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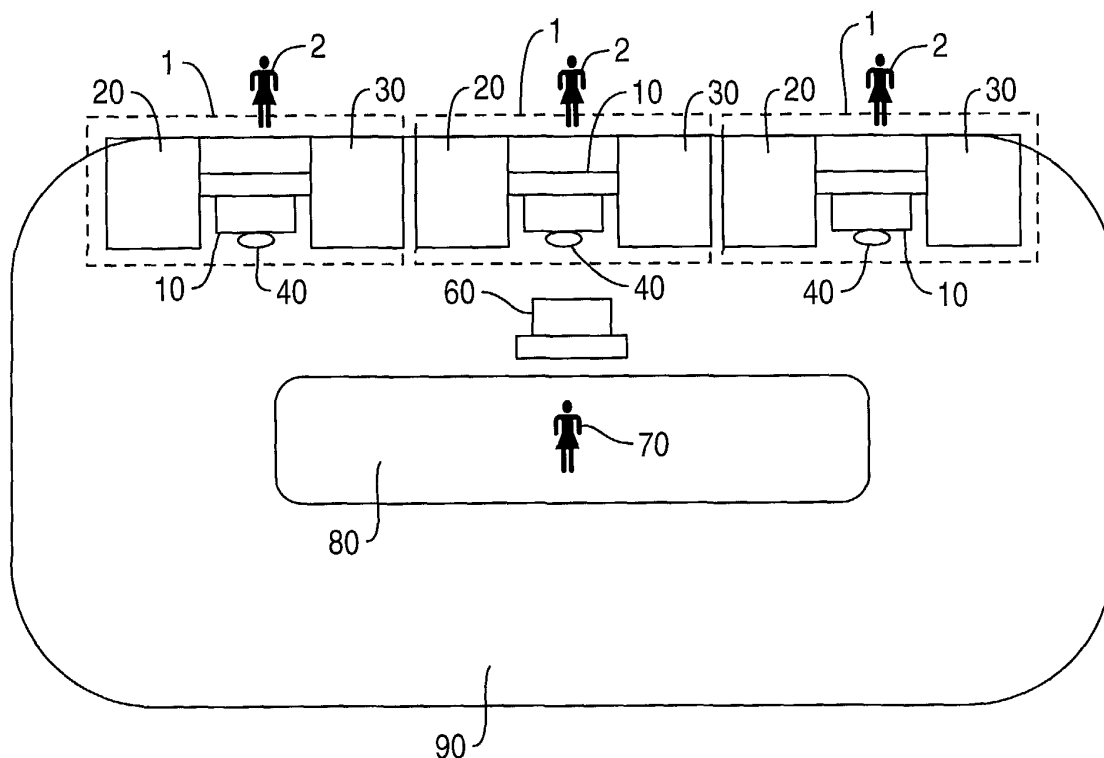
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(54) **Scalable self-checkout system**

(57) A system for self-checkout includes a plurality of self-checkout stations for self-assisted purchasing, each self-checkout station including a self-service terminal, a bagging area, and a merchandise placement area. The system also includes at least one supervisor terminal for monitoring purchasing activities of at least

some of the plurality of self-checkout stations. The self-checkout system is scalable for various configurations, applications, and capacity-based use. In a scalable form, two or more supervisor terminals are provided each of which is operative to monitor one or more of the plurality of self checkout stations.

FIG. 1



Description

[0001] The present invention relates to a checkout apparatus, system and method, and more particularly to a system, apparatus and method for a scalable self-checkout.

[0002] Primary motivations for shopping at any store include a store's merchandise, cost of merchandise, location, methods of payment accepted, and speed of checkout transaction. A potential consumer, when deciding where to shop, may additionally consider other factors than the ones preceding.

[0003] In one example, motivations for shopping at a convenience store include primarily a store's convenient location and speed of transaction. A typical transaction at a convenience store has a very low average dollar amount, a fact that helps limit some of the security concerns regarding different checkout methods used at a convenience store as well as the layout and manner of checkout.

[0004] During certain times, lines form at a checkout station of a convenience store, defeating the "speed of transaction" benefit of the convenience store. Times when a line forms are due to a variety of factors including a number of customers waiting to purchase their items exceeding the capability of the checkout station to quickly process the individual sales. As an example, a time when lines form at the checkout station is when lottery jackpots are larger than normal and lottery ticket sales are correspondingly high. A line at a checkout station can also be due to the fact that certain transactions require special assistance from the convenience store personnel. For example, lottery ticket sales or redemption, and sales of age-restricted items such as alcohol, tobacco, and adult magazines require that a convenience store employee perform special tasks such as approval or validation. The time spent performing these special tasks may negate the "speed of transaction" benefit of the convenience store, which also has conventionally negated the application and usefulness of a self-checkout device in a convenience store.

[0005] Self-checkout has been implemented for "pay at the pump" gasoline sales at convenience stores, where a gasoline pump includes a point-of-sale (POS) terminal. While one form of self-checkout has been implemented at a convenience store, namely "pay at the pump" gasoline sales where a gasoline pump includes a point-of-sale (POS) terminal, most other routine transactions performed at a convenience store are not adapted to present self-checkout operations. Moreover, certain transactions requiring approval or validation are also not adapted to a self-checkout operation in general.

[0006] Additionally, current self-checkout systems are not adaptable to limited space considerations in a typical store environment, such as a convenience store. Further, the current self-checkout systems are not adaptable with respect to layout within the given space.

[0007] This is thus a need for providing a system,

method and/or apparatus for effecting self-service checkout in a convenience store environment.

[0008] There is thus a further need for providing a self-checkout system, method and/or apparatus that is scalable for any store.

[0009] There is thus an even further need for implementing self-checkout at convenience stores, so that the intended convenience is not defeated due to waiting in lines.

[0010] According to a first aspect of the present invention there is provided a system for self-checkout, comprising: a plurality of self-checkout terminals for self-assisted purchasing, each self-checkout terminal including a display, a scanner, and a payment acceptor; and a supervisor terminal in communication with each one of said plurality of self-checkout terminals, said supervisor terminal having a display and operative to selectively monitor purchasing activities being conducted at any one or any number of said plurality of self-checkout terminals.

[0011] According to a second aspect of the present invention there is provided a system for self-checkout, comprising: a plurality of self-checkout terminals for self-assisted purchasing, each self-checkout terminal including a scanner, a display, and a payment acceptor; and a plurality of supervisor terminals each one of which is in communication with said plurality of self-checkout terminals and operative to monitor purchasing activities of any one or any number of said plurality of self-checkout terminals.

[0012] According to a third aspect of the present invention there is provided a method of self-checkout comprising: providing a plurality of self-checkout terminals, each self-checkout terminal having a scanner, a display, and a payment acceptor, and operative to perform a self-assisted purchase transaction; providing a plurality of supervisor terminals each one of which is in communication with said plurality of self-checkout terminals and operative to monitor a purchase transaction occurring at any one or at any number of said plurality of self-checkout terminals; and monitoring a purchase transaction currently occurring at any one or any number of the plurality of self-checkout terminals via any one or more of the plurality of supervisor terminals.

[0013] An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a schematic top view illustrating a checkout island according to an exemplary embodiment of the present invention;

FIG. 2 is a schematic top view illustrating a checkout counter according to an exemplary embodiment of the present invention;

FIG. 3A illustrates a bagging assembly according to an embodiment of the present invention;

FIG. 3B is a schematic view of an isolating post used in a bagging assembly according to an em-

bodiment of the present invention;

FIG. 4 is a schematic front view of a self-service terminal according to an embodiment of the present invention;

FIG. 5A is a schematic front view of a security/assistance pole according to an exemplary embodiment of the present invention;

FIG. 5B illustrates exemplary lenses of a security/assistance pole according to an exemplary embodiment of the present invention;

FIG. 6 is a schematic diagram of communication interfacing among elements of a self-checkout station according to an embodiment of the present invention;

FIG. 7 is a schematic diagram of a currency and coin acceptor and change assembly according to an embodiment of the present invention;

FIG. 8 is a flowchart for an exemplary method of self-checkout according to the present invention;

FIG. 9 illustrates a touch screen display of a self-service terminal in an exemplary payment choice mode of operation according to an embodiment of the present invention;

FIG. 10 illustrates a supervisor terminal's screen in an exemplary monitoring mode of operation according to an embodiment of the present invention;

FIG. 11 is a block diagram of an exemplary configuration of the present system illustrating a scalability aspect of the present invention;

FIG. 12 depicts a block diagram of another exemplary configuration of the present system illustrating the scalability aspect of the present invention; and

FIG. 13 is an exemplary depiction of a screen of a supervisor's terminal in accordance with the principles presented herein.

[0014] FIG. 1 shows an exemplary layout of an exemplary self-checkout system according to a checkout island embodiment of the principles of the present invention. A checkout island 90 includes a plurality of self-checkout stations 1, each including a self-service terminal 10, a bagging area 20, a merchandise placement area 30, and a security/assistance pole 40. The checkout island also includes a supervisor terminal 60 accessible from an open center area 80. It should be appreciated that the checkout island 90 may have only one self-checkout station 1, rather than two or more (a plurality). Further, the layout of the self-checkout system of FIG. 1 (i.e. the location of each self-checkout station 1 and the location of the supervisor terminal 60 by itself and in relation to each self-checkout station 1) is exemplary of the many configurations that the present self-checkout system may take.

[0015] The plurality of self-checkout stations 1 are designed for customer use, and each includes an outward-facing self-service terminal 10 located at a center position for each of the self-checkout stations 1. On one side of each self-service terminal 10 is the bagging area 20,

and on the other side of each self-service terminal 10 is the merchandise placement area 30. Each self-checkout station 1 also includes the security/assistance pole 40 having lights that indicate when assistance is requested, verification is required, or when a security issue is involved at the particular self-checkout station 1. The security/assistance pole 40 is preferably located at a position where it does not substantially block a line-of-sight between a customer 2 and a supervisor 70 manning the supervisor terminal 60.

[0016] The merchandise placement area 30 provides a flat surface where a customer 2 can place an item or items she wishes to purchase. The merchandise placement area 30 can be at a different height compared with the surfaces of the bagging area 20 and the area in front of the particular self-service terminal 10. For example, a lower merchandise placement height is preferable when the customer 2 has her items in a shopping basket and wishes to unload the items from the basket in a more comfortable manner. Another exemplary reason for varying the height of the surface of the merchandise placement area 30 is when the customer 2 is in a wheelchair, or is short in stature. In a preferred embodiment, however, the surface of the merchandise placement area 30 is at a same level as the other surfaces of the self-checkout station 1. The merchandise placement area 30 provides one or more surfaces that allow the customer 2 to selectively choose the order in which items are scanned or otherwise entered into an order being processed by the self-service terminal 10.

