credit card voucher imprinter.

In the past, the credit card voucher imprinters were usually manually operated in that a credit card with embossed codes and printing thereon and a credit card voucher were inserted in the imprinter, and the purchase amount for the credit purchase was manually entered upon the imprinter. The imprinter also contained a code identifying the seller or retail establishment, and a manually settable date printer. With the credit card and voucher positioned in the imprinter, and the purchase amount entered thereon, the operator then manually traversed an imprinter roller back and forth across the length of the voucher to imprint all the named data on the voucher.

Efforts in the past have been aimed at automating the entry of at least some of the data on a credit card voucher imprinter. One such effort is shown in U.S. Pat. No. 3,606,833 which shows a cash register and a credit card voucher imprinter which are interconnected so that purchase amounts which are entered upon the cash register will be automatically entered upon the associated voucher imprinter. Another U.S. Pat. No. 3,771,442 shows a zero-lock print wheel apparatus for an imprinting means.

The present invention discloses a low cost, compact, reliable means for entering data like a purchase price and codes on an imprinting means which is used in conjunction with a computer access terminal of the type described.

SUMMARY OF THE INVENTION

This invention relates to an imprinting means for a computer access terminal having a keyboard means and a transaction key for entering data into the terminal, for printing data on a record medium inserted in the terminal in response to data entered on the keyboard means.

The imprinting means comprises a frame means for securing the imprinting means to the terminal and a plurality of amount wheel means which are rotatably mounted in the frame means for representing a multi-digit number.

Indexing means are provided for each amount wheel means for incrementally indexing the associated amount wheel means one digit position each time the indexing means is actuated so that each amount wheel means is successively indexed a predetermined number of times or digit positions corresponding to the associated digit entered upon the keyboard means. Actuating means are provided for each indexing means to actuate

the associated indexing means the associated predetermined number of times upon actuation of the transaction key or an on-line imprint signal.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a general view, in perspective, of a computer access terminal into which the imprinting means of this invention may be incorporated.

FIG. 2 is a schematic block diagram showing how various elements of the computer access terminal are interconnected.

FIG. 3 is an enlarged schematic diagram showing a keyboard associated with the computer access terminal.

FIG. 4 is a plan view of the imprinting means of this invention showing a frame means for securing it to said terminal, amount wheel means thereon, and actuating means for setting various amounts on the amount wheel means.

FIG. 5 is a side view in elevation of the imprinting means when viewed from the right side of FIG. 4.

FIG. 6 is a side view in elevation, partially in cross section, and taken along the line 6—6 of FIG. 4 to show details of pawl means associated with the imprinting means for indexing the amount wheel means thereof.

FIG. 7 is a plan view showing a portion of the underside of the imprinting means to show additional details of the pawl means.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a general view in perspective of a computer access terminal 10 into which an imprinting means 12 of this invention may be incorporated. Before getting into the details of the imprinting means 12, it seems appropriate to discuss, generally, the general functioning of the terminal 10.

The terminal 10 (FIG. 1) may be a funds transfer terminal which has been developed in recent years to provide retail establishments, in conjunction with credit service agencies and banking institutions, the capability for on-line credit authorization and on-line funds transfer with automatic sales receipt/credit card voucher imprinting. Additionally, the terminal 10 can be used for other on-line data transfers such as check verification and account inquiries. The terminal 10 can also operate as an off-line sales receipt/credit card voucher imprinter.

The terminal 10 (FIG. 1) includes the imprinting means 12; a conventional display means 14 for displaying numeric information and various status and instruction indicators; a conventional entry keyboard means 16, for entering data upon the terminal 10; a conventional credit card reader means 18; and a conventional control means 20 shown in block diagram in FIG. 2 for controlling the various elements and operations of the terminal 10.

As previously stated, the terminal 10 (FIG. 1) will operate on-line or off-line at the discretion of the operator. Because the controls and various communication techniques used with the terminal 10 are not a part of this invention, any conventional controls and techniques may be used. In general, an on-line transaction consists of the following five phases:

