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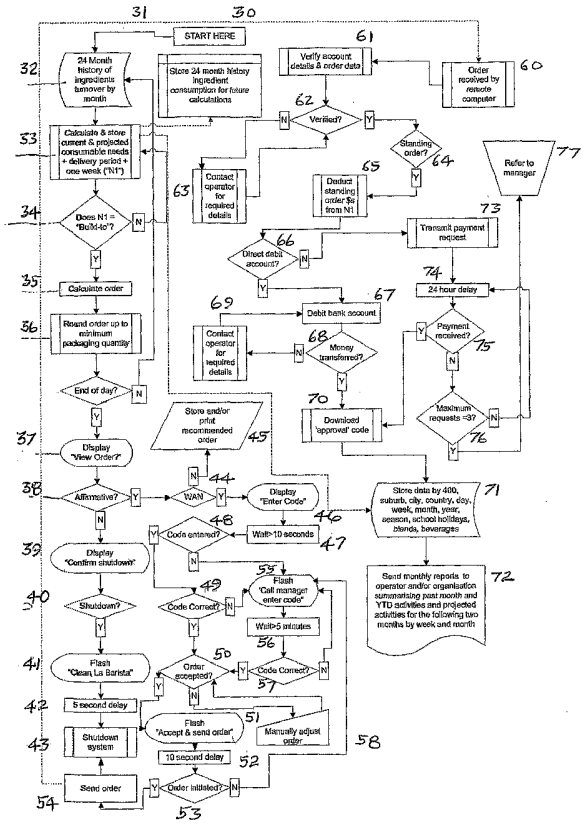

(57) Abstract: A machine for dispensing beverages including; a housing, an inlet for receiving a supply of water; at least one boiler which receives water from said water supply and which is/are capable of delivering hot water and /or steam. The machine also has a mixing station which receives hot water and a predetermined dose of a beverage ingredient such as coffee for mixing with said hot water and subsequent delivery of said beverage from said machine. The machine further comprises machine intelligence electronics allowing local and remote monitoring of machine parameters.

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LIQUID BEVERAGE DISPENSING MACHINE INCLUDING MANAGEMENT AND OPERATION INTELLIGENCE

BACKGROUND

The present invention relates to beverage making machines and more particularly relates to improvements in such machines for dispensing hot beverages such as coffee. More particularly the present invention relates to beverage machines which include on board intelligence systems for local and remote management and operation. More particularly the present invention relates to remote, monitoring and controlling machine performance parameters.

Widespread consumption of coffee has spawned production of various machines for dispensing and brewing coffee. These machines can be generally divided into three main categories namely vending machines which may be operated by consumers on demand and which dispense coffee and other hot beverages according to a mix prescribed by the consumer and generally at the touch of a button. Those machines provide a generally low standard of beverage, but they are quick and convenient and therefore have satisfied a particular market. The second category is the drip type that filters hot water through coffee. The third category of machine is the expresso type which expresses hot water through coffee beans and produces a higher quality of coffee such as cappuccino. It is the third category of machines to which this invention is preferably adapted. There is a wide class of coffee consumers which are discerning as to quality and demand a high standard of coffee. The present invention is directed towards improvements in vending and expresso machines and particularly the latter category of machines which have primarily been adapted for making expresso coffee. More particularly, the present invention provides a coffee machine capable of self

control, local and remote management to enable operators and suppliers to monitor performance, order product and report faulty parts.

PRIOR ART

Known hot beverage dispensing machines employ a source of hot water which is mixed with a beverage such as hot chocolate or coffee. These machines presently have no means of allowing an operator to monitor the progressive performance of the machines using machine intelligence which provides a management system.

The known expresso machines are effective with relatively high output when operated by a skilled barista.

A typical prior art coffee brewing machine is disclosed in US patent 4,681,028 which teaches a simple coffee machine having a housing, a fresh water supply reservoir mounted therein, a heating element adapted to heat fresh water supplied to a brewing chamber under pressure. The brewing chamber includes an inlet and an outlet for the coffee and further includes a water pump and driving control.

US patent 4,491,063 discloses an automatic coffee machine which distributes hot water under pressure from a tank,. boiler or the like and delivers it to a chamber where coffee powder is contained. The machine includes filtration of the infusion obtained by the passing of the hot water through the coffee powder. This machine has no means of system management beyond manual monitoring and maintenance.

US patent 6,035,762 discloses an expresso coffee machine which operates with filter capsules and includes a brewing unit with two brewing chamber parts which are connected to a brewing water heater and being provided with a multiple nozzle.

US patent 6,003,435 discloses a coffee making machine of the type to deliver hot water during a brewing cycle to ground coffee supported in a removable filter unit and includes a heated reservoir for water heating and storage and a spray head to deliver heated water from the reservoir to the filter unit. Selection switches allow an operator to select an amount of coffee to be brewed. The unit further includes a controller in communication with the selection switches and controls actuation of the first and second valved conduit during a brewing cycle to deliver an appropriate amount of heated water to the spray head for delivery to ground coffee in the filter unit thereby to brew the selected amount of coffee. This is a form of machine intelligence but is limited to normal interaction of components and does not keep memory of parameters to enable determination of constituent levels, maintenance requirements and normal and abnormal operating parameters.

Another known expresso coffee machine is disclosed in US patent 5,388,502 which discloses an expresso coffee machine including an electric water heater and a filter basket holder which has a brewing chamber for receiving coffee grounds in a pouring device arranged at its bottom. This is a basic version of a known machine and has no facility for monitoring operation to determine such parameters as ingredient refill.

Another coffee making machine is disclosed in US patent 5,063,836. and describes therein comprises a reservoir connected to a mains water supply and including a level sensor controlling the water refill valve to the reservoir. The machine further includes a thermostatically controlled heating element wherein the thermostat and refill valve are controlled by a single modular replaceable solid state circuit board. The level sensor functions cause refill of the reservoir to the appropriate level sensor functions to cause refill of the reservoir to the appropriate level for subsequent brewing of

coffee irrespective of the mains water pressure and the route by which water may previously have been removed from the reservoir. Again these functions are purely mechanical and do not provide a local operator or remote supplier to monitor a wide variety of characteristics of the machine.

Coffee brewing machines employ coffee grounds in making the coffee.

Traditional coffee expresso machines have two boilers, one which generates hot water for making the coffee and the other for making steam. Conventional machine designs have remained static for some time. Temperature control is effected by means of thermostats and in the prior art machines heat exchange takes place by contact with ambient air at an outlet which can be an inefficient means of temperature control possibly resulting in delivery of coffee which is too hot. One of the problems of the prior art machines is the maintenance of the required discharge temperatures particularly during mass production of coffee. These are not monitored at present due to the absence of any effective means for doing so.

Milk-based expresso coffee machines must be cleaned and maintained regularly to maintain the output quality. The standard of expresso/cappuccino production depends on operator expertise and equipment maintenance. Inadequate maintenance and operator expertise can lead to the sale of substandard coffee, decreasing sales and accelerated machine wear.

Filter coffee must be discarded approximately every 30 minutes. In busy restaurant environments, this policy is often forgotten which leads to substantial sub-standard coffee being served to customers. The known dispensing machines do not provide any sophisticated machine intelligence to enable an operator to keep on board records of machine status, ingredient supply (such as coffee) performance and activity

requirements or which allows local or remote monitoring of machine performance or ingredient requirements. Furthermore, the prior art does not teach the use of systems in such beverage dispensing machines which allow downloading or up loading data concerning machine security, machine performance and ingredient data

INVENTION

The present invention to be described herein in all its forms provides machine intelligence which provides machine security and enables monitoring and control of machine performance and ingredient requirements and is adaptable to known types of machine. It will be appreciated that although the invention will primarily be described with reference to its application to a beverage dispensing machine (such as that described in PCT/AU01/00411), it will be appreciated that the machine intelligence described herein may be adapted to a variety of vending and/or expresso type machines.

The present invention provides an improved beverage dispensing machine including machine intelligence which provides inbuilt security for a machine and which enables an operator to monitor and control the performance of the machine remotely or locally and to increase flexibility of machine operation. The invention further provides supplier monitoring so that a remote supplier can monitor machine usage and performance, its maintenance requirements and consumption.

According to one embodiment, the present invention provides a coffee dispensing machine which includes machine intelligence to enable an operator to monitor the performance of the machine and to adjust operating parameters accordingly.

In its broadest from the present invention comprises:

a machine for delivering hot beverages; the machine including;

an inlet for receiving a supply of water; at least one boiler which receives water from said water supply and which is/are capable of delivering hot water and /or steam;

a mixing station which receives hot water and a predetermined dose of a beverage ingredient such as coffee for mixing with said hot water and subsequent delivery of said beverage from said machine; a cooling chamber which receives part said water supply and which delivers hot water at a predetermined maximum temperature to said mixing station via an outlet the cooling chamber including at least one inlet and at least one outlet wherein said cooling chamber receives cold water from said water supply and wherein said cooling chamber receives hot water from said boiler for delivery to said mixing station, wherein the machine further comprises;

electronic control allowing local and remote monitoring of the machine for performance including consumption of ingredients, maintenance period determination.

In another broad form the present invention comprises:

a beverage machine for delivering hot beverages; the machine including;

an inlet for receiving a supply of water; at least one boiler which receives water from said water supply and which is/are capable of delivering hot water and /or steam;

a mixing station which receives hot water and a predetermined dose of a beverage such as coffee for mixing with said hot water and subsequent delivery of said beverage from said machine; a cooling chamber which receives part said water supply and which delivers hot water at a predetermined maximum temperature to said mixing station via an outlet the cooling chamber including at least one inlet and at least one outlet wherein said cooling chamber receives cold water from said water supply and wherein said cooling chamber receives hot water from said boiler for delivery to said mixing station, wherein the machine further comprises;

a system for monitoring and/or changing usage of ingredients and maintenance of the machine via a wide area network wherein data relating to said usage and maintenance is transmitted to a data base thereby allowing comparison between usage and performance parameters relative to data stored in said data base.

In another broad form the present invention comprises:

a system for remote monitoring of a beverage machine for delivering ingredients; the system comprising ;

'first monitoring' means for monitoring performance of machine hardware and,

'second monitoring' means for determining consumption of ingredients in the machine;

the 'first monitoring' means comprising at least one sensor for monitoring at least one motor, means for communication between the sensor and a wide area network

a data base in communication with said wide area network and for comparing performance values determined by said sensor of said at least one motor with predetermined normal performance values for each said at least one motor contained in said data base;

the 'second monitoring' means comprising; a local station and a remote station, a wide area network in communication with each said local and remote stations, a remote processing order system and an account verification system which processes product orders.

Preferably, the control means includes machine intelligence enabling an operator to monitor machine activity and/or operation parameters such as beverage usage. The machine further comprises a remote controller for monitoring machine hardware and

ingredient usage, a user interface. The machine intelligence may be located within or remote from the machine and allows commissioning and programming of the machine to enable monitoring and/or control of machine activity. The controller preferably includes central intelligence comprising process control means and information processing means.

The user interface preferably includes a user liquid crystal display interface and a circuit board wherein the LCD relays information to a user regarding machine performance. The machine intelligence collects data and relays the data to a data storage which may be located within the body of the machine or at a location remote from the machine. When the machine intelligence is located remote from the machine, machine activity data may be down loaded to or uploaded from the remote location. This enables comparison of data between load operating parameters and predetermined stored limit parameters. The brewing machine preferably includes means for setting and adjusting the machine and enables an operator to monitor machine activity and/or operation parameters. Preferably, the machine intelligence is located in the body of the machine.