[0017] The location of the bagging area 20 and/or the merchandise placement area 30 (i.e. on the left or right side of the self-service terminal 10) is typically a matter of choice. One or more self-checkout stations 1 may be configured for a left-handed person (i.e. the merchandise placement area 30 on the right side, and the bagging area 20 on the left), while one or more self-checkout stations 1 may be configured for a right-handed person (i.e. the merchandise placement area 30 on the left side, and the bagging area 20 on the right side). Of course, other configurations may be used.

[0018] The checkout island embodiment of the present invention may optionally include a second set of self-checkout stations 1 (not shown) and a second supervisor terminal 60 (not shown), all disposed on an opposite side of the counter 90 in a mirror configuration of FIG. 1. In this configuration, two supervisors 70 are able to service twice the number of self-checkout stations 1. Optionally, a single supervisor terminal 60 is operative to supervise any self-checkout stations 1 located at any location around the circumference of the island 90. Another variation of the checkout island embodiment of the present invention provides a variable number of supervisor terminals 60 and a variable number of self-checkout stations 1, where a plurality of supervisor terminals 60 are configured to select particular ones of the self-checkout stations 1 to supervise. As well, a supervisor terminal 60 may be used as a self-

service terminal 10 or vice versa, when swapped. In such a configuration, the monitored unassisted self-checkout operation is scaleable, thereby optimizing equipment and employee resources. For example, a single supervisor terminal 60 may adequately supervise a smaller number of active self-checkout stations 1 during a time of day when convenience store business is slow. On the other hand, multiple supervisor terminals 60 may be activated to supervise a larger number of active self-checkout stations 1 during a time of day when convenience store business is heavy.

[0019] FIG. 2 shows an exemplary layout of an exemplary self-checkout system according to a checkout counter embodiment of the principles of the present invention. A checkout counter 91 includes a plurality of self-checkout stations 1, each having the same elements described above for a checkout island embodiment. The checkout counter embodiment includes a supervisor area 81 on an opposite side of the counter 91 from the self-checkout stations 1. The supervisor terminal 60 is disposed facing this supervisor side of the counter 91. The supervisor area 81 may be used for stocking controlled merchandise such as alcohol, cigarettes, adult magazines, and items having a large value or that are small and easily stolen. The checkout counter embodiment allows the supervisor 70 to face in only one general direction, and may be more readily suited to certain store's floor plans or for providing the supervisor 70 with a safer area, e.g., by placing security glass between the self-checkout stations 1 and the supervisor 70.

[0020] A self-service terminal 10 in a preferred embodiment includes a kiosk. The individual components of a self-service terminal 10 may be embodied as separate devices, or they are preferably embodied as integrated components enclosed within or closely associated with the kiosk. One kiosk that may be used for implementing the present invention is a model 7401 web kiosk commercially available from NCR Corporation of Dayton, Ohio.

[0021] As shown in FIG. 4, the self-service terminal 10 contains a barcode scanner 15 that reads universal product code (UPC) information attached-to or printed on most of the items in the convenience store. In a preferred embodiment of the present invention, every item in the convenience store has a UPC label affixed in a location allowing the item to be conveniently scanned. However, a number of items for sale in the convenience store may not have UPC numbers, those non-UPC items including, *inter alia*, fruits and vegetables, and delicatessen items. One scanner that may be used in the present invention is a model number 7875 bi-optic scanner, commercially available from NCR Corporation of Dayton, Ohio.

[0022] The scanner 15 includes a first scanning window 19 and a second scanning window 18. The first scanning window 19 is disposed in a substantially horizontal manner, whereas the second scanning window 18 is disposed in a substantially vertical manner. An op-

tional product scale 97 may be integrated with the scanner 15 for weighing of fruits and vegetables. More specifically, the product scale 97 is disposed substantially parallel to the scanning window 19, or may be integrated with the first scanning window 19. If an item such as produce is placed upon the product scale 97 or the first scanning window 19, the product scale 97 may be used to determine the weight of the item. The scanner 15 may be physically integrated with the kiosk 11 or may be implemented as a separate piece of equipment adapted to communicate with the kiosk 11.

[0023] The scanner 15 includes a light source (not shown) such as a laser, a rotating mirror (not shown) driven by a motor (not shown), and a mirror array (not shown). In operation, a laser beam reflects off the rotating mirror and mirror array to produce a pattern of scanning light beams. As the product identification code on an item is passed over the scanner 15, the scanning light beams scatter off the code and are returned to the scanner 15 where they are collected and detected. The reflected light is then analyzed electronically in order to determine whether the reflected light contains a valid product identification code pattern. If a valid code pattern is present, the product identification code is then converted into pricing information that is then used to determine the cost of the item in a known manner.

[0024] The self-service terminal 10 in a preferred embodiment includes a kiosk 11 with a touch screen 12 that displays text and graphics to the customer and that obtains customer selections and inputs. The kiosk 11 includes the scanner 15 that scans or reads a barcode containing a product's UPC information, or other indicia associated with an item to be purchased such as industrial symbol(s) or alphanumeric characters. The UPC read by the scanner 15 is interpreted by using a local lookup table, or by feeding the UPC into a database of a computer (not shown), where product information from a lookup table entry is obtained for a specific UPC. The conversion of the UPC to product information allows a product description and price to be displayed on the touch screen 12 and printed as an individual entry on a paper receipt. The stored product information also includes a weight value for each item, the weight value used for security purposes (discussed below) related to the bagging area 20.

[0025] A self-service terminal 10 preferably includes a magnetic stripe reader 13 for obtaining information from a credit card, debit card, membership card, etc. A self-service terminal 10 optionally also includes speakers 14 for presenting audio messages and information to the customer. The self-service terminal 10 optionally includes an external signature capture device 88 that works in conjunction with a magnetic stripe reader of its own (not shown), or with the magnetic stripe reader 13 located on the kiosk 11, to obtain a signature verification for a credit card, debit card, or membership card purchase.

[0026] A printer 17 is located beneath the kiosk 11 on

a side of a base assembly 16 facing the customer. The printer 17 can alternatively be located in a cabinet (not shown) under the self-service terminal 10, or in a separate enclosure (not shown) that can be placed in an area of the self-checkout station 1 that provides accessibility and convenience for both customers and employees needing to maintain the printer 17, e.g., by replacing printer paper. The printer 17 is used for printing receipts for transactions that use the self-service terminal 10 and other related printed information, including cash and credit/debit card purchases, car wash code numbers, coupons, waiting numbers, vouchers, order numbers, and other receipts. A second printer (not shown) may be optionally provided in an area of the self-checkout station 1, the second printer used, e.g., for printing lottery tickets, coupons, or other items requiring special printing paper or print format. The self-service terminal 10 optionally includes a microphone 67 that allows two-way communication between a customer 2 and the supervisor 70.

[0027] The self-checkout stations 1 preferably are configured to operate as POS systems for receipt of tender of payment from the customer. The POS is a point-of-sale terminal that includes the touch screen display 12, keypad and / or buttons 65 for inputting a customer's selections or information, a currency and coin acceptor and change assembly 69, and a card reader 13 for reading information encoded on a user card such as a credit card, debit card, or membership card having a magnetic strip, a barcode, or flash memory. The POS may be embodied as integrated components associated with an automated teller machine (ATM), or can be suitably configured for integration into a particular ordering station application. For example, a conventional ATM may offer many features and menus (e.g., funds transfer, telephone utility payment) that are inapplicable to a quick service vending establishment and, thus, a POS may be more efficiently implemented in the kiosk 11. By optimizing the functionality of the several components of the POS, efficient customer self-payment for an order is effected or established.

[0028] The magnetic strip card reader 13 is arranged to read data from a card (such as a credit card, debit card, customer identification card, SMART card, etc.) inserted in the card reader 13 via a slot 113. In a preferred embodiment, the card reader 13 operates without utilizing the keyboard 65, debiting a card's account without requiring that a PIN or other verification number be entered. Alternately, the keypad 65 is used in conjunction with the card reader 13, allowing customer entry of a PIN number. The keypad 65 has keys 165 that allow a customer to select a function and to enter numerical data. The keypad 65 optionally has its own POS display (not shown) dedicated to card transaction information.

[0029] The card reader 13 optionally operates together with a signature capture device 88 such as a signature recognition pad or signature capture terminal. One such device that is suitable for implementation with the

present invention is a Model 5991 signature recognition pad marketed by NCR Corporation of Dayton, Ohio. As is known, the signature recognition pad includes a pressure transducer plate (not shown) on which a customer "writes" his or her signature using a stylus (not shown). The pad forms a digitized image of the signature and this image is transmitted to the processing unit 80 (discussed below) of the self-service terminal 10 for storage in a memory 84 contained therein. The signature capture device 88 is preferably a separate unit disposed externally of the kiosk 11 and connected to the kiosk 11 by a communications cable (not shown), although the signature capture device 88 may also be physically incorporated onto a top-facing surface of the kiosk 11. In any case, the signature capture device 88 is located in a position within the self-checkout station 1 that allows easy access by a customer 2. The memory unit(s) 84 may include known devices such as random access memory (RAM), read-only memory (ROM), large capacity memory such as tape and disc drives, and others, the memory unit(s) 84 being disposed either within the kiosk 11 or located in an external location accessed via the communications interface 83.

[0030] Each self-checkout station 1 preferably includes a currency and coin acceptor and change assembly 69, as shown in FIG. 7. The currency and coin acceptor and change assembly 69 has a bill reader 72 for inputting different denominations of currency, verifying that a bill is authentic, rejecting bills that fail a visual check, and causing the respective self-checkout station 1 to credit a bill's denomination to a customer's tender amount. The currency and coin acceptor and change assembly 69 also include a coin input mechanism 73, which has an input slot for accepting coins, a mechanical sifter (not shown) for identifying a coin's denomination, and an output signal device (not shown) for causing the respective ordering station 20 to credit a coin's denomination to a customer's tender amount.

