UNATTENDED AUTOMATED SYSTEM FOR SELLING AND DISPENSING

Background of the Invention

This invention relates generally to customer controlled facilities for selling and dispensing consumer products and services, and more particularly to a system for an unattended automated service or selling station for selling and dispensing products, particularly motor fuel, by card or cash and returning any change that may be due.

Heretofore, equipment has been provided at service stations which permit the remote enablement of gasoline dispensers by an attendant-controlled terminal. In such equipment, the terminal is located in the sales office of the service station remote from the island which contains the fuel pump dispensers. Such a terminal prevents theft of gasoline by allowing only the attendant to enable the fuel dispensing pumps.

U.S. Patent No. 3,786,421, the contents of which are incorporated herein by reference, discloses a system wherein the service station attendant has been eliminated by permitting self-vending of the fuel and self-payment by the customer. This device, however, is only capable of being actuated by a credit card and is not capable of receiving money for the transaction or giving change due. It further does not handle goods which cannot be automatically dispensed and therefore, does not create a complete transactional receipt for the purchased goods.

U.S. Patent No. 3,931,497, which issued January 6, 1976, the contents of which are also incorporated herein by reference, discloses an automatic fuel dispenser which is actuated by either a credit card or currency to establish a pre-established value for a particular amount of motor fuel and which dispenses a quantity of fuel up to the limit of the currency value or card limit value

inputted by the user. This system, however, is not capable of making exact change or of accepting any amount of currency or coins in payment for fuel.

U.S. Patent No. 3,747,732, issued July 24, 1973 and 3,768,617, issued October 30, 1973 the contents of each are incorporated herein by reference, disclose fuel dispensing systems which utilize change calculating coin-return mechanisms whereby an appropriate amount of change, in coins, may be returned to the customer in the event a preset amount of fuel has been dispensed and payment has been in excess of the amount needed for the purchase.

More recently, other systems have been developed for interaction with dispensing systems to enable customer control and selection for the purchase of consumer products, such as fuel, while providing during the process audio instructions and video instructions and information concerning the immediate purchase or issues relating thereto. See, for example, International Application No. PCT/GB88/00651, the contents of which are incorporated herein by reference.

The convenience of unattended automated service and selling stations for selling and dispensing items, particularly fuel, has created an ever-increasing need for such technology, and it is to that need that the present invention is directed.

None of the prior art provides change in the form of currency, i.e. banknotes and coins, and hence falls short of completely automating the retail sales agent function for the dispensing of motor fuel.

Summary of the Invention

It is therefore a general object of the present invention to provide a system for use in an unattended, automated service station for use in the selling and dispensing of products and services, principally motor fuel, that includes all of the advantages of prior art systems and none of the disadvantages, and specifically to

provide a system permitting the operation of a totally unmanned facility that will increase sales and reduce manpower costs.

Another object of the present invention is to provide a system for use with unattended service stations for the unattended and automated dispensing and selling of motor fuel which include, audio and visual instructions and information concerning the present selling and dispensing activities, as well as other available items for purchase and other useful information concerning local businesses and activities.

Yet another objective of the present invention is to provide a system of the type described that is operable with either cash or credit card by a user and which is capable of delivering correct change to a user by dispensing currency and coins in any amount of cash or credit applied toward the purchase.

Yet still another object of the present invention is to provide an unattended purchase site having high security and reliability and user-friendly components to facilitate the unattended sales transaction.

The present invention encompasses a system for an unattended automated service station for the selling of and dispensing of products and services, primarily motor fuel, which includes means indicating the quantity of fuel dispensed; card reader means identifying indicia carried by credit card and generating signals indicative of the indicia; card verification means for verifying the credit state of a card; coin and currency acceptor means for receiving direct payment for a quantity of fuel to be dispensed; receipt printing means for generating credit card and cash purchase receipts; fuel dispensing activating means for enabling the fuel dispensing means to dispense fuel; data transmission means interconnecting the various components of the system with other components to remote verifying and information services; and a process control means interconnected to the credit card reader

means, the coin and currency acceptor means, the credit card verification means, coin and currency dispensing means, the receipt printing means, the display means, the audio means, and the receipt generating means, the process control means being responsive to receive data transmitted from the card verification means and the card acceptor means to activate the fuel dispensing means for delivering a specific quantity, generating a receipt, activating the coin and currency dispensing means to deliver an exact amount of change in coins and currency, and terminating the operation of the system.