The control means enables an operator to monitor machine activity particularly hardware ingredient usage. The machine intelligence allows commissioning and programming of said machine to enable monitoring and/or control of machine activity.

In another broad form the present invention comprises;

machine intelligence for a beverage machine the intelligence including a central controller, a user interface, wherein said controller includes central intelligence comprising a process control computer and information processing means.

The user interface includes at least one user liquid crystal display interface and a circuit board. The LCD relays information to a user regarding machine performance. The LCD also discloses data which could be relayed to a central computer.

Sensors monitor the performance activity of the machine and/or operation parameters.

In another broad form the present invention comprises;

a control, monitoring and management system for use in the management and control of a coffee beverage dispensing machine;

the control and management system comprising; a main controller and a user interface, wherein the main controller includes a link to said user interface; the main controller further including central intelligence comprising information processing and control sections; enabling the operation and performance of the dispensing machine to be monitored and controlled locally or remotely.

According to a preferred embodiment, the control, monitoring and management system further comprises circuit boards associated with the smart card interface which enable reading of a memory in said smart card.

In a further broad form the present invention comprises;

a machine for dispensing beverages; the machine including;

a housing

an inlet for receiving a supply of water;

at least one boiler which receives water from said water supply and which is/are capable of delivering hot water and /or steam;

a mixing station which receives hot water and a predetermined dose of a beverage ingredient such as coffee for mixing with said hot water and subsequent delivery of said beverage from said machine;

wherein the machine further comprises;

machine intelligence electronics allowing local and remote monitoring of machine parameters.

In a further broad form of a method aspect the present invention comprises:

A method for monitoring the performance and activity of a beverage dispensing machine of the type comprising ;

a housing;

an inlet for receiving a supply of water;

at least one boiler which receives water from said water supply and which is/are capable of delivering hot water and /or steam;

a mixing station which receives hot water and a predetermined dose of a beverage ingredient for mixing with said hot water and subsequent delivery of said beverage from said machine;

machine intelligence electronics allowing local and remote monitoring of machine parameters.

the method comprising the steps of:

a) providing means in communication with said machine to allow monitoring of machine operating and performance parameters including consumption of beverage ingredients, performance of machine hardware and maintenance periods.

b) linking said machine to a remote control system.

c) providing associated with said remote control system, a sub system which allows remote ordering of ingredients consumed by the machine.

d) providing an account verification sub system.

c) providing in the remote control system an equipment monitoring system which includes means to allow determination of a performance state of machine wear and software components.

DETAILED DESCRIPTION

The present invention will now be described in more detail according to preferred but non limiting embodiment and with reference to the accompanying illustrations wherein;

Figure 1 shows a perspective view of a beverage dispensing machine

Figure 2 shows a front elevation of a beverage dispensing machine according to an alternative embodiment.

Figure 3 show exploded views of the machine of figure 1 .

Figure 4 shows a schematic layout of a mother board according to one embodiment.

Figure 5 shows a schematic layout of operating regimes for the beverage dispensing machine incorporating operating loops for an ordering and accounting verification system.

Figure 6 shows a schematic layout of an equipment monitoring flow chart for monitoring machine hardware according to a preferred embodiment. .

Figure 7 shows a schematic layout of an alternating mode and non alternating mode for two auto frother groups in an intelligent beverage dispensing machine according to one embodiment.

Figure 8 shows a schematic layout of an alternating mode and non alternating mode for two manual frother groups in an intelligent beverage dispensing machine according to one embodiment.

Figure 9 shows a selection of menu configurations.

Figure 10 shows alternative machine configurations depending upon operator and business selection requirements.

Referring to the illustrations, **figure 1** shows a perspective view of a beverage dispensing machine 1 according to one embodiment. **Figure 2** shows a front elevation of an alternative beverage dispensing machine 2 and **figure 3** shows an exploded views of the machine 2 of figure 1. The machines shown in figures 1, 2 and 3 are typical machine cabinets found in the prior art and are included to show the type of machines that the intelligent monitoring system of the invention to be described below can be included. Those cabinets will not be described in detail.

Typically a machine size would fall within the range 450 - 500 mm but this is to be construed as non limiting. Referring to figure 2 the elevation view of machine **2** shows LCD displays **4** and **5** on front control panel 6 which provide operator controls. Each display panel has 9 selection buttons. Each selection button can be programmed to perform coffee making functions or maintenance functions. Integrated software controls and monitors the state of each hardware device within the machine. Temperatures, pressures and coffee/water delivery quantities are controlled via the software. This allows the machine to be as flexible as the current software versions dictates. The software allows unlimited menu selections for coffee beverage recipes, customer customised menu selections, customer configurable coffee beverage recipes and customer configurable cup sizes. Furthermore, the software can communicate with point of sale systems and with automatic product ordering systems.

The beverage machine incorporates some known hardware but whose performance may be monitored in accordance with the method and system aspect of the invention by the hardware monitoring system. Typical machine components which may be monitored by the intelligent monitoring system of the present invention include:

1 a Steam Boiler (preferably 13 litre 240v 4000w) used to generate steam for a milk frothing function.

2 a heat exchanger to cool water for the coffee making process. The heat for this device is generated by the steam boiler and an electric element.

3 a plurality of plastic containers to store coffee or other ingredients. Delivery of the coffee is performed via 24v DC gear motors. The gear motors are fitted with an optical encoder to allow finite positioning of a drive auger and hence predictable coffee quantity delivery. The containers are arranged in pairs to enable a pair of containers to deliver ingredient into each mixing chamber.

4 Water for the coffee is delivered to a mixing chamber via 2 24v DC solenoid valves and 2 magnetically pulsed flow measuring device. Hence predictable water quantity can be delivered.

5 Ingredients and water are mixed in 1 of 2 chambers that are mounted on the front of the machine. These are removable to allow cleaning. The mixing is achieved by a 24v DC motors and integral impellers. The mixing motors are fitted with optical encoders to allow finite measuring of the speed that the ingredients and water are mixed (see further below) . Hence, beverage quality can be controlled.

6 Preferably two automatic milk frothing devices are mounted next to each beverage mixing chambers to allow both the mixed ingredient and frothed milk to be delivered to a cup. The auto frother is designed to froth fresh milk. Steam is used to create a vacuum required to draw the milk up a clear plastic tube from a milk storage device and to heat and froth the fresh milk. The temperature, bubble size and quality of froth is controlled by a fixed diameter orifice. The orifice can be closed via a 24vDC solenoid valve for latte type coffee beverages.

7 Hot water for tea at temperatures of 85 – 95 degrees C are delivered via a 24v DC solenoid valve. Water for the tea is heated by passing cold water through a heat exchanger in the main steam boiler.

8 A water pump is fitted within the coffee machine and controls water delivery and pressure.

The aforesaid hardware components are known. The prior art however, does not teach the local and /or remote monitoring of hardware and with that ingredient usage parameters.

There is further provided in a typical machine, an internal control module wherein the machine is controlled via a purpose built electronic circuit board. According to one embodiment and as shown in **figure 4**, the construction /design of the board is as follows:

- Main board with plug on connections for 4 multifunction boards and CPU board.
- 4 off multifunction configurable control boards
- CPU board with rs232 and USB communication ports
- Tbase10/100 network port

The following description provides details of the intelligent monitoring systems according to preferred embodiments of the invention. The above known hardware components are now able to be monitored by the method and system of the invention so that an operator can have his machine monitored either locally or remotely to enable tracking of machine ingredient usage, machine performance and machine hardware.

Referring to **figures 5 and 6** there are shown schematic layouts of operating regimes for the beverage dispensing machine incorporating operating loops.

Figure 5 describes a typical operating regime which includes a machine monitoring system which allows accurate monitoring of machine performance and billing, accounting 、data relating to use of the machine. The system according to the embodiment of figure 5 will be described from the Start here direction **30** and proceeding in the directions of the arrows starting from arrow **31**.

The system including history **32** is capable of monitoring at least 24 months history of machine operating parameters such as maintenance criteria, beverage ingredients, turnover by month, calculation of current and projected consumable needs and delivery periods/cycles. This allows a dispensing machine to be monitored remotely or on site for a variety of performance parameters and use of ingredients.

According to one embodiment, an initial phase of operation of the remote monitoring is an **order phase**. Once a machine history **32** has been developed, a projected ingredient order stage **33** may be calculated and compared to a machine's past usage to determine for instance if it is a standard or new order. A comparison at stage **34** compares current consumer needs with an order calculated and a delivery period allowed for. An order is calculated stage **35** and rounded off up to a minimum packaging quantity -stage **36**. The order may be displayed on a display **37,** affirmed at **38** and concurrently sent to a remote wide area network (WAN). If an order is not affirmed, the system displays *confirm shutdown* stages **39 - 43**. If an order is sent to the WAN **44** an order is either stored and /or printed. The recommended order may be printed out or stored for later processing. Alternatively a prompt to display an enter code is made - stage **46** and a time period is allowed for example 10 seconds - stage **47** to enter that code.

If the code is not entered, the machine flashes *call manager enter code* stage **55** and after 10 seconds - 5 minutes time period - stage **56** the operator waits for verification if code is correct - stage **57.** If the code is still not correct at that stage then the system reverts back to stage **55** and the call manager flashes *enter code* . Should the code be incorrect, the display will display *enter code* **46**. If the entered code is correct, confirmation of order selected is required - stage **50**. If the order is

not correct and cannot be accepted, the order may be manually adjusted - stage **58** in the processing.

If the order and associated code is correct, a flash display appears to *accept and send* order - stage **51**. Following a 10 second delay stage **52** the order is initiated - stage **53** then sent - stage **54**. If the order is not initiated or if the code is incorrect, the user code may be re entered. At any time within this process, an opportunity will be given to the proprietors to enter a correct order code.

Once the order is confirmed and initiated - stages **51** and **53**, the order is sent - stage **54** and the system is shutdown. Should the order not be initiated, The order is received by a remote computer.

Associated with the ordering system is an accounting system which works in conjunction with the ordering system. The system then undergoes an account verification phase. Thus once stage **54** has been reached and the order is sent by the consumer, that order is received by a remote computer **60** whereupon the account verification phase is initiated.

According to a preferred embodiment of the account verification phase, the order received by the remote computer **60** is verified and so are account details - stage **61**. If the account details are not verified - stage **62,** the user may be contacted to determine the required details for verification - stage **63**. Where an order is recognised as a standing order stage **64** by a comparison with the latest order and a stored order, the transaction will be treated as a standard order - stage **65** . If the account details are verified, the user account may be direct debited stage - **66**. In that case a bank account may be debited - stage **67** and money transferred - stage **68**. The operator may be contacted for required details. Provided the money is available for

payment from the account, an approval code will be transmitted from the remote controlling computer to the user - stage **70**.

If there is no direct debit facility a payment request will be made stage **73** by the remote computer **60**. If a payment is received within 24 hours - stage **75**, the user will receive an approval code -stage **70**. If a payment is not made within 24 hours multiple request will be made and according to a preferred embodiment, a maximum of three more requests will be made - stage **76**. If no payment is received, the order request will be referred to a manager at a controller station 77. Once an approval code is transmitted, relevant data may be stored in the computer for later verification purposes. The type of data **71** which may be stored includes suburb, city, country, day, week, month, year, school holidays, blends beverages. The controller can use the stored information to provide reports to an operator or organisation summarising hourly, daily, weekly, monthly and year to date activity and projected activities for a period (such as the following two months) by week and month - stage **72**.