[0031] Each of the bill reader 72 and the coin input mechanism 73 has a mechanism (not shown) for returning bills or coins that are rejected, and for returning a change amount to the customer for money tendered in excess of the order total amount. The bill reader 72 returns rejected currency to the customer 2. Rejected coins or coins returned to a customer as change are output to the change receptacle 74. The currency and coin acceptor and change assembly 69 also preferably includes its own separate display 71 for indicating the amounts tendered and related currency and coin information. The display 71 provides a convenience by eliminating a need for a customer to look at a distant display when tendering cash payments. The currency and coin acceptor and change assembly 69 may be located within the kiosk 11, or can be separately located below the merchandise placement area 30 or to one side of the bagging area 20.

[0032] As shown in FIGS. 5A and 5B, a security/assistance pole 40 has lights that indicate when assist-

ance is requested, verification is required, or when a security issue is involved at the particular self-checkout station 1. In a preferred embodiment, the security/assistance pole 40 includes a number of low-energy lights 42 disposed behind a corresponding number of lenses 41. The lenses 41 are made from different colored plastics, each lens having an indication message that is readily visible when the respective light 42 is illuminated. The security/assistance pole 40 includes a housing 43 for containing the lights 42 and lenses 41. The housing 43 is mounted on a pole 44 that can be mounted to a self-service terminal 10, a floor, an island 90, or a counter 91. Alternatively, the security/assistance pole 40 may be formed integrally with a kiosk 11, or may be configured so that indicators (not shown) for a group of self-checkout stations 1 are all included in a single display unit (not shown). The particular form of the security/assistance pole 40 is readily adaptable to the particular configuration of the self-checkout stations 1, the convenience store's floor plan, and logistical common sense.

[0033] As shown in FIG. 6 the self-service terminal 10 includes a processing unit 80 operative to assist in controlling the several functions of the self-checkout station 1. The processing unit 80 can include one or more processors (not shown).

[0034] The processing unit 80 cooperates with network interface circuitry 83 which conventionally permits the self-checkout station 1 to communicate with a network (not shown) such as a LAN or WAN through a wired connection (not shown). The processing unit 80 may communicate with the network during a checkout procedure in order to obtain information such as pricing information on an item scanned, and customer credit approval where appropriate. The network interface circuitry 83 associated with the self-checkout station 1 may include a known Ethernet expansion card, and the wired connection may include a known twisted-pair or fiber optic communication line. Alternatively, the network interface circuitry may support wireless communications with the network.

[0035] Each self-checkout station 1 includes a processing unit 80 having network interface circuitry 83 that permits the self-checkout station 1 to communicate with the supervisor terminal 60 and with an external computer (not shown) in order to both output and obtain information related to payments using the magnetic strip card reader 13. The card reader information includes authorization of a sales amount and optional verification of a customer for security reasons, e.g., confirmation of a PIN number, and to upload or download any information relevant to the self-checkout station 1 operation, such as for updating information held in memory 84. The communication between the supervisor terminal 60 and the external computer also provides update information used to change and exchange pricing and weight information, to change the touch screen 12's display format, and to change the virtual buttons of the touch screen 12

in order to, for example, add promotions and change operation of the touch screen 12.

[0036] The processing unit 80 is also operative to generate signals that effect a finalization of the tender of payment, thereby causing the touch screen display 12 to inform the customer that the payment for the order is complete. The card reader 13 can also generate the payment finalization signals or the cash input device 69. The payment finalization signals indicate that the customer's business at the self-checkout station 1 is over and, preferably, cause additional actions to be performed such as completing of the filling or authorizing of the customer's order (if applicable), and informing the customer 2 that all transactions are complete and instructing her to exit the self-checkout station 1.

[0037] In the apparatus of the present invention, the hardware and software of a POS terminal having at least some automated teller machine (ATM) functions are integrated with the hardware and software that support additional checkout functionality. Thus, the hardware elements of the self-checkout station 1 may be integrated into a single self-contained kiosk 11. Peripheral and the separate devices of the kiosk 11 preferably connect to the processing unit 80 via a serial controller in the I/O communication device 83 in a known manner, such as by using an RS-232 or universal serial bus (USB) controller. Alternatively, known parallel type communication apparatus can be utilized for any or all of the communications between elements within the checkout system and/or between a checkout system and an external device such as a computer (not shown). The touch screen 12 contains a known video controller that may be disposed on an adapter card or on a motherboard together with the processing unit 80.

[0038] The kiosk 11 is operative to use various software architectures or operating systems such as Microsoft Windows NT, Microsoft Windows 98, Microsoft Windows 2000, and Linux. However, it should be appreciated that other suitable operating systems are envisaged.

[0039] In traditional checkout systems, a checkout clerk at a conventional cash register provides a level of security against theft or other improprieties. However, in the case of a self-checkout station 1, the self-service terminal 10 itself must assist the supervisor terminal 60 in providing the necessary security. Such security includes preventing a customer from either inadvertently or intentionally placing an item in a grocery bag without scanning the item, or voiding one item from entry, but removing a second item of lesser value, or no item at all, from the grocery bag. Thus, another concern when evaluating a self-checkout station 1 is the level of security provided against illicit use of the self-checkout station 1 by customers.

[0040] The bagging area 20 includes a bagging assembly 29. As shown in FIG. 3A, the bagging assembly 29 in a preferred embodiment has two sets of bag dispensing/weighing stations 9. However, any number of

dispensing/weighing stations 9 may be used in a bagging assembly 29 according to the present invention. Each dispensing/weighing station 9 dispenses and weighs one bag 25 at a time. The bagging assembly 29 includes one or more security scale(s) 23 for weighing the bag(s) 25 as the customer 2 is filling them. The security scale 23 indicates whether something has been removed from or added to the customer 2's bag 25. The security scale 23 outputs weight information for an item placed into or removed from the bag 25, outputs a total weight of the bag 25 and its contents, or outputs a total weight of the bag 25 as well as a weight of a bag holder 27, 22, 28 and any unused bags 26 hanging from the bag holder 27, 22, 28.

[0041] The security scale 23 determines the weight value of the item by detecting a weight increase of the grocery bag 25. Alternatively, if a customer 2 removes an item from the grocery bag 25, the security scale 23 determines the weight value of the item by detecting a weight decrease of the grocery bag 25. The security scale 23 communicates with the processing unit 80 before, during, and after an item has been scanned. In a preferred embodiment, the security scale 23 includes a scale surface horizontally disposed parallel to or aligned with the bottom surface of the bagging area 20. The security scale 23 may be embodied as any known retail weight scale. One such retail weight scale that is particularly useful as the security scale 23 of the present invention is a model number 6680 weight scale that is commercially available from Weigh-Tronix, Incorporated of Santa Rosa, Calif.

[0042] In a preferred embodiment, the processing unit 80 calculates a total weight for a customer 2's purchases and compares this total weight to a calculated weight based on the weights of the corresponding scanned items. When the two weights are within a predetermined tolerance, then the processing unit 80 determines that no security violation has occurred. When a difference between the two weights is greater than the predetermined amount then the processing unit 80 sets a security violation flag in its monitoring program.

[0043] More specifically, the processing unit 80 retrieves the stored weight value of the item by using the UPC associated with the item to select the corresponding stored weight value from a number of values contained in a pre-defined, master product database. What is meant herein by the term "master product database" is a central database that includes product information (e.g. description, price, and weight) associated with every item that is sold by the retailer. The processing unit 80 compares the stored weight value of the item to the measured weight value of the item in order to determine if the item that was placed in the bag 25 is the same item that was scanned by the customer 2.

[0044] For example, if the customer 2 scans a can of soup with the scanner, the product identification code associated with the can of soup is used by the processing unit 80 to determine the stored weight value associ-

ated with the soup. In particular, the processing unit 80 communicates with memory device 84 in order to retrieve the stored weight value corresponding to the can of soup (e.g. 10 3/4 ounces) from the master product database of the memory 84. When the customer 2 places the can of soup into a bag 25, the scale 23 determines the weight of the can of soup. In particular, if the customer 2 places the can of soup into the bag 25, the scale 23 measures a weight increase corresponding to the can of soup (e.g. 10 3/4 ounces) thereby allowing the processing unit 80 to conclude that a proper bagging transaction has occurred. However, if the customer 2 places a pound of steak into the bag 25, the scale 23 will measure a weight corresponding to the steak (i.e. 16 ounces) thereby causing the processing unit 80 to conclude that an item substitution has occurred. It is imperative that the data within the master product database be maintained accurately.

[0045] The bagging assembly 29 includes a number of posts 21 which cooperate to support a number of the grocery bags 26. As shown in FIG. 3B, in a preferred embodiment, the posts 21 include one or more bag storage portions 27 and one or more corresponding "floating" portions 28. The floating portions 28 are connected to the bag storage portions 27 by an isolation mechanism 22 that allows a bag to be weighed while still being attached to the posts 21. By isolating the floating portion for each post 21, the floating portion 28 is able to move, or "float," when a customer's bag 25 is being filled. This floating enables an accurate weighing of the filled bag 25 since the bag 25 is no longer being supported or held-up by the posts 21.

[0046] The bagging assembly 29 is configured to allow a number of grocery bags 25 to be accessed by the customer 2 at any given time, the number of opened bags corresponding to the particular number of posts 21, or pairs of posts 21, depending on the number of posts 21 being used for each bag. When the number of separate floating portions 28 and corresponding opened bags 25 is more than one, a customer 2 is able to selectively load various item types into separate opened grocery bags 25. For example, the customer 2 may desire to use a first grocery bag 25 for household chemical items such as soap or bleach, and a second grocery bag 25 for edible items such as meat and produce.

[0047] In an alternate embodiment, the posts 21 of the bagging assembly 29 do not include the floating portions 28, and the bagging assembly 29 is configured to position the security scale(s) 23 at a height relative to the posts 21 so that a bag 25 hangs loose and does not have its weight affected by the posts 21. Other envisioned alternative embodiments of the bagging assembly 29 of the present invention include various configurations that allow accurate weighing of a bag 25, such as using freestanding bags 25 or using load cells (not shown) positioned in series with portions of the rod(s) 21, where the rods 21 are tilted vertically to allow the load cells to function properly.