There has been outlined rather broadly and in summary form, the more important features of the invention in order that the detailed description that follows may be better understood and in order that the present contribution to the art may be better appreciated. There are obviously additional features of the invention that will be described hereinafter and which will form the subject matter of the claims appended hereto. In this respect, before explaining several embodiments of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangement of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways.

It is also to be understood that the phraseology and terminology used herein are for the purpose of description and should not be regarded as limiting in any respect. Those skilled in the art will appreciate the concept upon which this disclosure is based and that it may readily be utilized as a basis for designing other structures, methods and systems for carrying out the several purposes of the present invention. It is also to be understood that the abstract is neither intended to

define the invention of the application, which is measured by the claims, nor to limit its scope in any way.

These and other objects, features and advantages of the present inventions will be apparent through a reading of the following detailed description, taken in conjunction with the accompanying drawings, wherein like reference numerals refer to like parts.

Brief Description of the Drawings

Throughout the course of this detailed description, reference will be made to the following drawings in which:

FIG. 1 is a perspective view of a motor fuel service station incorporating an unattended selling and dispensing system constructed in accordance with the principles of the present invention;

FIG. 2 is an enlarged perspective view of a fuel island of the service station of FIG. 1 illustrating a customer in place at the customer console thereof;

FIG. 3 is an enlarged perspective view of an alternate customer engaging console embodying a portion of the present invention in place at a fuel island with a dispensing facility which enables the unattended purchase of other consumer products in addition to fuel;

FIG. 4 is a functional block diagram illustration of the connected components comprising the present invention;

FIG. 5 is a flow chart illustrating the basic control sequence executed by the components represented in FIG. 4, and

FIG. 6 is an enlarged and isolated view of the customer engaging console constructed in accordance with the principles of the present invention used in the unattended service station of FIG. 1.

Detailed Description of the Invention

Reference will be made hereinafter to the present invention as it relates to an unattended service station having a plurality of gasoline dispensing islands to which the system comprising the present invention is applied. It is to be understood, however, that the system may be applied to other automated vending services or selling stations where consumer products such as food, drinks, cigarettes, candies, nonprescription drugs and others may be sold. In many instances, such items can be sold in conjunction with motor fuel at an unattended station.

Referring now to FIG. 1, an unattended service station 10 is illustrated which includes a plurality of gasoline dispensing islands 13, 15, 17 each of which is shown as having a separate, two-sided gasoline dispensers 19, 21, 23 shown generally in the Figures as fuel pump dispensers 35. Each side of the dispensers 19, 21, 23 may have anywhere from between one to five fuel outlets 12 for dispensing separate types of fuels, for example, regular, midgrade, premium, and diesel fuel.

Apparatus of the present invention includes a customer engaging console 25 closely associated in proximity and function with gasoline dispensers 19, 21, 23 and are shown illustrated in FIGS. 2 & 3 as in place upon one of the islands. This console 25 is preferably soundly constructed to be theft-and weatherproof and designed to house most of the components of the system shown more specifically in FIG. 4.

A facility server 27 is located in a separate and remote closed facility 29 in order to provide a control center for all of the consoles and fuel islands sites of the service station 10. The facility server 27, by way of a suitable transmission means 33, has suitable wide area network connections to gather all off-site information necessary for the efficient operation of the system including, but not limited to, credit card

verification and other information needed in day-to-day operation of the service station 10.

The facility server 27, through an interface 31, controls the activation and deactivation of the fuel dispensers 35 which continually display sales indicia, such fuel price and fuel quantity units for the customer. Server 27, through another transmission means, preferably in the form of a suitable local area network ("LAN") 37, also connects with a customer interface controller 39 in order to clear a credit sale transaction and activate fuel dispensation after such transaction has been cleared, or after a cash purchase has been initiated. In instances concerning the latter type of purchase, a PC controller 39 is connected to a cash coin controller 41 which in turn has two-way communication with a cash acceptor 43. Controller 41 also receives input from coin acceptor 45, and has two-way communication with cash dispenser 47, as shown in FIG. 4 in order to controls coin dispensation through coin dispenser 47.

The credit card reader 51 transmits information to controller 39, and an optional numerical pad 53 for the entering by a purchaser of a PIN ("personal identification number") is similarly connected to prohibit fraudulent access to the credit card reader and mechanism associated therewith. A receipt printer 55 is also provided which is activated by the controller 39 to provide a transaction receipt of the purchase regardless of whether the purchase is credit card or cash-based. A video display 57 may be provided on the console 25 which is controlled by controller 39 in order to provide additional fueling instructions or other important information about products for sale or locations of interest to the purchaser. There is an optional provision for a touch-panel type display to facilitate customer selections by touching simulated buttons on the screen.