Figure 6 shows a schematic layout of a monitoring flow chart according to a preferred embodiment. In addition to the usage, accounting and order monitoring system, there is provided an equipment monitoring system which protects the hardware components of the La Barista machine. This aspect of the system monitors machine performance of hardware

The monitoring system commences at start point **80**. A first motor **81** is monitored for maximum and minimum revolutions - stage **82** to determine if parameters are exceeded - stage **83**. If the parameters are not exceeded the next motor **84** is checked. If the parameters are exceeded the monitoring system checks to determine if the overload (such as over current) is critical - stage **84**. If the status of

the motor is not critical, the data will be simply stored - stage **86**. If the status of the motor is critical, the system will turn to a wide area network (WAN) **85** for obtaining stored data **87** which is retrieved - stage **88**. Once stored data **87** is retrieved, an exception report **90** is transmitted and an error report displayed - stage **91**. **The report may optionally be printed on a LAN** . If the motor status is not critical the monitoring system will invite the user to enter a maintenance code - stage **95**. The system will wait 5 minutes for code entry - stage **96.** If the code is not entered, a call manager will flash an invitation to *enter the code* stage **98**. The system will wait 5 minutes - stage **99** and query if the code has been entered - stage **100**. If the code is incorrect a further invitation will be flashed on a display to allow a user to insert the code - back to stage **98**. Once the correct code has been entered, an error report will be displayed - stage **101**. An acknowledgement code may be entered and error report displayed. After 5 minutes - stage **102** the system shows code entered - stage **103**. Once the code is entered a printer on a LAN may print a report - stage **97**. This triggers stages **126 - 128** resulting in printing of a report. At this point the next motor **93** is checked - stage **98** up until the last motor **92** is checked. Each motor may be checked individually and sequentially or concurrently using the regime described for the first motor. Once the last motor is checked according to the previously described checking regime, the dispensing machine seals may be checked. A first group of seals is checked - stage **104** by determining whether dispenses exceeds a predetermined maximum - stage **105**. If dispenses do exceed a predetermined number, a report is compiled requiring X number of seals to be replaced - stage **106**. This information goes into the data storage **86** to complete an end of day routine - stage **107**. A second group of seals is checked - stage **108** and a determination is made as to whether total dispenses exceeds X number. If they do, then a report is compiled - stage **110**

requiring X seals to be replaced. That information also goes into data storage **86** and that data is available to the WAN. This is also an end of day routine - stage **111**.

If there is more checking , the next step is checking of motherboards and circuits - stage **112**. Stage **113** determines if the test is satisfactory and if it is the next hardware tested is the machine boiler - stage **119**. If the motherboard is unsatisfactory, an IT rest routine is run - stage **114** and the mother boards are again tested - stage **115**. If the test is determined not satisfactory - stage 116, the system will flash *system fault close down* or words to that effect. In that case, the operator will be obliged to contact maintenance - stage **118**. According to the embodiment of figure 6, The next stage **119** is testing of the boiler. Parameters of the boiler are assessed at stage **120** and a display appears indicating system calibrating - state **121**. After a period which is preferably more than two minutes, - stage 122 the boiler is then tested - stage 123. Testing will take a time period **124** which is at least two minutes while boiler parameters are assessed - stage **125**. If boiler parameters are within prescribed ranges that is the end of the test. The test can be reactivated at the option of the operator. If the boiler parameters are outside specified ranges a system fault close down will occur - stage **117**. If the test is satisfactory, the system moves on to test the boiler - stage **119.**

Figures 7 - 10 describe in brief, some basic machine set up configurations. Irrespective of the configurations selected by an operator for particular machine and business requirements, machine performance will be monitored relative to motor cycles which relates back to ingredient usage and wear of components. The remote monitoring will allow accurate management of the machine usage and maintenance.

Figure 7 shows a schematic layout of an alternating mode and non alternating mode for two auto frother groups in an intelligent beverage dispensing machine according

to one embodiment. The arrangement described is figure 7 is one machine configuration for an operator to adopt. This arrangement is intended for self service operator use or in a location where the same people occasionally use the machine. There is a left side group **200** and a right side group **204** . Each group is fed by two hoppers that could for example be two coffee, two hot chocolate or one of each. Where ingredients fed to each group are the same alternating mode is used and where multiple dispensing is not required, non alternating mode is used. In non alternating mode the operator makes a selection from a basic menu **207** and makes a selection from left side group **208** or **209**.

Figure 8 shows a schematic layout of an alternating mode and non alternating mode for two manual frother groups in an intelligent beverage dispensing machine according to one embodiment. This arrangement is intended for high volume operator use where the same people continually use the machine. Each option has a right side group and a left side group. In alternating mode left side group **300** and right side group **304** are preferably fed with the same ingredients. In non alternating mode, left side group **309** and right side group **310** different ingredients may be used.

Figure 9 shows a schematic display of menu options available to an operator in auto frother mode and manual mode. This arrangement which provides one auto frother group **401** and one manual group **402** . Manual group **402** provides three manual menu options **403**, **404** and **405**

Figure 10 shows alternative machine configurations depending upon operator and business selection requirements. Option **500** is a two auto frother configuration which includes a default menu set up **502** and a non default menu set up **503**.

A second option **504** provides one manual group and an auto frother group. A third option provides a two manual group configuration **505.**

There are numerous advantages for a machine having integrated intelligence and remote monitoring systems . The machine will communicate with the remote controller to determine machine requirements for usage and performance. Servicing of the machine may be performed after remote exception reporting. Thus an operator will know when a particular machine or part of a machine such as a motor seal will require servicing. Also the system has the capacity to automatically record and download beverage/ ingredient use such as, but bot limited to coffee. The system therefore allows constant monitoring in real time for ingredient orders and maintenance. A supplier of coffee for instance may monitor use of its brand of ingredient by a particular user or machine or group of one machine from a remote location. Thus it is feasible to monitor a beverage machine from overseas or locally for both usage and hardware status. Performance of motor seals for instance may be monitored in real time to determine when the machine requires a service. Hardware status is held on a data log establishing a machine and /or usage history. The usage and performance data is uploaded to a central controller. Performance reports may be sent to a user for instance in the event that the performance criteria parameters are exceeded. According to one embodiment diagnosis of machine faults may be made at a remote controller locality in real time . Performance data is uploaded to a central computer so the central controller may monitor the machine activity. According to one embodiment, ingredient consumption activity may be monitored according to the following method. An optical pulse sensor monitors the revolutions per minute of each machine motor. The pulse can determine motor speed or rpm so that a calculation of the delivery rate enabled by the motor may be made. This allows a determination of the delivery rate of a particular beverage so the central controller knows at any time from that delivery rate when re ordering or maintenance is

required. Monitoring and calibration of the motors by measuring pulsing, allows a remote controller to determine if the machine is properly calibrated. Preferably, the sensors are fitted to each motor as decoders. A motor feed back arrangement may be achieved using a slotted opto switch. This provides an opto feed back system allowing pulse monitoring . The pulse monitoring may be achieved according to one embodiment, by use of a disc with tabs which will allow determination of a number of motor pulses. The opto feed back assembly provides a diagnostic tool. The use of pulse measuring allows a high level of accuracy in determining extent of machine usage. .

In a case where a beverage supplier permits use of the machine provided, a user or operator uses a particular type of coffee, the central controller may remotely police the usage. The real time monitoring will allow monitoring of machine usage to ensure that there is no substitution of another brand of coffee in competition with the supplier. The supplier may elect to provide the machine free to an operator provided that operator agrees to certain terms and conditions of the transaction. A machine may be provided free to an operator as an incentive to use a suppliers brand. The user submits to the system by the establishment of a link between a machine or plurality of machines and a central controller via a wide area network. The central controller includes a computer which has a data base to which may be compared predetermined machine operating parameters. Thus the system incorporates usage monitoring to determine throughput of product and concurrently or separately hardware monitoring.

It will be recognised by persons skilled in the art that numerous variations and modifications may be made to the invention broadly described herein without departing from the overall spirit and scope of the invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS

1 A machine for dispensing beverages; the machine including;

a housing

an inlet for receiving a supply of water;

at least one boiler which receives water from said water supply and which is/are capable of delivering hot water and /or steam;

a mixing station which receives hot water and a predetermined dose of a beverage ingredient such as coffee for mixing with said hot water and subsequent delivery of said beverage from said machine;

wherein the machine further comprises;

machine intelligence electronics allowing local and remote monitoring of machine parameters.

2 A machine according to claim 1 wherein the machine parameters which are monitored include consumption of beverage ingredients, performance of machine hardware and maintenance periods.

3 A machine according to claim 2 wherein the machine electronics are linked to a remote control system.

4 A machine according to claim 3 wherein the remote control system includes a sub system which allows remote ordering of ingredients consumed by the machine.

5 A machine according to claim 4 wherein the remote control system further comprises an account verification sub system.

6 A machine according to claim 5 wherein the remote control system provides an equipment monitoring system which includes means to allow determination of a performance state of machine wear and software components.

7 A machine according to claim 6 further comprising a first LCD display for display of machine operating parameters.

8 A machine according to claim 7 further comprising a second LCD display for display of additional machine parameters.

9 A machine according to claim 8 wherein the first LCD display , displays an auto frother selection option to enable an operator to access a frother menu.

10 10 A machine according to claim 9 wherein the second LCD display allows operator selection of a manual menu.

11 A machine according to claim 10 wherein the first LCD menu provides operator selections from options including cappuccino, flat white, latte, foamed milk on/off, mocha, choco milk, hot chocolate, warm milk on/off, short black, black coffee and hot water.

12 A machine according to claim 11 wherein the second LCD menu provides operator selections from options including cappuccino, hot chocolate, short black, black coffee and hot water.

13 A machine according to claim 12 wherein the second LCD menu includes at least two manual selection options the first including an operator selection from cappuccino, black coffee, special coffee, large toggle and hot water.

14 A machine according to claim 13 wherein, a second of said at least two manual selection options includes an operator selection from special cappuccino, special black coffee, special short coffee, hot chocolate, large toggle and hot water.

15 A machine according to claim 14 wherein the machine electronics provides means to allow selection between an alternating mode in which an operator may select between two display modes and a non alternating mode wherein an operator can select a single fixed menu display without an alternative display option.

16 A machine according to claim 15 wherein the ordering sub system receives remote orders from a machine location.

17 A machine according to claim 16 wherein the ordering sub system processes an order according to historical ordering data from a consumer placing an order.

18 A machine according to claim 17 wherein the ordering sub system includes at least 24 months history of machine operating parameters such as maintenance criteria, beverage ingredients, turnover by month, calculation of current and projected consumable needs and delivery periods/cycles.

19 A machine according to claim 18 wherein the ordering sub system includes a projected ingredient order stage calculated and compared to a machine's past usage to determine if the order is a standard or new order.

20 A machine according to claim 19 wherein, the order is displayed on a machine LCD display and concurrently sent to a remote wide area network (WAN).