[0048] Referring back to FIGS. 1 and 2, the security/assistance pole 40 indicates the status of a transaction in progress. In a preferred embodiment, the security/assistance pole 40 has different colored lights for indicating different types of status. A "normal" indication informs the supervisor 70 that no assistance is needed at the particular self-checkout station 1. An "assistance/approval needed" indication informs the supervisor 70 that the indicating self-checkout station 1 requires some form of assistance, such as authorization for a sale of age restricted items, a customer 2 requiring assistance for any reason, and others. A "security violation" indication informs the supervisor 70 that an item has been placed in a bag located in the bagging area 20 without the item having been scanned, the weight of an item placed in the bag does not match a known weight of the item identified by scanning, and others.

[0049] The supervisor terminal 60 monitors transactions in progress and is preferably located in very close proximity to the customers 2 and the self-checkout stations 1. The supervisor terminal 60 is in electronic communication with each of the self-service terminals 10, and is operative to monitor transactions at all the self-checkout stations 1.

[0050] The self-checkout station 1 optionally includes one or more video cameras 98 and associated electronics (not shown), a video camera 98 in a preferred embodiment being disposed above the scanning area and bagging area 20 and positioned for detecting motion within a number of "target areas." What is meant herein by use of the term "target area" is an area across which the video camera 98 is capable of detecting motion. For example, a first target area is defined by the maximum range in which an item can be successfully scanned as it is passed across the scanner 14. The electronics associated with the video camera 98 preferably digitize video signals from the video camera 98, so that corresponding video information may be communicated to the processing unit 80 and stored in the memory 84. In an alternate embodiment, more than one video camera 98 is included in a self-checkout station 1, the separate video cameras being positioned to respectively view separate areas within the self-checkout station 1. In a preferred embodiment, the supervisor 70 can select any of the store's video cameras 98 in order to monitor particular activities on the supervisor terminal touch screen display 72. In this manner, the supervisor can view any customer 2 who is having problems understanding the self-checkout procedure and needs assistance. Another use for the selectable viewing capacity of the supervisor terminal 60 is allowing the supervisor to closely monitor any suspicious activity (e.g., theft).

[0051] Referring to the flowchart of FIG. 8 and the touch screen display shown in FIG. 9, an exemplary method of a checkout process according to an embodiment of the present invention will now be described. A customer 2 enters a convenience store and selects goods she wishes to purchase. The customer 2 either

carries the goods herself or places the goods in a conventional hand-carry basket (not shown).

[0052] In step 100, the customer 2 arrives at a self-checkout station 1 and places hand-carry basket or the goods themselves on a surface of the corresponding merchandise placement area 30 of the self-checkout station 1. The customer 2 may initially select a payment type by pressing an appropriate virtual key icon 52 being displayed on the touch screen display 12 of the self-service terminal 10 located at the self-checkout station 1. The touch screen display 12 may then displays a series of prompts that request the customer 2 to make corresponding choices in response to each prompt being displayed on the touch screen display 12. The customer 2 makes her payment choices by pressing virtual keys 52 being displayed for each prompt. For example, if the customer 2 selects "credit card" as her choice for type of payment, the touch screen display 12 then instructs the customer to swipe her card through the card reader 13. After the customer has swiped her credit card, the touch screen display 12 instructs the customer 2 to proceed to enter additional verification information, such as a PIN number, using the keypad 65. If the particular self-service terminal 10 does not include a keypad 65, the touch screen display 12 displays virtual keys 52 on which the customer 2 enters the verification information (if required).

[0053] If the particular self-service terminal 10 includes a microphone 67 and speakers 14 coupled to a software program residing in memory 84, the kiosk 11 may present the customer 2 with additional prompts and instructions via audiovisual messages such as those involving a known synthesized speech module (not shown) and /or digitized video segments employing known MPEG or VPEG codification. For example, the touch screen display 12 may display a virtual "help key" 51 that when pressed causes the kiosk 11 to provide a customer 2 with an audio or visual training clip for a given kiosk 11 operation. In a preferred embodiment, the touch screen display 12 displays the help key 51 during some or all of the various stages of the checkout process. In such a case, the processing unit 80 accesses a corresponding set of control programs located in memory 84, the control programs being operative to cause the kiosk 11 to present instructions or messages that pertain to a current operation being performed. The touch screen display 12 can also display a menu of help choices when the virtual help key 51 is pressed.

[0054] Alternatively to the above, the kiosk 11 may not initially accept and/or prompt the customer 2 to select a payment type. Instead, the kiosk 11 may display a "Start Transaction" or similar virtual button on the touch screen display 12 so that the customer 2 may begin to scan items. As well, the act of scanning a first item may begin the transaction. The ability to operate in either operational flows (press button or scan) may be termed "multi-pathing."

[0055] In step 110, the touch screen display 12 in-

structs the customer 2 to begin scanning her goods and then placing the goods in one or more of the opened bags 25 located in the bagging area 20. In a preferred embodiment, the touch screen display 12 instructs the customer 2 to perform the scanning and bagging of goods one item at a time. For example, the touch screen display 12 may display a message "place item in bag " after an item has been scanned. After the security scale 23 verifies that the item has been placed in the bag 25, the touch screen display 12 then instructs the customer 2 to "now scan another item." In this way, the customer 2 proceeds to scan and then bag all her goods one item at a time.

[0056] In the case of an item carrying a UPC bar code, the item is scanned by passing it over the first scanning window 19 or in front of the second scanning window 18. If the scan is successful, an audible tone is generated by the security scale 23 via a known electronic beeper device (not shown) or via one or more of the speakers 14, and the price and identity (name, brand, weight, description, etc.) of the scanned item is displayed on the touch screen display 12 and/or printed by the printer 17 on a receipt that is output by the printer 17 at the completion of the checkout process.

[0057] For each successful scan, the scanner 15 in communication with the processing unit 80 decodes the bar code label information to obtain a description, price, and weight of the item from a look-up file stored in memory 84. The processing unit 80 adds the price of each scanned item to a total price and also adds the item's weight information to a weight total. In the event of a customer 2 filling her bag 25 and then removing the bag 25 from the bagging assembly 29, the last weight information output by the particular security scale 23 is stored in memory 84 for the current checkout operation and the weight for a new bag 25 is reset.

[0058] In a preferred embodiment, all items being purchased at the convenience store contain a UPC code. When produce or other items have a price dependent upon weight, the particular item is either pre-packaged to include a UPC label, or the convenience store has a known weighing station (not shown) where a customer 2 can weigh and bag her produce and can self-affix a UPC label for each separately bagged produce type. The convenience store may alternatively have an employee manning a produce weighing station, or may provide a weighing station camera (not shown) operative to view the self-assisted weighing station for security purposes.

[0059] However, a convenience store having a produce weighing station may still desire to provide a customer 2 the option of selecting her individual produce items so that the customer 2 can be "finicky," and can select produce items that are ripe, green, un-bruised, etc. For produce items not having a UPC bar code label attached, the self-checkout station 1 has a known produce weighing scale (not shown) in close proximity to, or integrated with, the scanner 15. In such a case, the

touch screen display 12 displays a menu of virtual buttons 52 that allow a customer 2 to press a "produce" button (not shown) to inform the self-service terminal 10 that the item being currently entered into the purchasing transaction is a type of produce. When the produce button is pressed, the touch screen display 12 then displays a menu of produce types (not shown), such as "apples," "bananas," and others. When the customer 2 enters the particular produce type by pressing the appropriate virtual key 52, the customer 2 places the produce on the produce weighing scale, and the touch screen display 12 indicates the price, product identifier (e.g., "red delicious"), and weight for the produce item and instructs the customer 2 to place the particular produce item in one of the opened bags 25. In this manner, the customer 2 begins to checkout all her produce items.

[0060] In step 120, the customer 2 presses a virtual key or icon 53 on the touch screen display 12 to inform the self-service terminal 10 that the customer has completed her checkout.

[0061] In step 130, the processing unit 80 determines whether a current transaction at the particular self-service terminal 10 may be finalized. The processing unit determines this by checking to see whether any flags have been set during the customer 2's scanning and bagging activities. If any of the scanned items requires age verification, the processing unit 80 sets an authorization flag in an internal program that monitors individual transactions occurring at the plurality of self-checkout stations 1. The processing unit 80 also sets one or more security flags, during a checkout at a self-checkout station 1, when a total weight of filled bags 25 does not match a weight total calculated by the processing unit 80 using individual weights stored in memory 84 for each UPC, or codified in the UPC itself. The processing unit 80 also sets an assistance flag when verification is required for a coupon or other customer credit request, or when a scanned item's product description is unknown by the processing unit 80 or when an item's product description or price being displayed is deemed incorrect by the customer 2, or for any other event requiring inspection and action by the supervisor 70.

[0062] If none of the purchased items require age verification or any other intervention by the supervisor 70 and no flags have been set during the customer 2's checkout, then the processing unit 80 proceeds to the finalization of the checkout.

[0063] In an alternative embodiment, the processing unit outputs a signal to the security/assistance pole 40 that causes one or more indicating lights on the security/assistance pole 40 to illuminate as soon as any flag has been set during checkout at the self-checkout station 1 having the particular security/assistance pole 40. By informing the supervisor 70 of a need for her intervention at a particular self-checkout station 1 in advance of completion of a customer 2's checkout activities, the supervisor 70 is able to timely and efficiently provide the required verification, authorization, or security inspection

without unnecessarily delaying the customer 2.

[0064] In step 140, a preferred embodiment of the checkout method performs authorization, verification, and security activities after the customer 2 has pressed the virtual key or icon 53 on the touch screen display 12, informing the processing unit 80 that the customer wishes to finalize her checkout transaction. The processing unit 80 then checks to determine whether any flags have been set during the customer 2's checkout activities. If any of the flags has been set, the processing unit generates a flag signal and sends the flag signal to the security/assistance pole 40, causing one or more indicator lights (not shown) on the pole 40 to illuminate. The pole may indicate "authorization required," "verification required," "security violation suspected," "customer assistance requested/required," and others depending on which of several flag signals has been sent by the processing unit 80.

[0065] It should be appreciated from the foregoing that any indicator light may be set (illuminated) during or when an item or action requiring attention, such as age verification for alcohol purchase, is encountered rather than waiting until the end of the transaction. This scenario speeds up the transaction in that a clerk could check an ID (in the age verification case) when appropriate and/or expedient. It should therefore be further appreciated that this scenario is applicable to operation with respect to the other indicator lights, flags (security assistance) and display on the operator terminal, both described above and below.