1. Input;
2. Communications;
3. Output processing;
4. Imprinting; and

5. Termination.

If an on-line transaction is to be effected, the terminal display 14 (FIGS. 1 and 2) will light up an indicator like Ready/Enter to indicate that it is ready to accept data. If a credit purchase is to be made, the operator will depress a credit key 22 (FIG. 3) on the keyboard means 16 to indicate to the terminal 10 the type of transaction to be entered, and then he enters the amount of the purchase on the numeric entry keys 24 and thereafter depresses an amount key 26. Depression of the amount key 26 causes the preceding data (amount) to be entered into an input/output buffer (not shown) which is part of the control means 20 shown in FIG. 2. The operator may then insert a credit card 26 having embossed printing or characters thereon into a slot 27 in the terminal 10 to pass under the card reader means 18 (FIG. 1) to read the embossed Account Code (characters) on the card 26 and transfer the card to the position shown in dashed outline 26' by conventional transport wheels 28. The data read from the card 26 is conventionally transferred to control electronics 30 shown in FIG. 2. The operator also inserts a credit card voucher 32 in the terminal 10 to slide between side frames 34 and 36 of the terminal 10 to receive the printing of the imprinting means 12, credit card 26, manually settable date wheels 38 and related retail outlet codes. For an on-line transaction, the operator will then depress a send key 40 (FIG. 3) to transmit the data entered upon the terminal 10 to a central communications center 42. If the purchase request and credit card are valid, an on-line imprint signal will be sent from the center 42 to the control electronics 30 causing the data entered upon the terminal to print on the voucher 32. Printing is effected by using a conventional imprint roller means 44 which is traversed (back and forth) over the length of the entire voucher 32 by a lead screw 46 and associated conventional drive means 48 shown only as belts 50, 52, and pulleys 54 and 56. The terminal 10 has a cover (not shown) which is removed to facilitate the showing of the elements described herein. The amount of the purchase is displayed on the display means 14 along with any necessary instructions or lead through messages to assist an operator in utilizing the terminal 10 as is conventionally done. Because the general functioning of the terminal 10 along with the sequence of entering data into the terminal may be conventional and is dependent upon the particular control means 20 utilized, no further discussion thereof is deemed necessary. After imprinting, the voucher 32 may be removed, and the credit card 26 is exited from the terminal 10 by the transport wheels 28 through a slot 58 in the terminal 10.

When an off-line transaction is to be conducted on the terminal 10, and a credit transaction is to be made, the operator merely depresses the credit key 22 to indicate the type of fixed transaction, enters the amount of the credit purchase on the numeric entry keys 24, and then depresses the amount key 26 to indicate that the data entered is for the amount of the purchase. Thereafter, the credit card 26 and the voucher 32 are inserted into the terminal as previously explained, and the operator depresses an imprint key 60 (FIG. 3) causing the amount of the credit purchase to be set upon the imprinting means 12 and the roller means 44 to be traversed over the length of the voucher 32 to imprint the data thereon as previously explained.

The keyboard means 16 (FIG. 3) of the terminal 10 has thereon the usual clear and reset keys 62 and 64, respectively, and has two fixed transaction keys 66 and 68 (similar to the fixed transaction key 22 for credit) for a cash transaction and for a return transaction, respectively. There is also provision for manually entering the credit card number by depressing an account key 70 after the card number has been entered upon the numeric keys 24, and for similarly entering special codes via a code key 72 which special codes are printed by the imprinting means 12.

The imprinting means 12 has a frame means generally designated as 74 (FIG. 4) for securing it to the terminal 10. The frame means 74 includes side plates 76 and 78 which are maintained in spaced parallel relationship by end plates 80 and 82, and also includes a block 84 having one end secured to side plate 78 and a block 86 secured to the other end thereof. The block 86 is positioned vertically and is parallel to side plate 78. The frame means 74 is secured to the underside of a plate 88 (FIG. 1) on the terminal 10 by fasteners (not shown) which pass through the plate 88 and are secured in the threaded mounting holes 90 located in the side plates 76 and 78.

The imprinting means 12 also has an amount wheel means designated generally as 92 associated therewith and upon which various purchase amounts and/or codes may be set by means to be later described herein. In the embodiment shown, the amount wheel means 92 includes a plurality of digit amount wheels 94, 96, 98, 100, 102 and 104 with each wheel having the digits 0 to 9 formed on the periphery thereof, and with these wheels being rotatably supported on a shaft 106 which is perpendicularly fixed to the side plate 76 and the block 86. These amount wheels (like 94, etc.) are loosely or rotatably mounted on the shaft 106 to enable each wheel to be driven or rotated independently of the others, and the outer-most amount wheels 94 and 104 have C-type washers (not shown) fixed in complementary annular grooves (not shown) on shaft 106 to prevent axial displacement of the amount wheels thereon.

Each of the amount wheels like 94 has an indexing means designated generally as 108 (FIG. 6) associated therewith for indexing the associated amount wheel one digit position each time the associated indexing means is actuated.