21 A machine according to claim 20 wherein an order may be stored for later processing or printing out.

22 A machine according to claim 21 wherein access to the remote ordering is enabled by an access code.

23 A machine according to claim wherein the ordering sub system further comprises a consumer verification enter code.

24 A machine according to claim 23 wherein the sub system includes means to enable verification of the enter code.

25 A machine according to claim 24 wherein the order is received by a remote computer.

26 A machine according to claim 5 or 25 wherein the account verification phase is initiated by the remote computer.

27 A machine according to claim 26 wherein the account sub system includes means to allow order verification.

28 A machine according to claim 27 wherein the account subsystem allows a consumer to be direct debited.

29 A machine according to claim 28 wherein the accounting sub system provides a consumer with an approval code upon verification of the receipt of a payment.

30 A machine according to claim 29 wherein the accounting sub system includes access to a data base including consumer data.

31 A machine according to claim 30 wherein the data on the data base includes suburb, city, country, day, week, month, year, school holidays, blends, beverages.

32 A machine according to claim 31 wherein the accounting sub system includes means to provide reports to an operator or organisation summarising hourly, daily, weekly, monthly and year to date activity and projected activities for a period (such as the following two months) by week and month.

33 A machine according to claim 6 or 32 wherein the equipment monitoring system provides protection for the hardware components of the dispensing machine by measurement of performance parameters.

34 A machine according to claim 34 further comprising at least one electric motor

35 A machine according to claim 34 further including means to remote monitor performance parameters of the at least one electric motor.

36 A machine according to claim 35 wherein performance parameters of the at least one electric motor are determined with reference to maximum and minimum revolutions.

37 A machine according to claim 36 wherein said measured performance data is compared to prescribed performance limits stored on a data base in said computer.

38 A machine according to claim 37 wherein performance data is transmitted via a wide area network (WAN).

39 A machine according to claim 38 wherein the system shows a code entered which initiates printing of a hardware performance report.

40 A machine according to claim 39 and further including seals .

41 A machine according to claim 40 wherein the seals' working life is tied to a number of total dispenses rendered by the machine.

42 A machine according to claim 41 further comprising mother boards and circuits .

43 A machine according to claim 42 further comprising at least one machine boiler, wherein said at least one boiler parameters are tested to determine if they are within prescribed ranges.

44 A machine according to claim 43 wherein the system allows for a system fault close down in the event parameters fall outside prescribed ranges.

45 A machine according to claim 44 wherein the machine communicates with the remote controller to determine machine requirements for, hardware maintenance, usage and performance.

46 A machine according to claim 45 wherein said remote monitoring is local or overseas.

47 A machine according to claim 46 wherein machine ingredient usage, performance and hardware status are monitored in real time to determine when the machine requires ingredients and /or maintenance.

48 A machine according to claim 47 wherein status of machine hardware is held on a data log establishing a machine and /or usage history.

49 A machine according to claim 48 wherein usage and performance data is uploaded to a central controller.

50 A machine according to claim 49 wherein machine performance reports are sent to a user for instance in the event that the performance criteria parameters are exceeded.

51 A machine according to claim 50 wherein ingredient consumption activity is monitored using at least one pulse sensor which monitors revolutions per minute of each machine motor.

52 A machine according to claim 51 wherein the at least one pulse sensor can determine motor speed (revolutions per minute) to allow a calculation of a delivery rate enabled by the motor.

53 A machine according to claim 52 wherein monitoring and calibration of the machine motors by said at least one pulse sensor, allows a remote controller to determine if the machine is properly calibrated.

54 A machine according to claim 53 wherein said pulse sensors are fitted to each motor as decoders

55 A machine according to claim 54 wherein an operator of said machine establishes a link between a machine or plurality of machines and a central controller via a wide area network.

56 A machine according to claim 55 wherein the data base is retained on a computer at a central controller.

57 A machine according to claim 56 wherein machine performance parameters are compared to parameters contained in the data base.

58 A machine according to claim 57 further comprising an operator control panel having control buttons each individually programmed to perform coffee making functions.

59 A machine according to claim 58 wherein machine parameters of temperatures, pressures and coffee/water delivery quantities are controlled via machine software.

60 A machine according to claim 59 wherein said software allows unlimited menu selections for coffee beverage recipes, customer customised menu selections, customer configurable coffee beverage recipes and customer configurable cup sizes.

61 A machine according to claim 60 wherein the software can communicate with point of sale systems and with automatic product ordering systems.

62 A machine according to claim 61 wherein delivery of the coffee from the machine is performed via 24v DC gear motors fitted with an optical encoder to allow finite positioning of a drive auger to thereby allow predictable coffee quantity delivery.

63 A machine according to claim62 further comprising two automatic milk frothing devices connected to respective beverage mixing chambers to allow both the mixed ingredient and frothed milk to be delivered to a cup.

64 A machine according to claim 63 wherein the auto frother is designed to froth fresh milk.

65 A machine according to claim 64 wherein a water pump is fitted within the coffee machine and controls water delivery and pressure.

66 A machine according to claim 65 further comprising, an internal control module wherein the machine is controlled via a purpose built electronic circuit board.

67 A machine according to claim 66 wherein the circuit board comprises :

a main board with plug on connections for 4 multifunction boards and CPU board;

four multifunction configurable control boards;

a CPU board with rs232 and USB communication ports; and

a Tbase10/100 network port

68 A method for monitoring the performance and activity of a beverage dispensing machine of the type comprising ;

a housing;

an inlet for receiving a supply of water;

at least one boiler which receives water from said water supply and which is/are capable of delivering hot water and /or steam;

a mixing station which receives hot water and a predetermined dose of a beverage ingredient for mixing with said hot water and subsequent delivery of said beverage from said machine;

machine intelligence electronics allowing local and remote monitoring of machine parameters.

the method comprising the steps of:

a) providing means in communication with said machine to allow monitoring of machine operating and performance parameters including consumption of beverage ingredients, performance of machine hardware and maintenance periods.

b) linking said machine to a remote control system.

c) providing associated with said remote control system, a sub system which allows remote ordering of ingredients consumed by the machine.

d) providing an account verification sub system.

c) providing in the remote control system an equipment monitoring system which includes means to allow determination of a performance state of machine wear and software components.

69 A method according to claim 68 comprising the further step of providing a first LCD display for display of machine operating parameters.

70 A method according to claim comprising the further step of providing a second LCD display for display of additional machine parameters.

71 A method according to claim 70 comprising the further step of allowing an operator to access a menu selection displayed on said LCD displays.

72 A method according to claim 71 comprising the further step of providing on the menu operator selections from options including cappuccino, flat white, latte, foamed milk on/off, mocha, choco milk, hot chocolate, warm milk on/off, short black, black coffee and hot water.

73 A method according to claim 72 comprising the further step of providing operator selections from options including cappuccino, hot chocolate, short black, black coffee and hot water.

74 A method according to claim 73 comprising the further step of providing means to allowing selection between an alternating mode in which an operator may select between two display modes and a non alternating mode wherein an operator can select a single fixed menu display without an alternative display option.

75 A method according to claim 74 comprising the further step of submitting an order to the ordering sub system from a machine location.

76 A method according to claim 75 comprising the further step of processing an order according to historical ordering data from a consumer machine placing an order.

77 A method according to claim 76 comprising the further step of uploading a data base with at least 24 months history of machine operating parameters such as maintenance criteria, beverage ingredients, turnover by month, calculation of current and projected consumable needs and delivery periods/cycles.

78 A method according to claim 77 comprising the further step of displaying an order on said LCD screens and concurrently sending the order for processing via a remote wide area network (WAN).

79 A method according to claim 78 comprising the further step of providing an operator with an access code.

80 A method according to claim 79 comprising the further step of providing in the ordering system a consumer verification enter code.

81 A method according to claim 81 comprising the further step of providing means to enable verification of the enter code.

82 A method according to claim 81 comprising the further step of providing a remote computer for processing orders and holding data concerning machine performance.

83 A method according to claim comprising the further step of allowing the account verification phase to be initiated by the remote computer.

84 A method according to claim 83 comprising the further step of providing in the account sub system includes means to allow order verification.

85 A method according to claim comprising the further steps of direct debiting a consumer and providing a consumer with an approval code upon verification of the receipt of a payment..

86 A method according to claim85 comprising the further step of allowing the accounting sub system access to a data base including consumer data.

87 A method according to claim 86 comprising the further step of providing on the data base data including consumer suburb, city, country, day, week, month, year, school holidays, blends, beverages.

88 A method according to claim 87 comprising the further step of providing with the accounting sub system means to provide reports to an operator or organisation summarising hourly, daily, weekly, monthly and year to date activity and projected activities for a period (such as the following two months) by week and month.

89 A method according to claim comprising the further step of providing means at the remote monitoring system to protect hardware components of the dispensing machine by measurement of performance parameters.

90 A method according to claim 89 comprising the further step of remote monitoring of performance parameters of at least one electric motor with reference to maximum and minimum revolutions.

91 A method according to claim 90 comprising the further step of comparing measured performance data to prescribed performance limits stored on a data base in said computer.

92 A method according to claim 91 comprising the further step of transmitting performance data via a wide area network (WAN).

93 A method according to claim 92 comprising the further step of remote monitoring of machine boilers, seals and other boards by linking working life to total number of dispenses over a predetermined period.

94 A method according to claim 94 comprising the further step of providing a system fault close down in the event parameters fall outside prescribed ranges.

95 A method according to claim 94 comprising the further step of allowing machine communication with the remote controller to determine machine requirements for, hardware maintenance, usage and performance.

96 A method according to claim 95 comprising the further step of uploading machine usage data to the data storage computer.

97 A method according to claim 96 comprising the further step of monitoring ingredient consumption activity using at least one pulse sensor which monitors revolutions per minute of each machine motor.

98 A method according to claim 97 comprising the further step of monitoring and calibration of machine motors by said at least one pulse sensor and allowing a remote controller to determine if the machine is properly calibrated.

99 A machine for dispensing beverages; the machine including;

a housing;

an inlet for receiving a supply of water;

at least one boiler which receives water from said water supply and which is/are capable of delivering hot water and /or steam;

a mixing station which receives hot water and a predetermined dose of a beverage for mixing with said hot water and subsequent delivery of said beverage from said machine;

wherein the machine further comprises;

machine intelligence electronics allowing local and remote monitoring of machine parameters wherein, the machine electronics are linked to a remote control system.

100 A machine according to claim 99 wherein the remote control system includes

a) a sub system which allows **remote ordering of ingredients** consumed by the machine.

b) an account verification sub system.

c) an equipment monitoring system which includes means to allow determination of a performance state of machine wear and software components.

101 A machine according to claim 100 further comprising;

a) a first LCD display for display of machine operating parameters.

b) a second LCD display for display of additional machine parameters.

102 A machine according to claim 101 wherein the first LCD display , displays an auto frother selection option to enable an operator to access a frother menu and the second LCD display allows operator selection of a manual menu.

103 A machine according to claim 102 wherein the machine electronics provides means to allow selection between an alternating mode in which an operator may select between two display modes and a non alternating mode wherein an operator can select a single fixed menu display without an alternative display option.

104 A machine according to claim 103 wherein the ordering sub system includes a projected ingredient order stage calculated and compared to a machine's past usage to determine if the order is a standard or new order.

105 A machine according to claim 104 wherein, the order is displayed on a machine LCD display and concurrently sent for processing to a remote wide area network (WAN).