[0066] As shown by way of example in FIG. 10, the flags set at a self-checkout station 1 also cause message(s) 62 to be displayed on the supervisor terminal 60's touch screen display 72. The messages 62 provide an additional indication to the supervisor 70 that she is required to perform an authorization, verification, price check, or other supervising activity. The supervisor touch screen display 72 also displays a virtual "security emergency" key 61 that activates a known telephone auto-dial mechanism that calls "911" and that activates additional security equipment (not shown) such as microphones and video cameras. The automatic 911 call informs the local police that a security emergency such as a robbery is taking place. The supervisor touch screen display 72 also has a virtual approval key 64 adjacent each corresponding message 62 for an individual self-checkout stations 1, where the supervisor 70 can press the virtual approval key 64 after all the supervisor actions (e.g., viewing a customer 2's driver's license for liquor or cigarette purchases) for a particular self-checkout station 1 have been completed.

[0067] The supervisor touch screen display 72 also has a virtual menu key 63 that provides a refreshed supervisor touch screen display 72 screen having virtual buttons 62 that, when pressed, direct a processing unit (not shown) in the supervisor terminal 60 to display screens other than the monitor screen shown in FIG. 10. Such additional screens may include an inventory

screen, a daily sales total screen, a shift sales total screen, a troubleshooting screen for remote functional checking of a selected self-checkout stations 1, a batch download screen for communicating with an external computer (not shown), a monitoring configuration screen for selecting which of the plural self-checkout stations 1 are monitored by the supervisor terminal 60, a functional override screen, a remote configuration screen for changing parameters, displayed promotions, and settings being used by one or more of the self-service terminals 10, and other screens pertinent to a convenience store supervisory operation.

[0068] If none of the purchased items require age verification or any other intervention by the supervisor 70, the supervisor touch screen display 72 will display a message 62 indicating that a successful checkout has occurred at a particular self-checkout stations 1. The supervisor terminal 60's processing unit may be configured to either require approval of all transactions and a pressing of the virtual approval key 64 for all transactions, or can be configured to only require a pressing of the virtual approval key 64 when a supervisor action was required.

[0069] In step 150, the customer 2's checkout transaction is finalized. The customer 2 presses the virtual key or icon 53 to inform the self-service terminal 10 that she wishes to complete her checking out activities. If no flags were set during the customer 2's checkout activities, or when the virtual approval key 64 corresponding to the particular customer 2's self-checkout station 1 has been pressed by the supervisor 70 (if applicable), then the customer 2 proceeds to pay for her purchase according to the payment option she selected in step 100 or, if no payment option was specified at the beginning of the transaction, then the customer 2 selects a payment type in a similar or the same manner as described above in connection with step 100. In a preferred embodiment, an additional virtual key (not shown) is displayed on the customer 2's touch screen display 12, the key providing the customer 2 with the option of changing her method of payment selection previously performed in step 100. Referring still to step 150, the touch screen display 12 displays a total price for the scanned goods. The customer 2 then proceeds to use the appropriate one of the cash and coin acceptor 69, or the card reader 13 and optionally the signature reader 88 to tender her payment. The processing unit 80 for the particular self-checkout station 1 receives payment information from the above-described payment device being used by the customer 2.

[0070] For example, when the customer 2 selects a credit card as the type of payment, the customer may be instructed by a message on the touch screen display 12 to authorize that the purchase amount is "OK" by pressing a virtual "OK" button 52 on the touch screen display 12. Where the signature pad 88 is used, the customer 2 is instructed by the touch screen display 12 to carry out her credit card authorization by entering her

signature using the signature pad 88. A digitized version of the customer's signature is stored in memory 84 for possible future reference in the event of a dispute occurring in respect of a particular checkout transaction. The signature process may be preceded by a communication between the particular self-checkout station 1 and an external credit database maintained by, for example, a credit card institution. After capturing the signature of the customer 2, the signature recognition pad 88 sends the digitized signature information to the processing unit 80, which stores the information in memory 84 and / or sends the information to a host computer (not shown). The host computer then stores this signature in a storage location file. A transaction file containing the details of the transaction is stored at the host computer while the processing unit 80 sends a signal to the touch screen 12 informing the customer 2 that the transaction is complete.

[0071] When the processing unit 80 determines that payment in full has been received, it signals the supervisor terminal 60 that the checkout at its self-service

Claims

1. A system for self-checkout, comprising:
 - a plurality of self-checkout terminals for self-assisted purchasing, each self-checkout terminal including a display, a scanner, and a payment acceptor; and
 - a supervisor terminal in communication with each one of said plurality of self-checkout terminals, said supervisor terminal having a display and operative to selectively monitor purchasing activities being conducted at any one or any number of said plurality of self-checkout terminals.
2. A system as claimed in claim 1, wherein said supervisor terminal is operative to approve and authorize any monitored purchasing activity.
3. A system as claimed in claim 1 or claim 2, wherein each self-checkout terminal further comprises a security/assistance indicator each operative to inform a supervisor when a customer at a respective one of the plurality of self-checkout terminals requires at least one of purchasing assistance and purchasing authorization.
4. A system as claimed in claim 2, wherein said supervisor terminal is disposed in close proximity to said plurality of self-checkout terminals.
5. A system as claimed in any preceding claim, wherein each said self-checkout terminal display is a touch screen.
6. A system as claimed in any preceding claim, wherein said supervisor terminal includes a communications unit operative to effect two-way communications between said supervisor terminal and an external computer.
7. A system as claimed in claim 6, wherein the two-way communications utilize at least one of an intranet, a LAN, and the Internet.
8. A system as claimed in claim 6 or claim 7, wherein the two-way communications utilize wireless networking within at least one of an intranet, a LAN, and the Internet.
9. A system for self-checkout, comprising:
 - a plurality of self-checkout terminals for self-assisted purchasing, each self-checkout terminal including a scanner, a display, and a payment acceptor; and
 - a plurality of supervisor terminals each one of which is in communication with said plurality of self-checkout terminals and operative to monitor purchasing activities of any one or any number of said plurality of self-checkout terminals.
10. A system as claimed in claim 9, wherein each supervisor terminal of the plurality of supervisor terminals is operative to concurrently monitor with regard to other of the supervisor terminals of the plurality of supervisor terminals, purchasing activities of a selected one or selected ones of the self-checkout terminals.
11. A system as claimed in claim 10, wherein each self-checkout terminal includes a security/assistance indicator that is operative to inform the supervisor when a customer at a respective one of said self-checkout terminals requires at least one of purchasing assistance and purchasing authorization.
12. A system as claimed in claim 9 or claim 10, wherein each supervisor terminal is operative to exclusively monitor with regard to other supervisor terminals, purchasing activities of a selected one or selected ones of said plurality of self-checkout terminals.
13. A system as claimed in any of claims 9 to 12, wherein each self-checkout terminal includes a security/assistance indicator that is operative to inform the supervisor when a customer at a respective one of said self-checkout terminals requires at least one of purchasing assistance and purchasing authorization.
14. A system as claimed in any of claims 9 to 13, where-

in each said supervisor terminal is disposed in close proximity to said plurality of self-checkout terminals.

15. A method of self-checkout comprising:

providing a plurality of self-checkout terminals, each self-checkout terminal having a scanner, a display, and a payment acceptor, and operative to perform a self-assisted purchase transaction;
 providing a plurality of supervisor terminals each one of which is in communication with said plurality of self-checkout terminals and operative to monitor a purchase transaction occurring at any one or at any number of said plurality of self-checkout terminals; and
 monitoring a purchase transaction currently occurring at any one or any number of the plurality of self-checkout terminals via any one or more of the plurality of supervisor terminals.

16. A method as claimed in claim 15, wherein monitoring a purchase transaction currently occurring at any one or any number of the plurality of self-checkout terminals via any one or more of the plurality of supervisor terminals includes exclusively monitoring, with regard to other supervisor terminals, a purchase transaction of a selected one or selected ones of said plurality of self-checkout terminals.

17. A method as claimed in claim 16, further comprising:

monitoring a security/assistance indicator associated with each self-checkout terminal that is operative to inform a supervisor when a customer at a respective one of the self-checkout terminals requires at least one of purchasing assistance and purchasing authorization.

18. A method as claimed in any of claims 15 to 17, wherein monitoring a purchase transaction currently occurring at any one or any number of the plurality of self-checkout terminals via any one or more of the plurality of supervisor terminals includes concurrently monitoring, with regard to other supervisor terminals, a purchase transaction of a selected one or selected ones of said plurality of self-checkout terminals.

19. A method as claimed in any of claims 15 to 18, further comprising:

monitoring a security/assistance indicator associated with each self-checkout terminal that is operative to inform a supervisor when a customer at a respective one of the self-checkout terminals requires at least one of purchasing

assistance and purchasing authorization.

20. A method as claimed in any of claims 15 to 19, further comprising:

providing each supervisor terminal in close proximity to the plurality of self-checkout terminals.