With reference now to FIG. 5 which illustrates the operational sequence of the system of the present

invention, controller 39 controls the processing and management of the customer control console 25. The operational activities may be summarized as follows:

(1) data is received from card reader 51 which includes information read from the customer's credit card, by way of its magnetic stripe, and is manipulated to provide output commands to the server 27 for off-site verification;

(2) an accepted card enables the interface 31 of the system to activate the appropriate dispenser 35;

(3) fueling commences and audio instructions or information may be provided during the fueling period; and

(4) fueling is completed and an optional receipt is available from receipt printer 55 through controller 39.

In the event a cash purchase of motor fuel is desired by the purchaser, cash, such as either currency or coins are inserted into either the currency acceptor 43 and/or the coin acceptor 45. The dispenser 35 is then activated through interface 31 by the facility server 27 via controllers 39 and 41 once the amount deposited by the purchaser into the acceptors 43, 45 is determined. Upon the completion of fueling, cash and/or coins that are due from the transaction are returned by way of activation of four currency dispensers 49 and/or four coin dispensers 47 upon initiation by controller 41.

In order to effectuate providing the purchaser with change for his or her purchase of fuel, the currency and coin dispensers 47, 49 preferably contain distinct supplies of different denominations of currencies and coins. As illustrated in Fig. 4, the currency dispenser 47 contains a supply of the following different denominations of currency: 1-dollar bills, 5-dollar bills, 10-dollar bills and 20-dollar bills, while the coin dispenser 49 contains a supply of the following different

denomination coins: pennies, nickels, dimes and quarters. Upon command from a signal from the controller 41, the dispensers 47, 49 will make appropriate change to the purchaser, which may be dispensed to the purchaser by way of a slot 18 on the customer console 25. Any convenient amount of cash may be utilized for the purchase such as a $20.00 bill even though the sales transaction totals only $18.50. Likewise, the cash and coin acceptors 43, 45 will have the ability, as is known in the art of such acceptors, to distinguish between and identify different denominations of currency and coins as illustrated in FIG. 4.

An optional receipt is again available, and after a suitable time elapses, the system recycles to the start position.

The console 25 preferably is partially embedded in a concrete base of the service station island and is also preferably physically constructed to resist vandalism and weather. The customer engaging screen 14 of the console 25 is preferably recessed within front wall 59 thereof to protect it from wind and rain and to facilitate its visibility to a purchaser. Moreover, the console 25 and fuel island will be suitably covered with a protective roof 16 to further insure minimum weather damage to the unit. All interconnecting transmission lines such as copper wires, fiber optic cables or the like 18 which may make up part of the LAN 37 may be sealed in a protective conduit and buried in concrete extending from the console 25 to the separate closed facility 29 and to all dispensers 35. As illustrated in FIG. 3, the customer console 25 may also be incorporated into an additional product vending station 26 disposed on the service station islands in proximity to the fuel dispensers 35 at which the purchaser may purchase drinks, snacks, personal items, etc.

The various components of the present system are of a conventional nature, but have been combined to

provide the unique combination set forth herein. For example, an appropriate facility server 27 may be a Dell PT90 personal computer with 500 megabyte hard drive and 32 megabytes of RAM (random access memory). Larger memory applications may be required dependent upon the member of islands and dispensers served.

A suitable interface 31 operable with this type of PC server may include a conventional GPCC manufactured by Progressive International, Inc. A compatible customer interface controller 39 may be a PSI Pieces and Parts PC. A Hess GmbH MCMC Controller Board (TIPS 280) may be used as suitable cash coin controller 41. A suitable coin dispenser 47 suitable for use and the present invention is the Universal Hopper MK11 made by Coin Controller, Ltd., and a suitable cash dispenser 49 may be the Model 13234 banknote dispenser made by DeLaRu Ltd.

Additional acceptable components for the present invention include a credit card reader 51 may include a Model No. MT 215232 made by Magtee Corporation, while suitable receipt printer 55 for use with the present invention may be the Model FTP 421 (WMCR 512) Printer by Fugitsu. Any number of suitable units for video display 57, for example Potronix, model 2400, are available and the PIN pad 53 may be of the type utilized by banks in automatic teller machines such as by Atalla. Numerous alternative components for each of the operational functions are currently available and can be utilized in the present inventive concept.