The indexing means 108 includes a set 110 of gear teeth (for each digit amount wheel 94, etc.) which teeth are formed on one side of the associated digit amount wheel like 104, 94 shown in FIG. 6. In the embodiment shown, there are 16 teeth 112 of the involute variety formed on the wheel 104, and each tooth 112 is used to advance the wheel like 104 one digit position relative to a print line 114 (FIG. 4) each time the wheel is indexed by a pawl means designated generally as 116.

The indexing means 108 includes one pawl means 116 for each digit amount wheel like 96, 104. The pawl means 116 includes a pawl member 118 (FIG. 6) which is pivotally joined between its ends to one end of a crank lever 120 by a pin 122. The remaining end of the crank lever 120 is fixed to one side of a bushing 124 which is rotatably mounted on a shaft 126. The shaft 126 is aligned parallel to the shaft 106 and is conventionally supported and retained in the side plates 76 and 78. The remaining side of bushing 124 also has one end of a crank arm 128 fixed thereto, and the remaining end of the crank is pivotally joined to the operating

plunger 130 of a solenoid 132 which is suitably secured to the end plate 82. A bar 134 has slots therein to slidably receive the associated pawl member 118 to keep it aligned with its associated set 110 of gear teeth. One end of the bar 134 is fastened to the side plate 78 (FIG. 4) and the other end is secured to an L-shaped support 136 which in turn is secured to the side plate 76 by a fastener 138 to secure the bar 134 parallel to shaft 106. The use of the support 136 provides a clearance for the date wheels 38 shown in FIG. 1 and also shown in outline in FIG. 4 by the closed dashed line 140.

The pawl member 118 (FIG. 6) has a tooth contacting end 142 which is substantially perpendicular to the length thereof and is also undercut as at 144 to provide a clearance for a succeeding tooth 112' as shown in FIG. 6. The remaining end of the pawl member 118 has an offset portion 146 to which one end of a tension spring 148 is secured, and the remaining end of the spring is secured to a rod 150 which is conventionally secured in the side plate 78 and the support 136.

The pawl member 118 (FIG. 6) operates with its associated digit amount wheel 102 in the following manner. When the solenoid 132 is momentarily energized by the control means 20 (FIG. 2), the plunger 130 is withdrawn and the crank arms 128 and 130 are rotated in a counterclockwise direction (as viewed in FIG. 6), and the end 142 of pawl member 118 is dragged over a succeeding tooth 112' to engage it. During the time that the pawl member 118 is pulled to the left over a succeeding tooth 112', the tension spring 148 causes the pawl member to rotate in a clockwise direction about pin 122 and thereby engage the next succeeding tooth 112'. After the momentary energization of the solenoid 132, the spring 148 causes the pawl member 118 to move the right to thereby index the associated digit amount wheel 102 one digit position. Also, crank arms 128 and 120 are rotated in a clockwise direction by the action of spring 148. In moving the digit amount wheel 102 one digit position, the wheel 102 is rotated in a clockwise direction as viewed in FIG. 6. The motion of crank arm 120 and the associated pawl member 118 is limited in one direction by a C-type washer 131 placed in an annular groove on the plunger 130, and in the opposite direction, the crank member 120 abuts against the bar 134 to thereby fix the limits of travel of the pawl member 118.

During the time that the pawl member 118 (FIG. 6) is being dragged over a succeeding tooth 112' as described, an anti-back-up pawl member 152 prevents the associated digit amount wheel 102 from backing-up or rotating in a counterclockwise direction. As the wheel 102 is rotated in a clockwise direction one digit position, the pawl member 152 is resiliently pushed out of engagement with the teeth 112, and after the wheel 102 is indexed one position, the pawl member 152 pushes between two adjacent teeth 112 to help align the associated wheel 102 along the print line 114 (FIG. 4). The pawl member 152 is fixed to a bushing 154 which is rotatably mounted on a shaft 156 which is secured on the side plates 76 and 78. The bushing 154 and pawl member 152 are kept aligned relative to the associated set 110 of teeth 112 by C-washers (not shown) on shaft 156 which prevent axial displacement of the pawl member 152 thereon. A torsion type spring 158 mounted on the bushing 154 and having one end secured to the pawl member 152 and the remaining end secured to a rod 160 resiliently keeps the pawl member

152 in engagement with its associated teeth 112. The rod 160 is positioned parallel to shaft 106 and is supported in the side plates 76 and 78.