FIG. 1

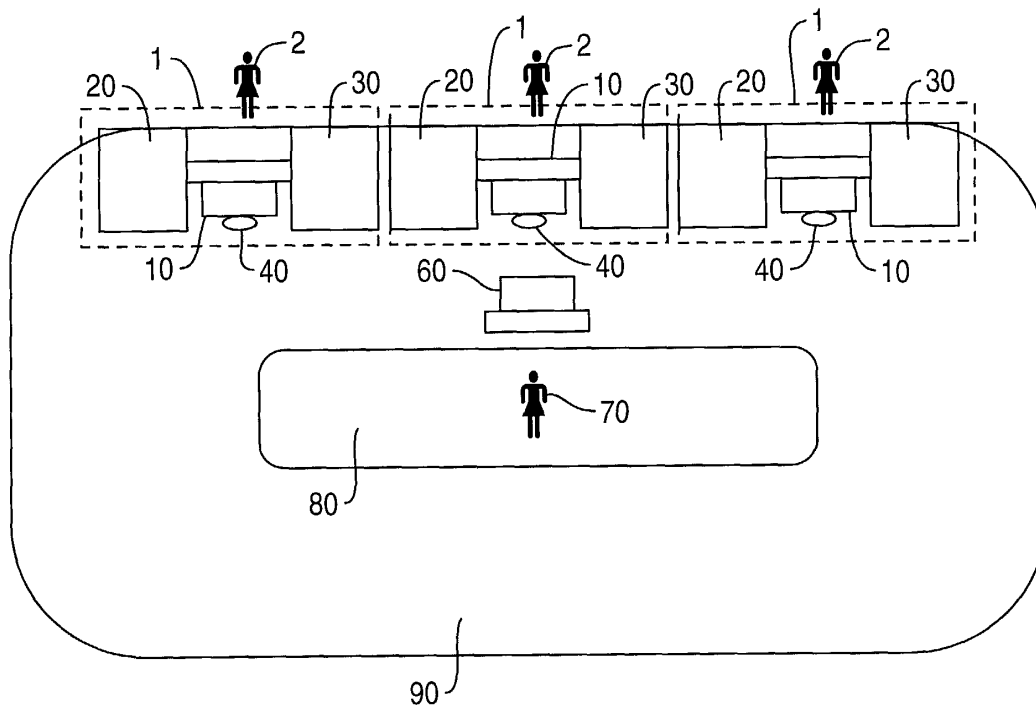


FIG. 2

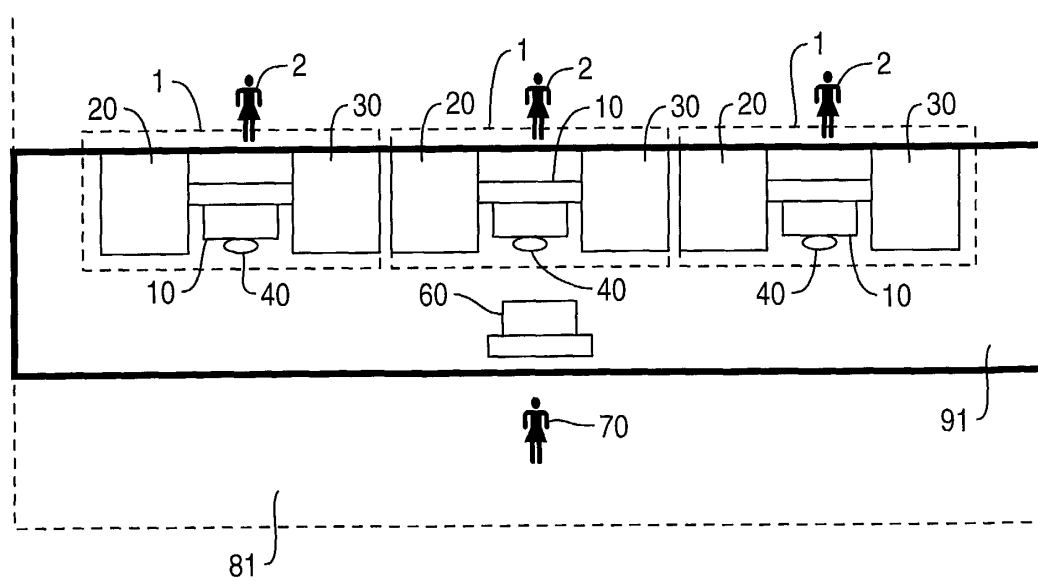


FIG. 3A

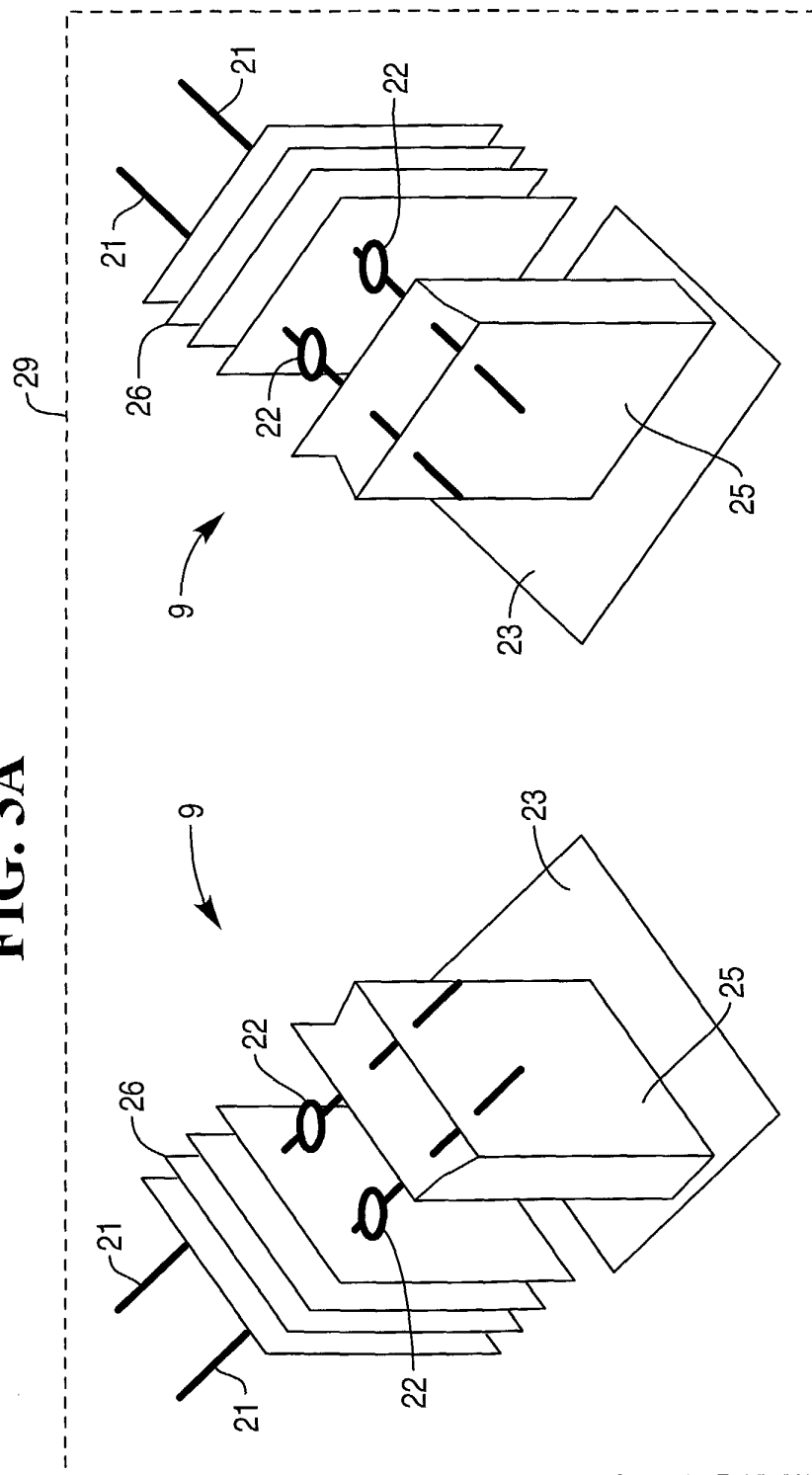


FIG. 3B

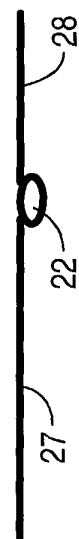
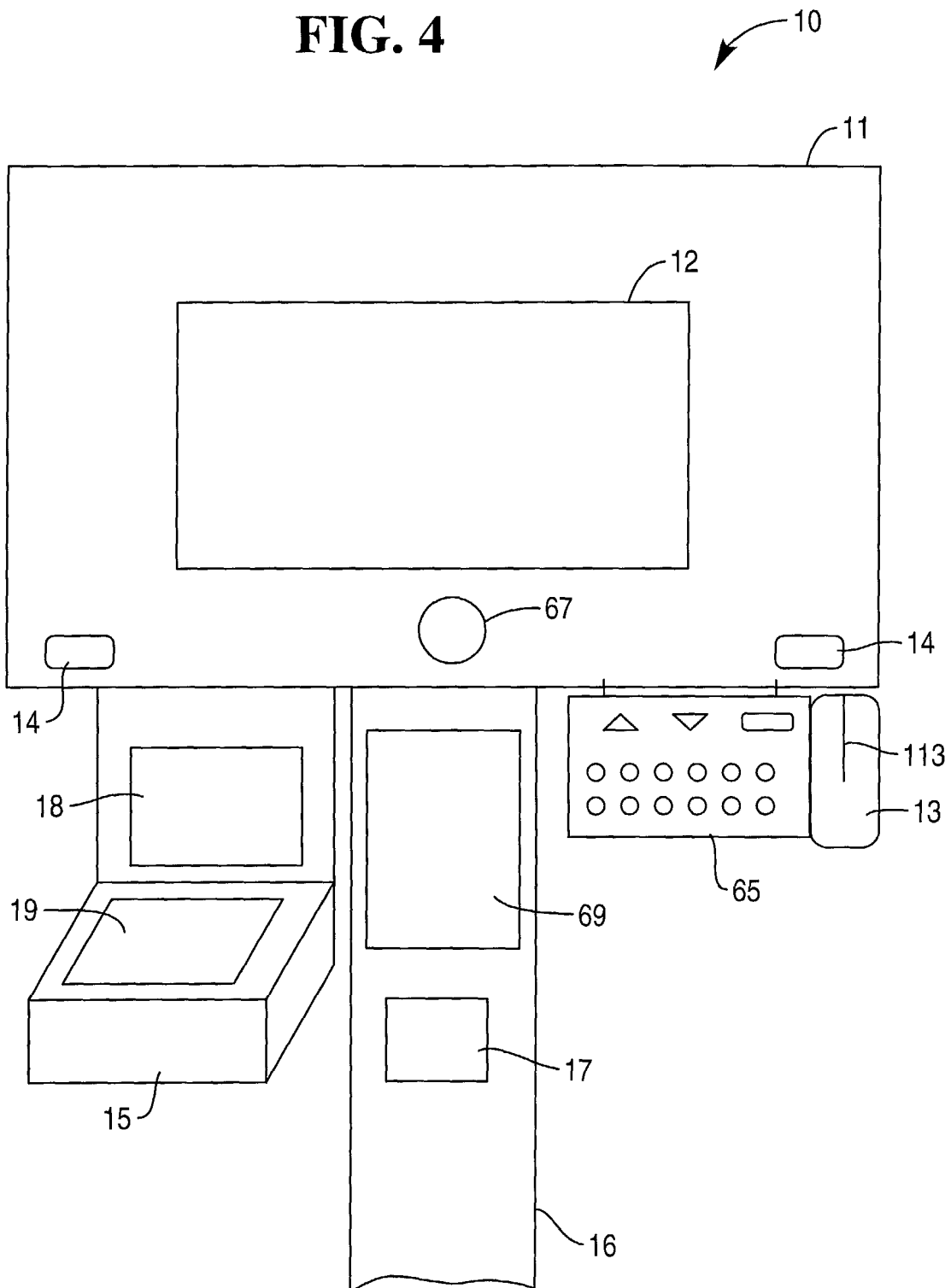