106 A machine according to claim 105 wherein the order is received by a remote computer.

107 A beverage machine for delivering hot beverages; the machine including; an inlet for receiving a supply of water; at least one boiler which receives water from said water supply and which is/are capable of delivering hot water and /or steam;

a mixing station which receives hot water and a predetermined dose of a beverage such as coffee for mixing with said hot water and subsequent delivery of said beverage from said machine; a cooling chamber which receives part said water supply and which delivers hot water at a predetermined maximum temperature to said mixing station via an outlet the cooling chamber including at least one inlet and at least one outlet wherein said cooling chamber receives cold water from said water supply and wherein said cooling chamber receives hot water from said boiler for delivery to said mixing station, wherein the machine further comprises;

a system for monitoring and/or changing usage of ingredients and maintenance of the machine via a wide area network wherein data relating to said usage and maintenance is transmitted to a data base thereby allowing comparison between usage and performance parameters relative to data stored in said data base.

108 A system for remote monitoring of a beverage machine for delivering ingredients; the system comprising ;

'first monitoring' means for monitoring performance of machine hardware and, 'second monitoring' means for determining consumption of ingredients in the machine;

the 'first monitoring' means comprising at least one sensor for monitoring at least one motor, means for communication between the sensor and a wide area network

a data base in communication with said wide area network and for comparing performance values determined by said sensor of said at least one motor with predetermined normal performance values for each said at least one motor contained in said data base;

the 'second monitoring' means comprising; a local station and a remote station, a wide area network in communication with each said local and remote stations, a

remote processing order system and an account verification system which processes product orders.

109 A beverage dispensing machine according to claim 108 wherein, the control means includes;

machine intelligence enabling an operator to monitor machine activity and/or operation parameters such as beverage usage,

a remote controller for monitoring machine hardware and ingredient usage, and

a user interface.

110 A beverage dispensing machine according to claim 109 wherein the machine intelligence is located within or remote from the machine and allows commissioning and programming of the machine to enable monitoring and/or control of machine activity.

111 A beverage dispensing machine according to claim 110 wherein the controller includes central intelligence comprising process control means and information processing means.

112 A beverage dispensing machine according to claim 111 wherein the user interface preferably includes a user liquid crystal display interface and a circuit board wherein the LCD relays information to a user regarding machine performance.

113 A beverage dispensing machine according to claim 112 wherein the machine intelligence collects data and relays the data to a data storage which is located within the body of the machine or at a location remote from the machine.

114 A beverage dispensing machine according to claim 113 wherein machine intelligence located remote from the machine, is down loaded to or uploaded from the remote location, thereby enabling a comparison of stored data with performance data.

115 A beverage dispensing machine according to claim **114** wherein machine intelligence for the beverage machine includes a central controller, at least one user liquid crystal display interface, a circuit board, a user interface, wherein said controller includes central intelligence comprising a process control computer and information processing means.

116 A control, monitoring and management system for use in the management and control of a beverage dispensing machine;

the control and management system comprising; a main controller and a user interface, wherein the main controller includes a link to said user interface; the main controller further including central intelligence comprising information processing and control sections; enabling the operation and performance of the dispensing machine to be monitored and controlled locally or remotely.

FIGURE 1

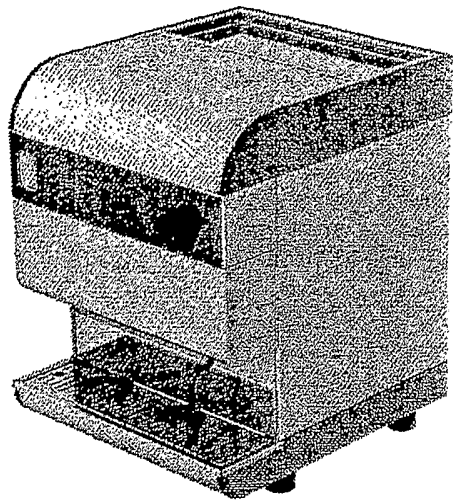


FIGURE 2

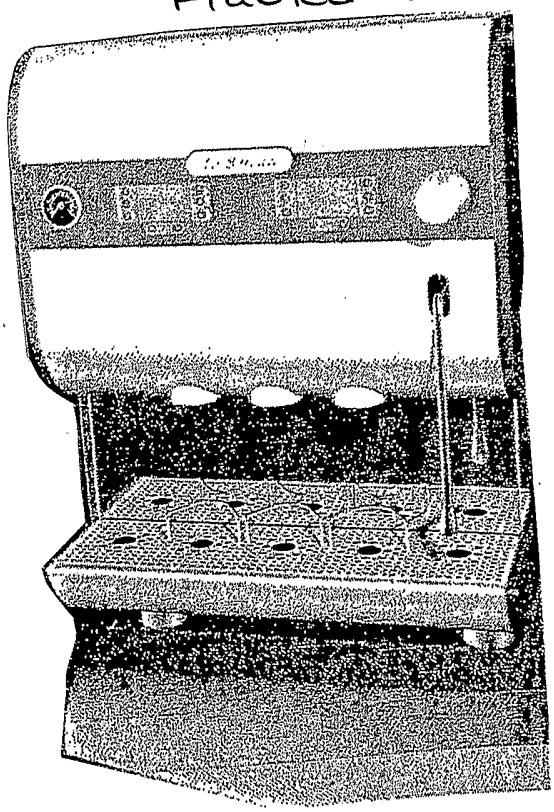
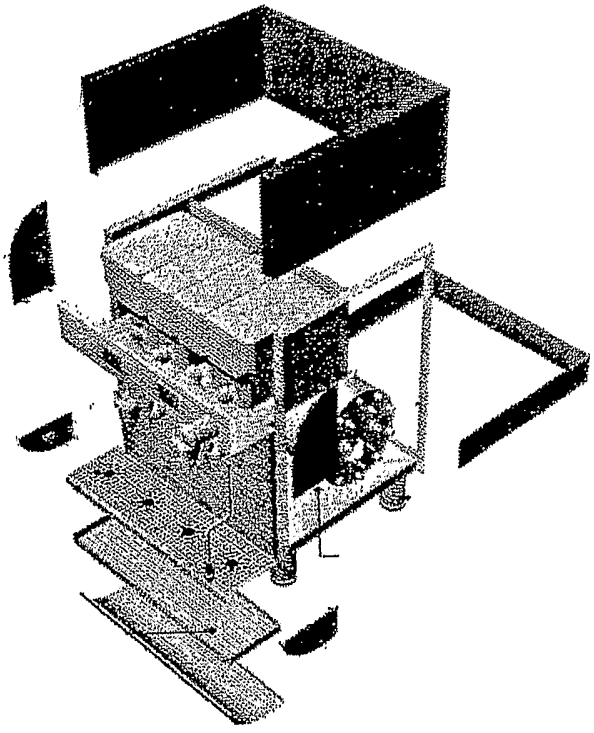
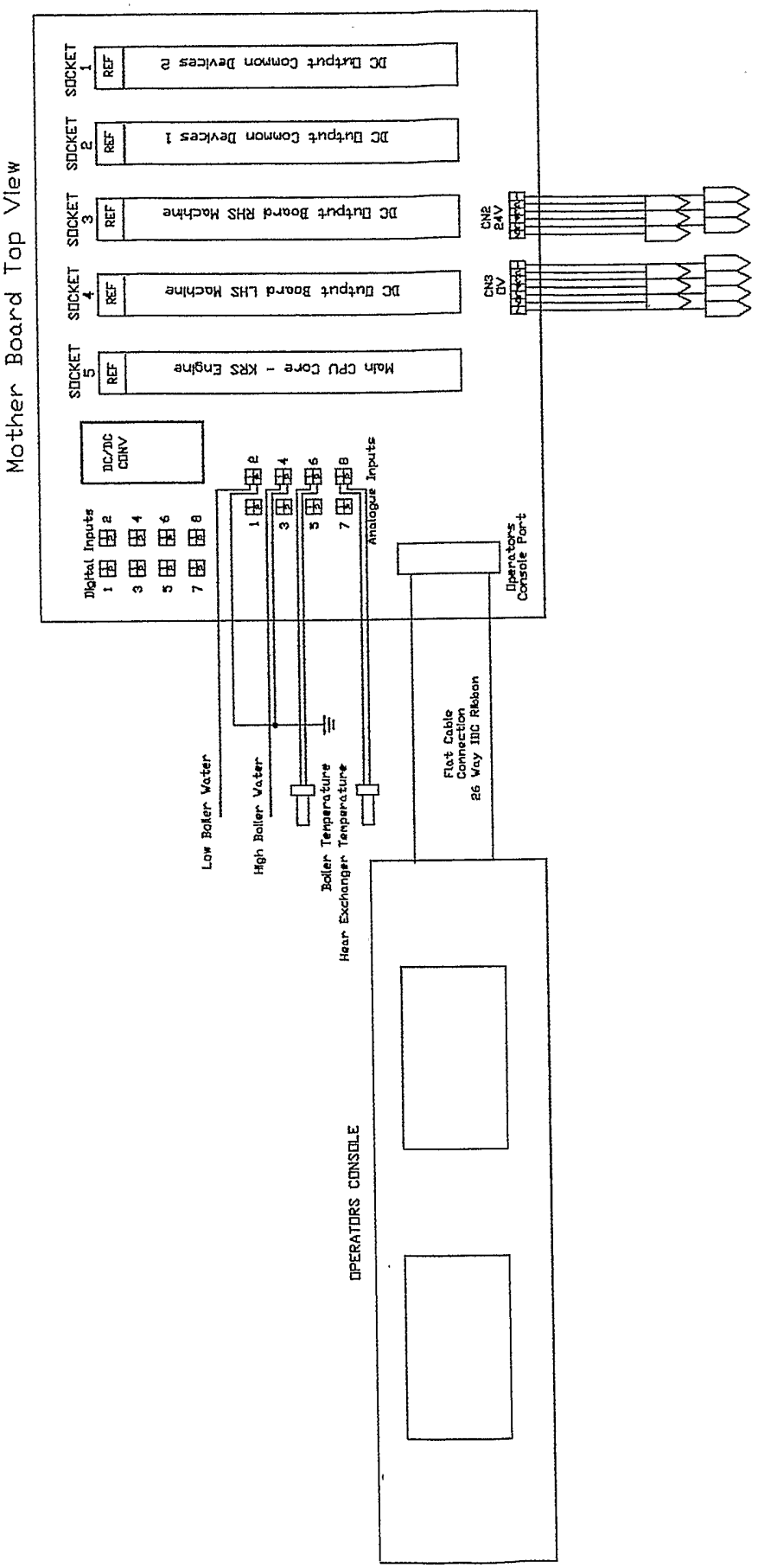


FIGURE 3




Mother Board Top View
SOCKET 1
REF
DC Output Common Devices 2
SOCKET 2
REF
DC Output Common Devices 1
SOCKET 3
REF
DC Output Board RHS Machine
SOCKET 4
REF
DC Output Board LHS Machine
SOCKET 5
REF
Main CPU Core - KRS Engine
DC/DC CONV
Digital Inputs
1 2
3 4
5 6
7 8
Analogue Inputs
1 2
3 4
5 6
7 8
CN2 24V
CN3 0V
Operators Console Port
Low Boiler Water
High Boiler Water
Boiler Temperature
Heat Exchanger Temperature
Flat Cable Connection 26 Way IDC Ribbon
OPERATORS CONSOLE