In the drawings and specification there has been set forth the best mode presently contemplated for the practice of the present invention, and although specific terms are employed, they are used in the generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

While the preferred embodiment of the invention have been shown and described, it will be understood by those skilled in the art that changes or modifications may

be made thereto without departing from the true spirit and scope of the invention.

I CLAIM:

1. A system for an unattended automated service or selling station for selling and dispensing products and services, particularly fuel, comprising:

dispensing means for dispensing a preselected quantity of a motor fuel and for indicating the amount of fuel dispensed;

first and second means for accepting payment corresponding to the preselected quantity of said motor fuel, said first payment acceptance means accepting indirect payment from a purchaser by way of currency and coin and including credit card reader means for reading identification and verification data from a credit card of the purchaser;

said second payment acceptance means accepting direct payment from said purchaser by way of currency and coin and including currency and coin acceptors for receiving a payment amount directly from said purchaser;

first verification means for verifying the integrity of said credit card accepted by said first payment acceptance means;

second verification means for verifying the payment amount accepted by said second payment acceptance means;

dispensing activating means for activating said fuel dispensing means to dispense said preselected quantity of motor fuel and deactivating said fuel dispensing means when said preselected quantity of motor fuel has been dispensed;

printing means for generating a printed receipt indicating a direct or indirect payment for said preselected quantity of motor fuel and,

control means interconnecting said first and second payment acceptance means, said first and second verification means, said printing means, dispensing means and dispensing activating means

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together such that data may be terminated between said control means to and from said previously recited means, said control means including processor means for responding to data transmitted from either of said first and second verification means and activating said fuel dispensing means to enable dispensing of said preselected quantity of motor fuel, generating a receipt reflecting such a purchase and deactivating said fuel dispensing means.

2. The unattended automated service station as defined in claim 1, further including change dispensing means for dispensing change to said purchaser after a purchase of motor fuel whenever any direct payment made by said purchaser exceeds any payment amount corresponding to said preselected quantity of motor fuel.

3. The unattended automated service station as defined in claim 2, wherein said charge dispensing means includes first and second dispensing means, said first dispensing means including currency dispensers and said second dispensing means including coin dispensers.

4. The unattended automated service station as defined in claim 2, wherein said first dispensing means includes at least three distinct currency dispensers, each of said three currency dispensers including a supply of currency stored therein and said second dispensing means includes a plurality of coin dispensers corresponding in number to the number of distinct coins which make up a lowest denomination of currency.

5. The unattended automated service station as defined in claim 4, wherein said plurality of coin dispensers

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includes four coin dispensers, said four coin dispensers containing respective supplies of pennies, nickels, dimes and quarters.

6. The unattended automated service station as defined in claim 1, further including audio information means for providing audio information and instructions to said purchaser for operating said system.

7. The unattended automated service station as defined in claim 1, further including visual audio information means for providing a visual display for conveying visual information and instructions to said purchaser for operating said systems.

8. The unattended automated service station as defined in claim 1, further including audio and visual information display means for providing both visual and audio information and instructions to said purchaser for operating said system.

9. The unattended automated service station as defined in claim 1, wherein said unattached service station includes at least one service island associated therewith, the service island including at least one fuel pump associated therewith, said fuel dispensing means being connected to said fuel pump.

10. The unattended automated service station as defined in claim 1, wherein said unattached service station includes a plurality of service islands each of the service islands including at least one fuel dispenser associated therewith, each of said service island including a purchaser accessible console, said console containing said fuel dispensing means, said first and second payment acceptance means and said printing means.

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11. The unattended automated service station as defined in claim 2, wherein said unattached service station includes a plurality of service islands each of the service islands including at least one fuel dispenser associated therewith, each of said service island including a purchaser accessible console, said console containing said fuel dispensing means, said first and second payment acceptance means and said printing means.

12. The unattended automated service station as defined in claim 11, wherein said charge dispensing means includes first dispensing means for dispensing a predetermined amount of currency from a currency supply as charge for a direct payment purchases of motor fuel and second dispensing means for dispensing a predetermined amount of coins from a coin supply as change for a direct payment purchase of motor fuel, said first and second dispensing means being interconnected by said control means to dispense any preselected amount of change to said purchaser for a purchase of motor fuel.

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