FIG. 4



40 → **FIG. 5A**

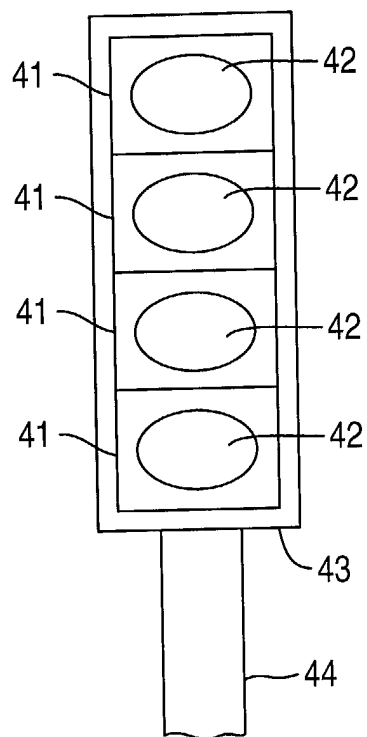


FIG. 5B

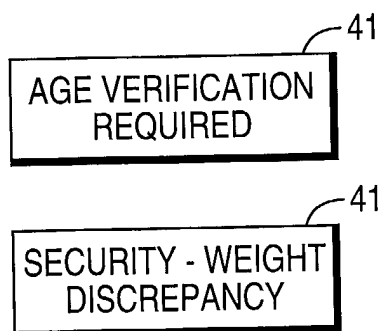


FIG. 6

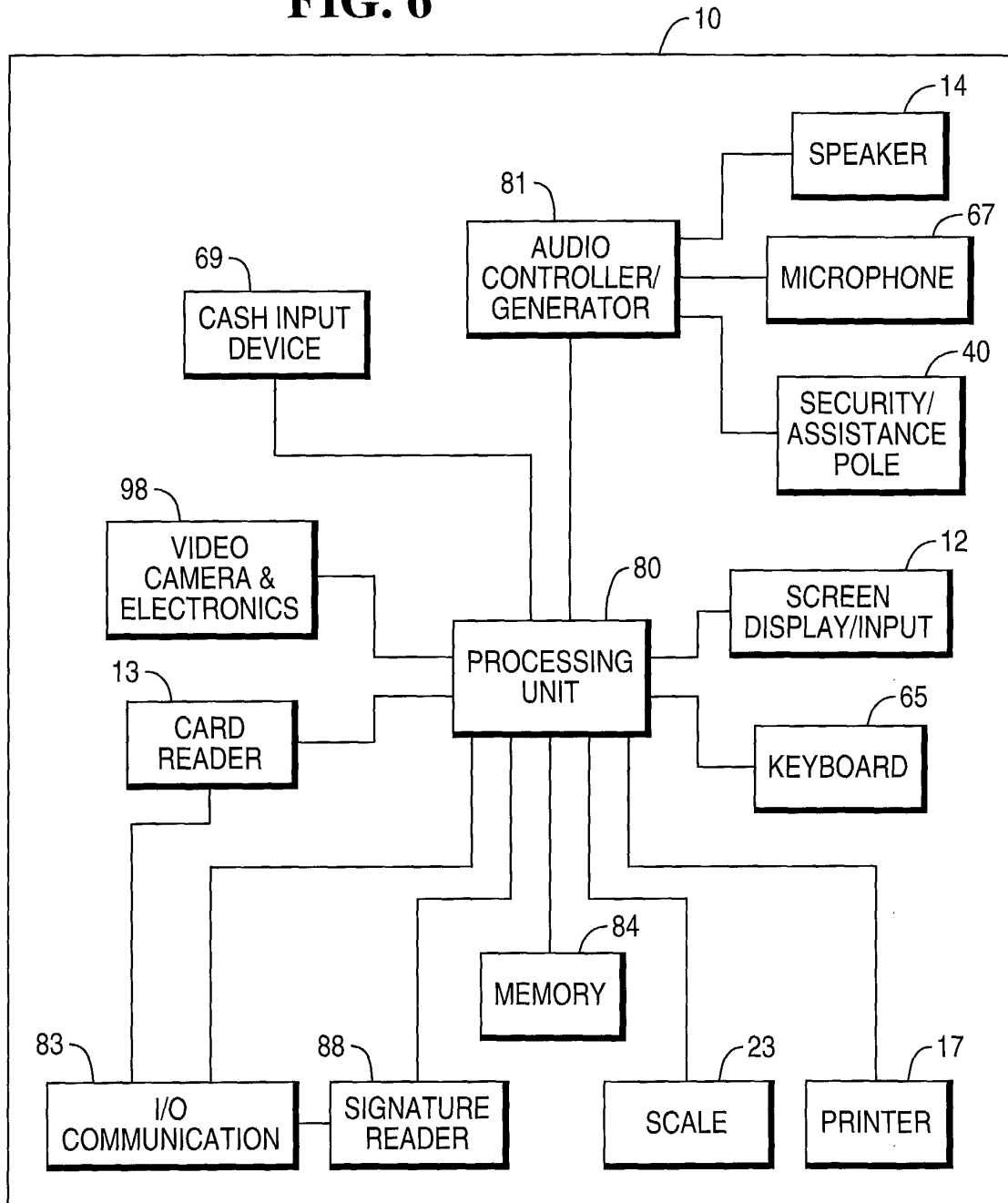


FIG. 7

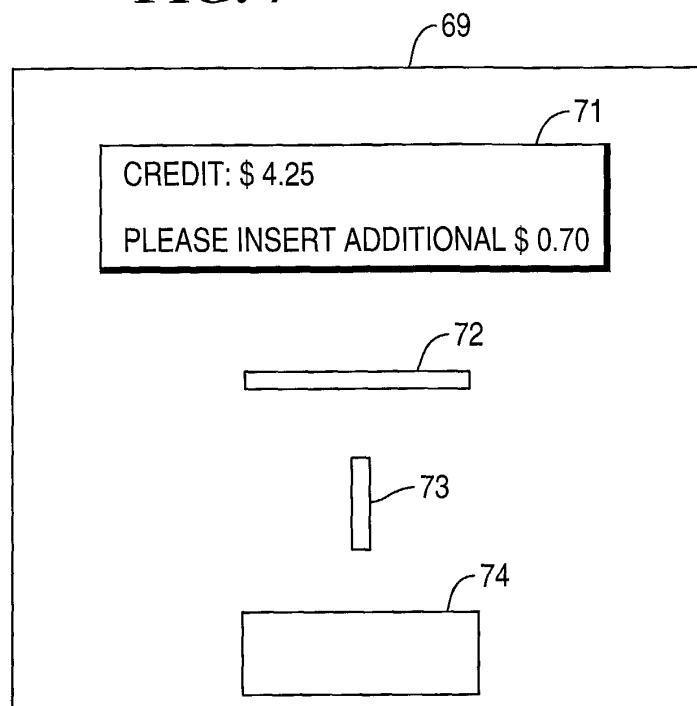