There is one indexing means like 108 provided for each of the digit amount wheels 94, 98 and 102; however, the pawl member like 118 is slightly different in shape for the digit amount wheels (96, 100, 104) so as to effect compactness of the imprinting means 12. The digit amount wheels 94 and 98 have associated therewith, pawl members 162 and 164, respectively, which are identical to pawl member 118. The pawl members 162 and 164 each have their own solenoids 166 and 168, respectively, and associated crank arms like 120 and 128 already described; however, their associated bushings 170 and 172 respectively, interconnecting the associated crank arms have different axial lengths to enable the pawl members 162 and 164 to be aligned with their respective digit amount wheels and yet provide room for their associated solenoids 166 and 168. The pawl members 162 and 164 operate in a manner identical to the operation of indexing means 108 already described to index their associated digit amount wheels 94 and 98, respectively, one digit position each time the associated solenoids 166 and 168, respectively, are momentarily energized.

The indexing means for the digit amount wheels 96, 100 and 104 have associated therewith pawl members 174, 176 and 178 respectively, as shown in FIGS. 6 and 7, and because these pawl members are identical, only a discussion of pawl member 178 will follow. Pawl member 178 is pivotally joined between its ends to one end of a crank arm 180 by a pin 182, and is slidably mounted in a complementary slot in a bar 184 to keep the pawl member aligned with its set 110 of gear teeth on the associated digit amount wheel 104. The bar 184 is fixed to the side plates 76 and 78 with the long length of bar 184 being in parallel relationship with the longitudinal axis of shaft 106. The remaining end of crank arm 180 is fixed to one end of a bushing 186 which is rotatably mounted on a shaft 188 whose ends are supported in the side plates 76 and 78. The other end of bushing 186 has one end of a short crank arm 190 fixed thereto, and the remaining end of the crank arm is pivotally joined to the operating plunger 192 of a solenoid 194 by a pin 196. The solenoid 194 is fixed to the plate 80. The portion of pawl member 178 which contacts the teeth 112 is identical to pawl member 116, and is kept in contact with the teeth by a tension spring 198 having one end which is secured to one end of the pawl member and the remaining end secured to a rod 200 which is supported in the side plates 76 and 78. The pawl member 178 operates in exactly the same manner as does pawl member 118 whose operation has already been described i.e., each time solenoid 194 is momentarily energized, the pawl member 178 advances its associated digit amount wheel 104 one digit position as already explained.

The pawl members 174 and 176 have linkage interconnecting them to their associated solenoids 202 and 204, respectively, which linkage is identical to that explained relative to pawl member 178; however, their associated bushings 206 and 208 (FIG. 4) respectively, are different in axial length from bushing 186 so as to accommodate the solenoids 202, 204 and 194. Each digit amount wheel like 94 etc., has its own anti-back-up pawl member 152 as previously explained.

While there are only six digit amount wheels like 94 etc. shown in FIG. 1, the imprinting means 12 can be expanded to include additional digit amount wheels as shown in dashed outline in FIG. 7. The indexing means for these extra wheels are constructed according to the same principles already described; however, the crank member like 180 shown in FIG. 6 may be modified as shown in dashed outline 210 in FIG. 7 to provide the necessary reach for its associated pawl member 212.

Each of the digit amount wheels 94, 96, 98, 100, 102 and 104 has a lug 214 (FIG. 6) thereon to cooperate with a switch means 216 provided for each wheel to indicate when each of the associated wheels is in a home position. When in the home position, a flat area 218 having no embossed characters on the associated digit amount wheel, is aligned with the print line 144 as shown by digit amount wheel 102 in FIG. 4. The switch means 216 includes a thin lever 220 which is aligned with the associated digit amount wheel like 102 and pivotally mounted on a rod 222 supported on the side plates 76 and 78. The lever 220 has an arcuately-shaped portion 224 on one end thereof to engage the arcuately shaped lug 214, and also has an offset portion 226 to engage the plunger of a switch 228, whose leads 230 are connected to the control electronics 30. The energizing leads 232 for each of the solenoids like 132 and 194 are also connected to the control electronics 30.

The imprinting means 12 is secured to the underside of plate 88 as shown in FIG. 1 so that a character or digit 234 on a digit amount wheel to be used in printing lies above the top surface of plate 88 as shown in FIG. 6.