Figures 4

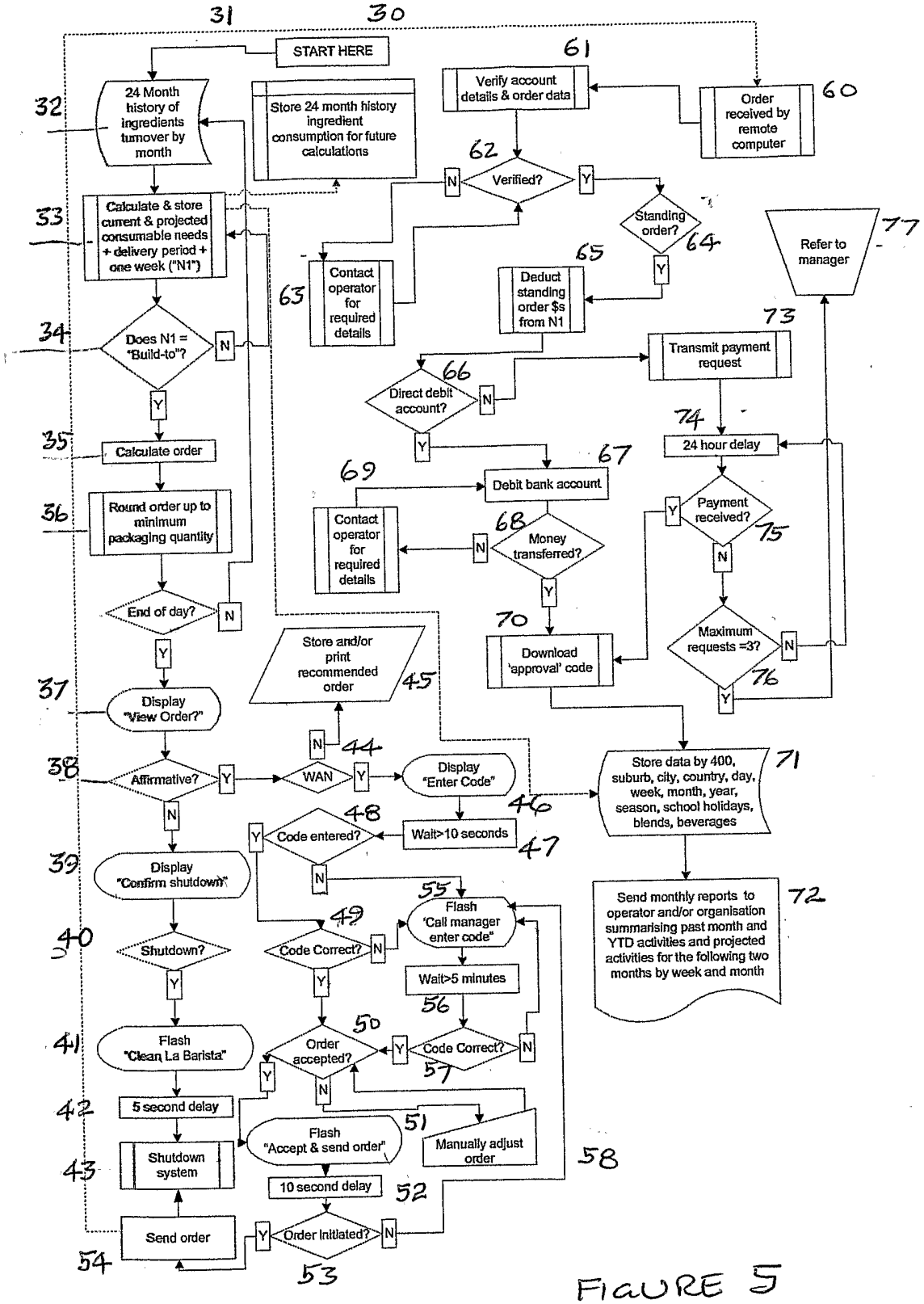

START HERE
24 Month history of ingredients turnover by month
Store 24 month history ingredient consumption for future calculations
Verify account details & order data
Order received by remote computer
Verified?
Standing order?
Refer to manager
Calculate & store current & projected consumable needs + delivery period + one week ("N1")
Contact operator for required details
Deduct standing order $s from N1
Transmit payment request
Does N1 = "Build-to"?
Direct debit account?
24 hour delay
Calculate order
Debit bank account
Payment received?
Round order up to minimum packaging quantity
Contact operator for required details
Money transferred?
End of day?
Maximum requests =3?
Store and/or print recommended order
Download 'approval' code
Display "View Order?"
Affirmative?
WAN
Display "Enter Code"
Store data by 400, suburb, city, country, day, week, month, year, season, school holidays, blends, beverages
Code entered?
Wait>10 seconds
Display "Confirm shutdown"
Flash 'Call manager enter code"
Shutdown?
Code Correct?
Wait>5 minutes
Send monthly reports to operator and/or organisation summarising past month and YTD activities and projected activities for the following two months by week and month
Flash "Clean La Barista"
Order accepted?
Code Correct?
5 second delay
Flash "Accept & send order"
Manually adjust order
Shutdown system
10 second delay
Send order
Order initiated?
Y
N

FIGURE 5

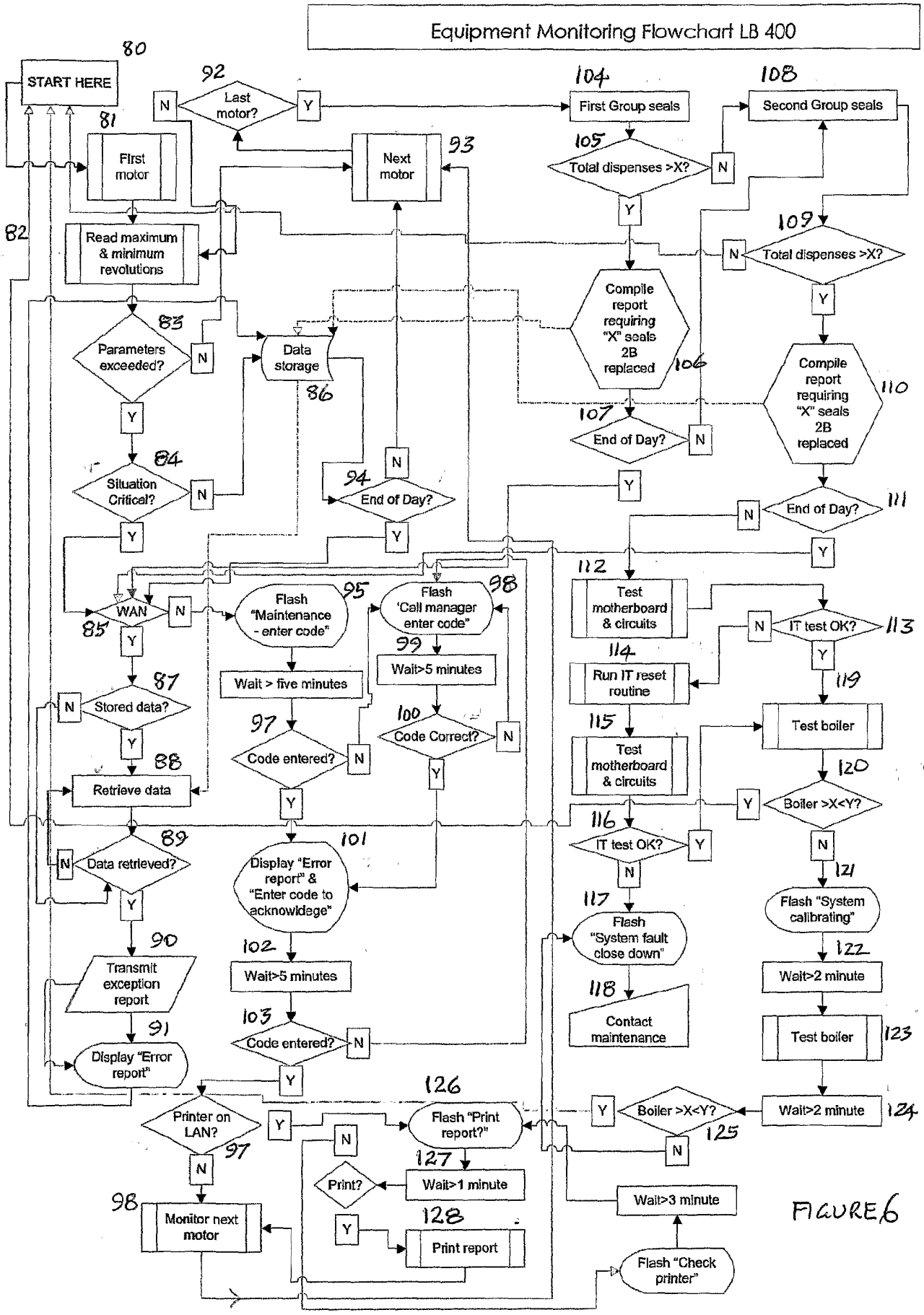

Equipment Monitoring Flowchart LB 400
START HERE
80
Last motor?
92
First motor
81
Next motor
93
Read maximum & minimum revolutions
82
Parameters exceeded?
83
Data storage
86
Situation Critical?
84
End of Day?
94
WAN
85
Flash "Maintenance - enter code"
95
Flash 'Call manager enter code"
98
Wait > five minutes
Wait>5 minutes
99
Stored data?
87
Code entered?
97
Code Correct?
100
Retrieve data
88
Data retrieved?
89
Display "Error report" & "Enter code to acknowledge"
101
Transmit exception report
90
Wait>5 minutes
102
Display "Error report"
91
Code entered?
103
Printer on LAN?
97
Flash "Print report?"
126
Print?
127
Wait>1 minute
Monitor next motor
98
Print report
128
First Group seals
104
Total dispenses >X?
105
Compile report requiring "X" seals 2B replaced
106
End of Day?
107
Second Group seals
108
Total dispenses >X?
109
Compile report requiring "X" seals 2B replaced
110
End of Day?
111
Test motherboard & circuits
112
IT test OK?
113
Run IT reset routine
114
Test motherboard & circuits
115
IT test OK?
116
Flash "System fault close down"
117
Contact maintenance
118
Test boiler
119
Boiler >X<Y?
120
Flash "System calibrating"
121
Wait>2 minute
122
Test boiler
123
Wait>2 minute
124
Boiler >X<Y?
125
Wait>3 minute
Flash "Check printer"