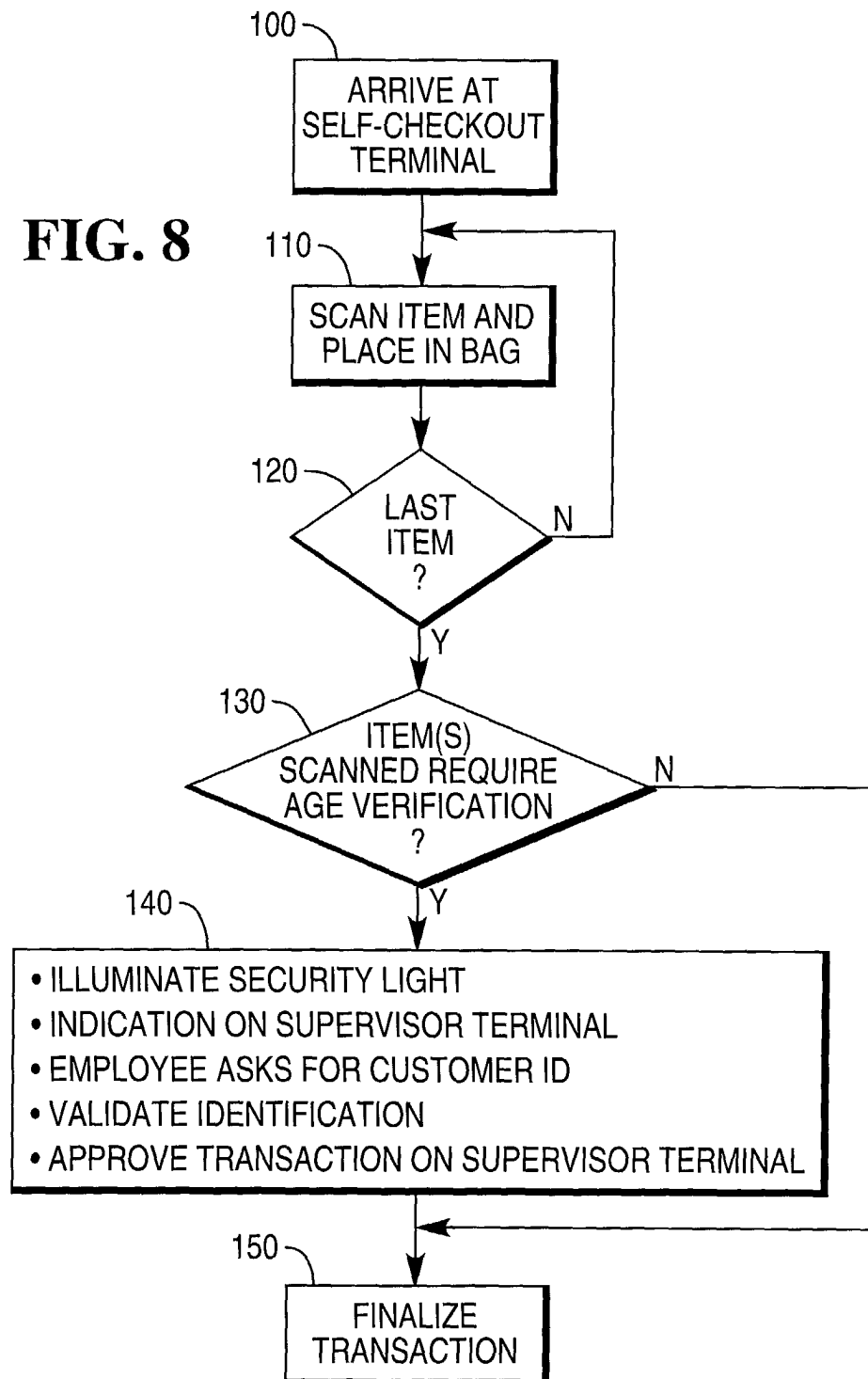
FIG. 8

FIG. 9

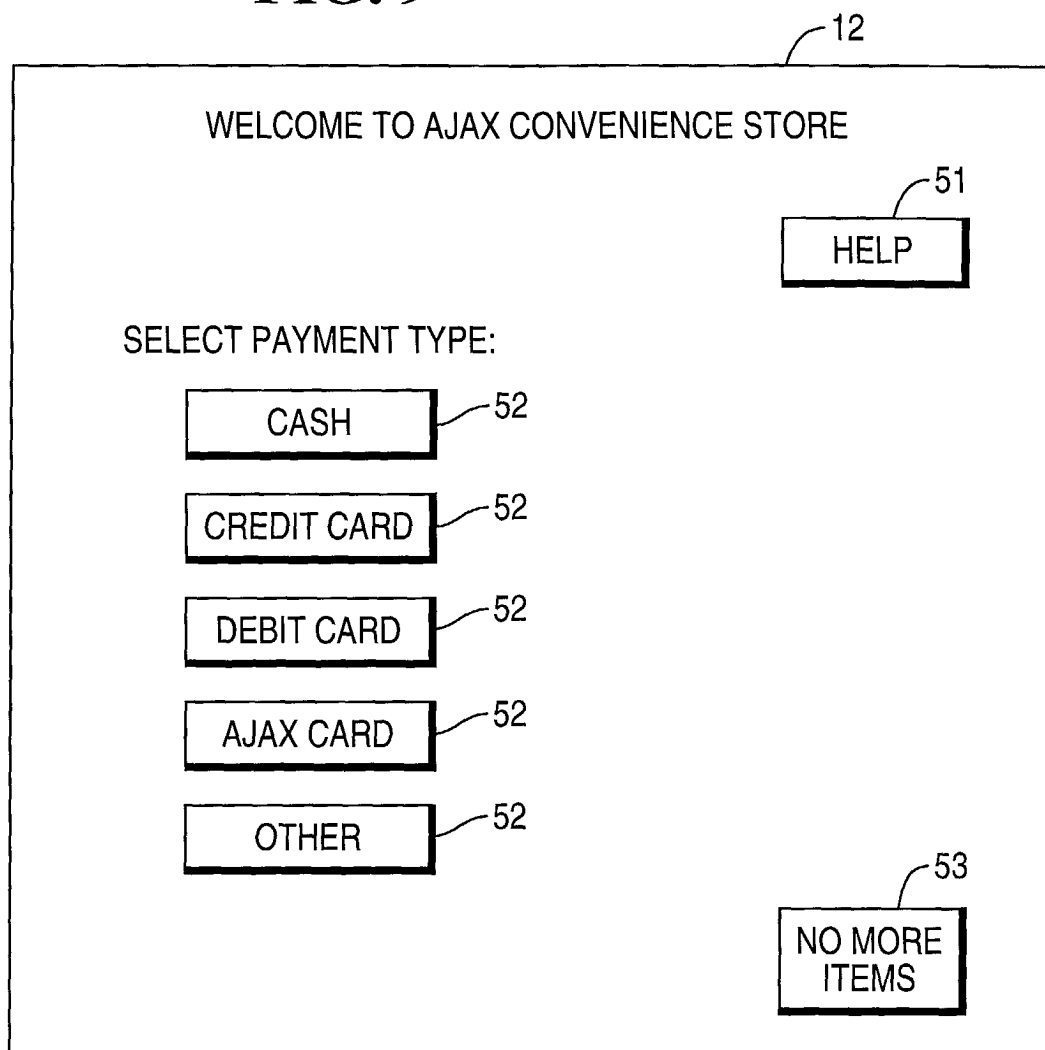


FIG. 10

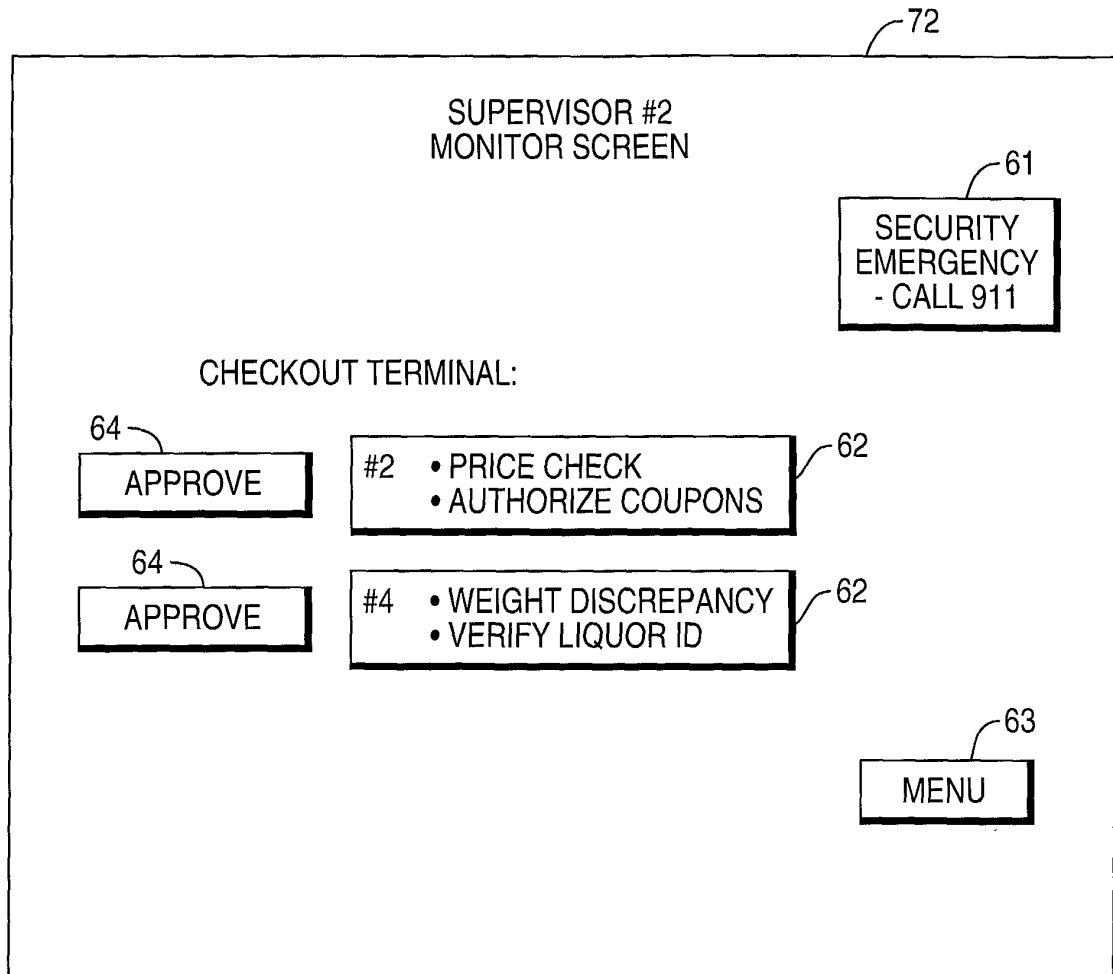


FIG. 11

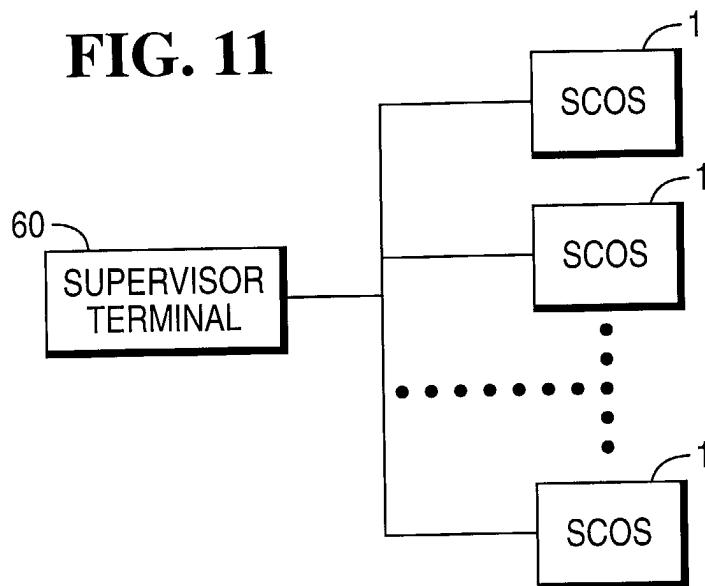


FIG. 12

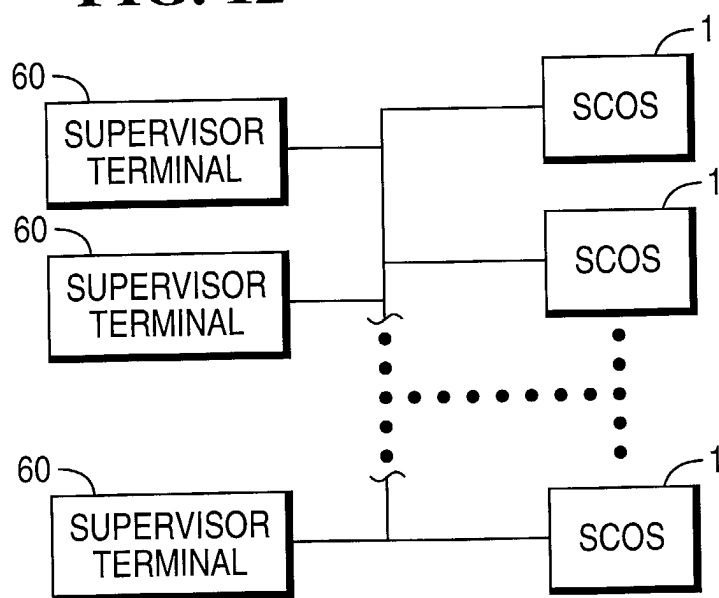


FIG. 13