The operation of the imprinting means 12 is as follows. During the normal ready-up cycle of the terminal 10 after it is turned on or when a clear key 62 or reset key 64 is depressed, all of the solenoids like 132, 194 are repetitively energized to index the associated digit amount wheel in a clockwise direction (as viewed in FIG. 6) until the lug 214 on the associated wheel like 104 engages the associated switch means 216 to open the switch 228. When switch 228 is open, the associated solenoid like 132, etc., will not be energized again as part of the ready-up cycle. When all the digit amount wheels are indexed as just described, all the lugs 214 thereof will engage the associated switch means 216, to stop the repetitive indexing thereof and accordingly, the blank portion 218 (FIG. 4) of the wheels 94, etc., will be aligned with the print line 114 (FIG. 1). When this occurs, the imprinting means 12 is ready to be indexed to reflect an amount entered upon the keyboard means 16.

After a purchase amount is entered upon the keyboard means 16 and the amount key 26 (FIG. 3) is depressed, the data therefor is transferred to the control electronics 30 as previously described. With the credit card 26 in place and a credit/sales voucher 32 (FIG. 1) in place, as previously described, to imprint the amount upon the voucher 32, the imprint key 60 is depressed or an on-line signal (if on-line) is used to effect the printing. If an amount like \$21.50 is to be entered upon the amount wheel means 92, the first digit amount wheel 94 will be repetitively indexed four times. The control electronics 30 will energize the solenoid 166 four times to align a 2 on wheel 94 with the print line 144. The solenoid 202 will similarly be energized three times by the control electronics 30 to align a 1 on wheel

96 with the print line 144. The solenoid 168 will be energized seven times by the control electronics to align a 5 on wheel 98 with the print line 144, and similarly, solenoid 204 will be energized two times to align a 0 on digit wheel 100 with the print line 144. The remaining two digit amount wheels 102 and 104 may be similarly utilized to set various codes upon the amount wheel means 92. The voucher 32 may be preprinted to show the location of the decimal point in the amount printed and to also show the codes set upon the digit wheels. The digits on the wheels 94, etc., are all identical and are positioned on the periphery of each wheel in a 0 to 9 order. It is necessary to index each wheel 2 digit positions from the home position (represented by the flat area 218 thereon) to reach the first "digit" in the series which digit is a zero. Because the control electronics 30 to effect the energization of the solenoids 166, etc., may be conventional, no further discussion thereof is deemed necessary.

What is claimed is:

1. In a computer access terminal comprising a keyboard means for entering data into said terminal and having a slot therein for receiving a credit card, and an imprinting means for printing data on a record medium inserted into said terminal in response to data entered on said keyboard means and an imprint signal from said terminal; said imprinting means comprising:

a frame means for securing said imprinting means to said terminal;

a plurality of amount wheel means rotatably mounted in said frame means for representing a multi-digit number;

indexing means for each amount wheel means for incrementally indexing the associated said amount wheel means one digit position relative to a print line each time the indexing means is actuated so that each amount wheel means is successively indexed a predetermined number of times to effect a predetermined number of digit positions of indexing corresponding to an associated digit entered on said keyboard means;

and actuating means for each said indexing means to actuate each said indexing means the associated said predetermined number of times corresponding to the associated digit entered on said keyboard means upon the occurrence of said imprint signal; said indexing means for each said amount wheel means comprising:

a plurality of teeth on the associated said amount wheel means, with one tooth being provided for each digit position;

a pawl means; and

a spring means to bias the pawl means to a first position;

said pawl means being movable from said first position to a second position upon a momentary energization of the associated said actuating means;

said pawl means in moving from said first position to said second position upon the momentary energization of the associated said actuating means being effective to slide over one said tooth of the associated said amount wheel means against the bias of the associated said spring means to thereby engage a next succeeding said tooth, and with said spring means being effective to move said pawl means to said first position from said second position to thereby advance the associated said amount wheel

means one digit position upon the deenergization of the associated said actuating means;
each said amount wheel means having a lug in a pre-determined location on the periphery thereof, and a switch means cooperating with said lug to open said switch means when said lug contacts said switch means as said amount wheel means is being rotated by its associated indexing means to thereby deactivate the associated said actuating means to thereby align said amount wheel means in a home position with reference to said print line prior to indexing each said amount wheel means said pre-determined number of times;
said imprinting means further including a support shaft mounted in said frame means, and in which each said actuating means comprises:
an actuating arm means having a first end pivotally mounted on said support shaft for movement be-

tween a first position and second position and also having a second end;
means for pivotally mounting the associated pawl means between its ends on said second end; and an actuator for pivotally moving the associated actuating arm means from said first position to said second position;
each said amount wheel means having a plurality of characters around a portion of the periphery thereof and also having a flat portion on said periphery; each said amount wheel means having its associated flat portion aligned with said print line when in said home position to enable a credit card to be moved in said slot over said plurality of amount wheel means when each said amount wheel means is in said home position.

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