FIGURE 6

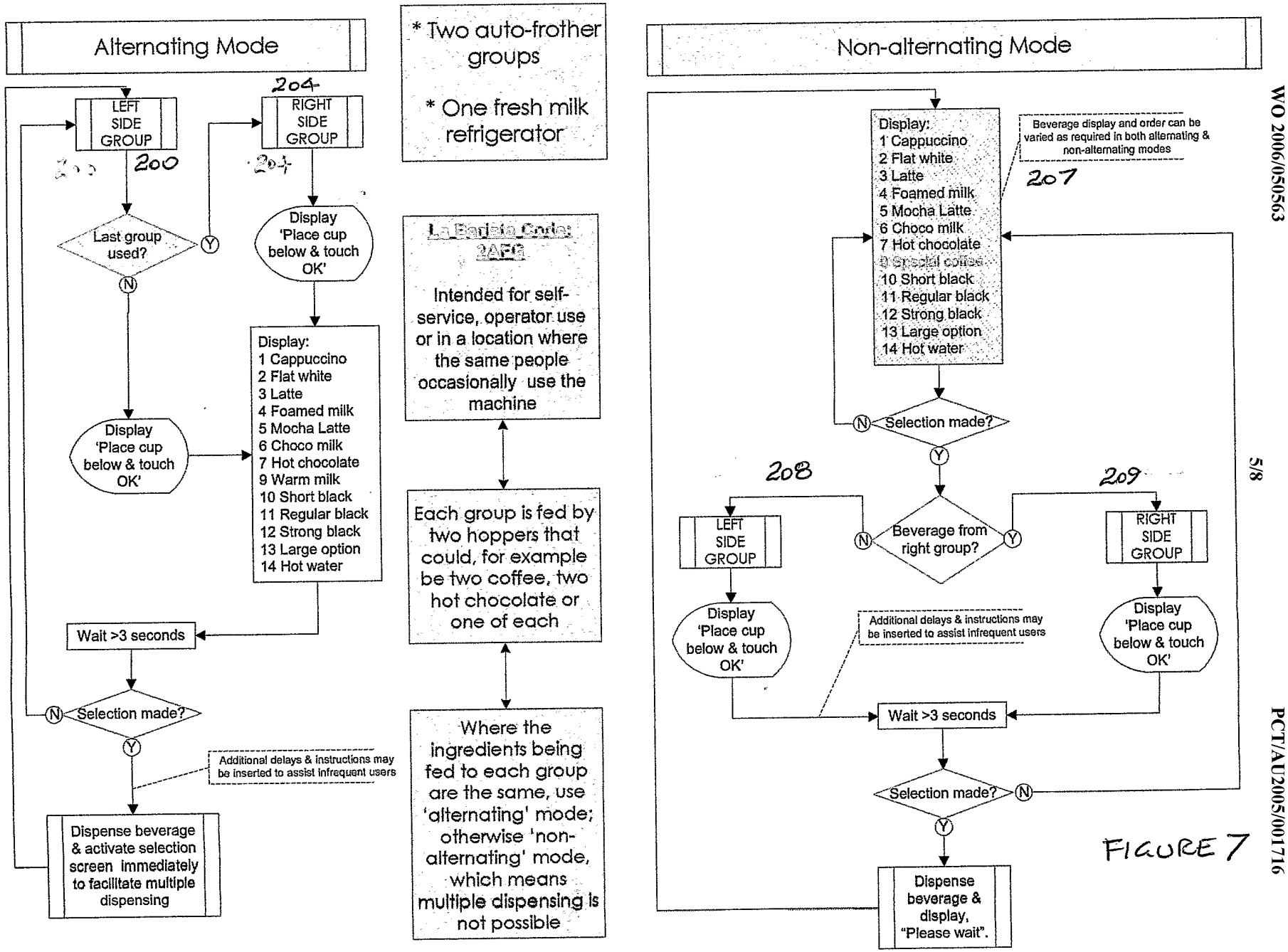

Alternating Mode
LEFT SIDE GROUP
200
RIGHT SIDE GROUP
204
Last group used?
Y
N
Display 'Place cup below & touch OK'
Display:
1 Cappuccino
2 Flat white
3 Latte
4 Foamed milk
5 Mocha Latte
6 Choco milk
7 Hot chocolate
9 Warm milk
10 Short black
11 Regular black
12 Strong black
13 Large option
14 Hot water
Wait >3 seconds
Selection made?
Additional delays & instructions may be inserted to assist infrequent users
Dispense beverage & activate selection screen immediately to facilitate multiple dispensing
* Two auto-frother groups
* One fresh milk refrigerator
La Barista Code: 2AF9
Intended for self-service, operator use or in a location where the same people occasionally use the machine
Each group is fed by two hoppers that could, for example be two coffee, two hot chocolate or one of each
Where the ingredients being fed to each group are the same, use 'alternating' mode; otherwise 'non-alternating' mode, which means multiple dispensing is not possible
Non-alternating Mode
Display:
1 Cappuccino
2 Flat white
3 Latte
4 Foamed milk
5 Mocha Latte
6 Choco milk
7 Hot chocolate
10 Short black
11 Regular black
12 Strong black
13 Large option
14 Hot water
Beverage display and order can be varied as required in both alternating & non-alternating modes
207
Selection made?
208
209
LEFT SIDE GROUP
Beverage from right group?
RIGHT SIDE GROUP
Display 'Place cup below & touch OK'
Additional delays & instructions may be inserted to assist infrequent users
Wait >3 seconds
Selection made?
Dispense beverage & display, "Please wait".

FIGURE 7

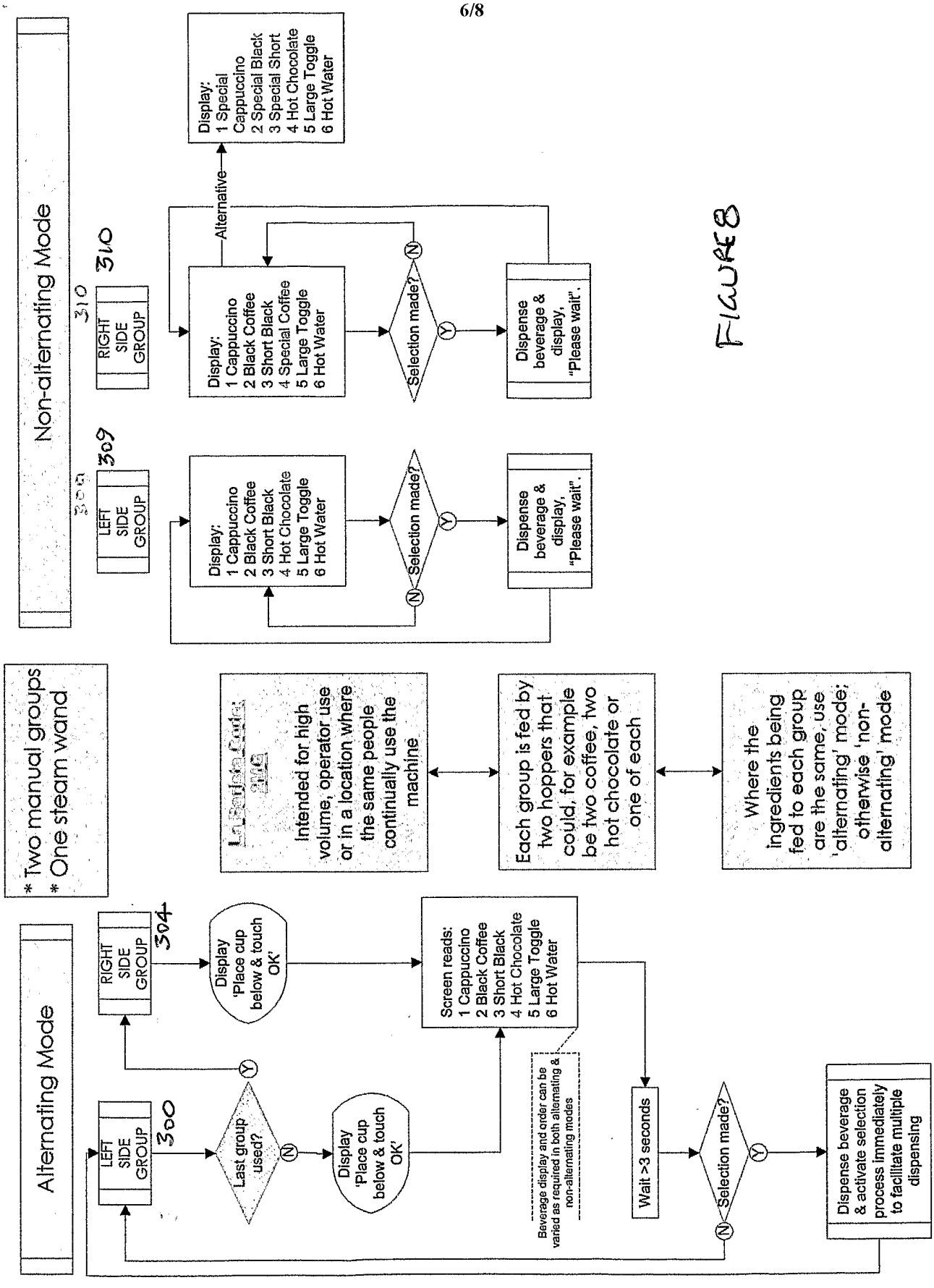

Alternating Mode
LEFT SIDE GROUP
300
Last group used?
Y
N
RIGHT SIDE GROUP
304
Display 'Place cup below & touch OK'
Display 'Place cup below & touch OK'
Screen reads:
1 Cappuccino
2 Black Coffee
3 Short Black
4 Hot Chocolate
5 Large Toggle
6 Hot Water
Beverage display and order can be varied as required in both alternating & non-alternating modes
Wait >3 seconds
Selection made?
Dispense beverage & activate selection process immediately to facilitate multiple dispensing
* Two manual groups
* One steam wand
Intended for high volume, operator use or in a location where the same people continually use the machine
Each group is fed by two hoppers that could, for example be two coffee, two hot chocolate or one of each
Where the ingredients being fed to each group are the same, use 'alternating' mode; otherwise 'non-alternating' mode
Non-alternating Mode
LEFT SIDE GROUP
309
Display:
1 Cappuccino
2 Black Coffee
3 Short Black
4 Hot Chocolate
5 Large Toggle
6 Hot Water
Selection made?
Dispense beverage & display, "Please wait".
RIGHT SIDE GROUP
310
Display:
1 Cappuccino
2 Black Coffee
3 Short Black
4 Special Coffee
5 Large Toggle
6 Hot Water
Selection made?
Dispense beverage & display, "Please wait".
Alternative
Display:
1 Special Cappuccino
2 Special Black
3 Special Short
4 Hot Chocolate
5 Large Toggle
6 Hot Water

FIGURE 8

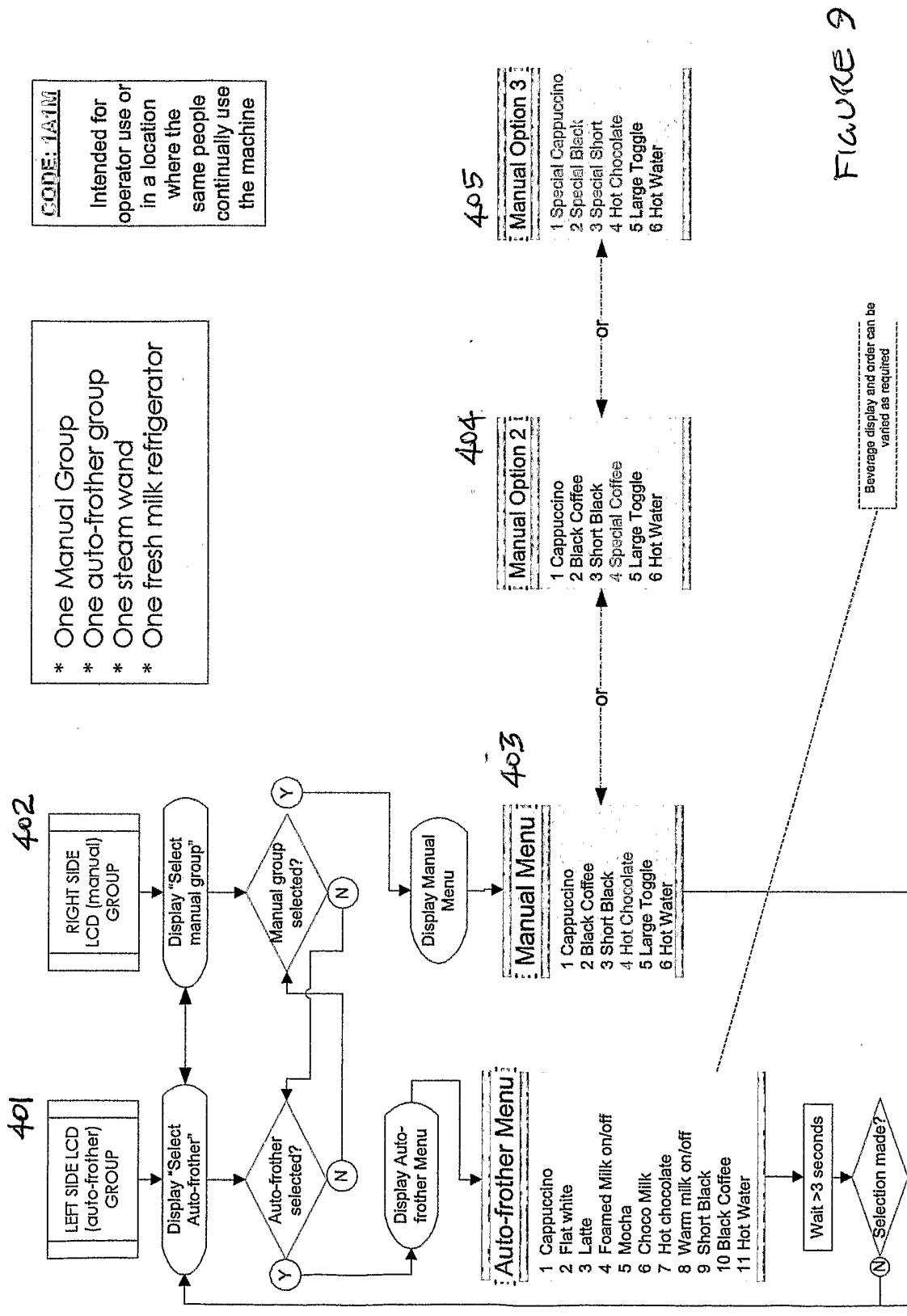

CODE: IAIN
Intended for operator use or in a location where the same people continually use the machine
* One Manual Group
* One auto-frother group
* One steam wand
* One fresh milk refrigerator
401
LEFT SIDE LCD (auto-frother) GROUP
Display "Select Auto-frother"
Auto-frother selected?
Y
N
Display Auto-frother Menu
Auto-frother Menu
1 Cappuccino
2 Flat white
3 Latte
4 Foamed Milk on/off
5 Mocha
6 Choco Milk
7 Hot chocolate
8 Warm milk on/off
9 Short Black
10 Black Coffee
11 Hot Water
402
RIGHT SIDE LCD (manual) GROUP
Display "Select manual group"
Manual group selected?
Y
N
Display Manual Menu
403
Manual Menu
1 Cappuccino
2 Black Coffee
3 Short Black
4 Hot Chocolate
5 Large Toggle
6 Hot Water
or
404
Manual Option 2
1 Cappuccino
2 Black Coffee
3 Short Black
4 Special Coffee
5 Large Toggle
6 Hot Water
or
405
Manual Option 3
1 Special Cappuccino
2 Special Black
3 Special Short
4 Hot Chocolate
5 Large Toggle
6 Hot Water
Beverage display and order can be varied as required
Wait >3 seconds
Selection made?
N
Y
Dispense beverage &

FIGURE 9

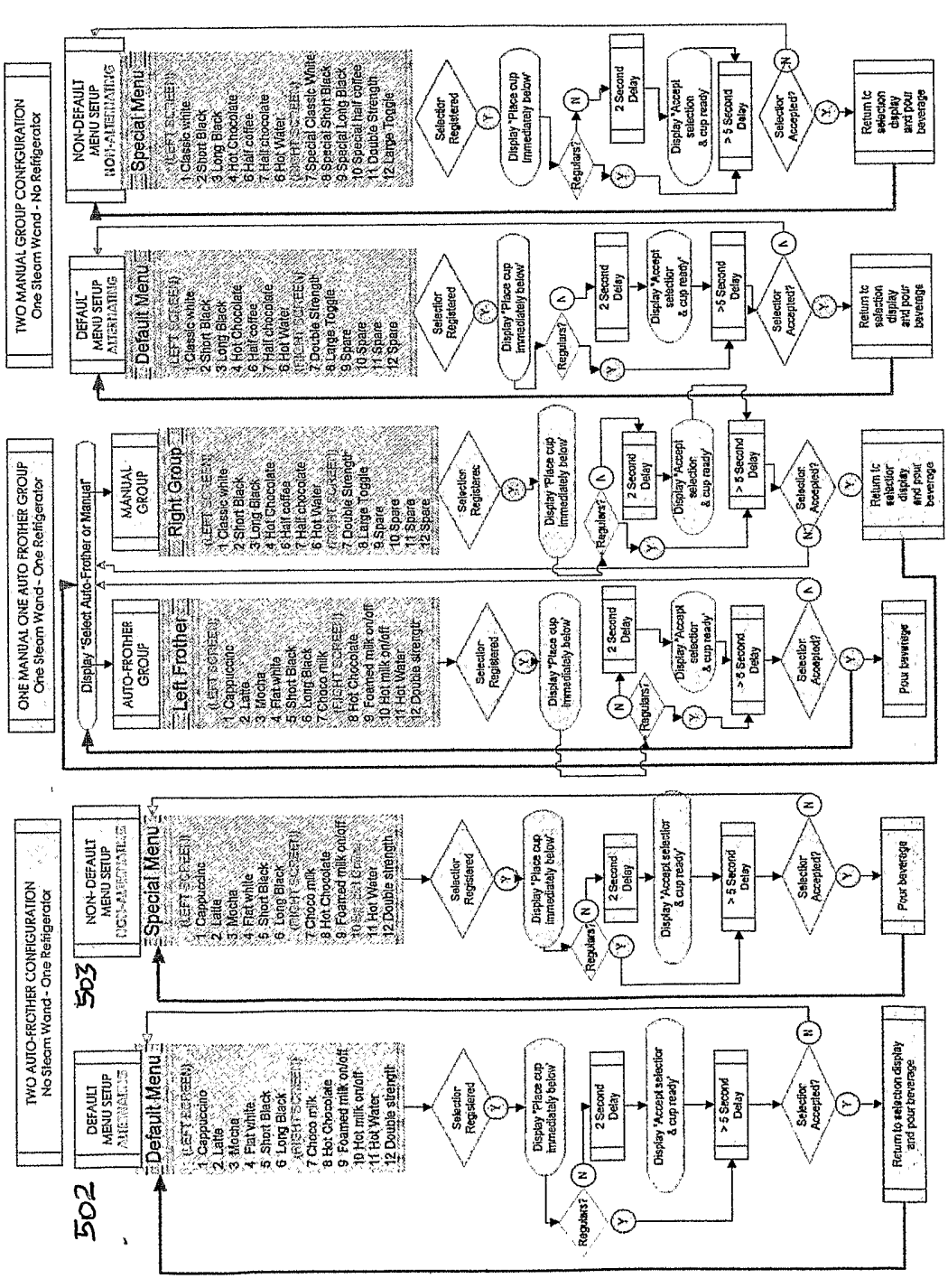

500
TWO AUTO-FROTHER CONFIGURATION
No Steam Wand - One Refrigerator
502
DEFAULT MENU SETUP
Default Menu
503
NON- DEFAULT MENU SETUP
Special Menu
504
ONE MANUAL ONE AUTO FROTHER GROUP
One Steam Wand - One Refrigerator
Display "Select Auto-Frother or Manual"
AUTO-FROTHER GROUP
Left Frother
MANUAL GROUP
Right Group
505
TWO MANUAL GROUP CONFIGURATION
One Steam Wand - No Refrigerator
DEFAULT MENU SETUP
Default Menu
NON-DEFAULT MENU SETUP
Special Menu
Selection Registered
Display "Place cup immediately below"
Regulars?
2 Second Delay
Display "Accept selection & cup ready"
> 5 Second Delay
Selection Accepted?
Pour beverage
Return to selection display and pour beverage

FIGURE 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/001716

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

A47J 31/44 (2006.01) *G05B 19/048* (2006.01) *G07C 11/00* (2006.01)
A47J 31/40 (2006.01) *G07C 7/00* (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC: *A47J 31/44* (2006.01) *G05B 19/048* (2006.01) *G07C 11/00* (2006.01) *A47J 31/40* (2006.01) *G07C 7/00* (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU IPC: *A47J 31/44* (2006.01) *G05B 19/048* (2006.01) *G07C 11/00* (2006.01) *A47J 31/40* (2006.01) *G07C 7/00* (2006.01)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DWPI: IPC *A47J 31/44* (2006.01) *G05B 19/048* (2006.01) *G07C 11/00* (2006.01) *A47J 31/40* (2006.01) *G07C 7/00* (2006.01) AND (MONITOR+ OR CHECK+ OR REMOTE+ OR TRANSMIT+ OR NETWORK+ OR OFFSITE+) AND (BEVERAGE+ OR DRINK+ OR COFFEE OR TEA OR CHOCOLATE).

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003 0016141 A (SUDOLCAN) 23 January 2003. See entire document.	
A	US 2005 0080510 A (BATES ET AL) 14 April 2005. See entire document.	
A	US 2002 0035404 A (FICCO ET AL.) 21 March 2002. See entire document.	

[X] Further documents are listed in the continuation of Box C [X] See patent family annex

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search
08 February 2006

Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/001716

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1039358 A (STEFANO ET AL.) 27 September 2000. See entire document.	
X	WO 2002 023735 A (BUNN-O-MATIC CORPORATION) 21 March 2002. See entire document.	1 to 6,26,68, 99,100,107 to 111,116.
X	EP 1302138 A (JURA ELEKTROPPARATE AG) 16 April 2003. See entire document.	1 to 6,26,68, 99,100,107 to 111,116.
A	US 2001 0054083 A (DEFOSSE) 20 December 2001. See entire document.	
A	US 2002 0130136 A (SEGAL) 19 September 2002. See entire document.	
A	US 2003 0079613 A (WILLIAMSON) 1 May 2003 See entire document.	
X	WO 2002 045559 A (BARISTA HOLDING PTY LTD) 13 June 2002. See entire document (especially page 8).	1 to 116.
X	WO 2002 012112 A (ISOCHRON DATA CORPORATION) 14 February 2002. See entire document.	1 to 6,26,68, 99,100,107 to 111,116.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU2005/001716

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	2003016141	US	6788218	WO	03009250		
US	2005080510	US	2002165788				
US	2002035404	US	6868292				
EP	1039358	IT	MI990382				
WO	0223735	AU	90703/01	CA	2422277	US	2004015305
		US	2005182599				
EP	1302138	US	2003070555				
US	2001054083	AU	31925/99	AU	81397/01	AU	96695/01
		AU	2003295946	BR	9908908	CA	2324563
		EP	1062644	MX	PA00009200	US	6457038
		US	2002016829	US	2002194387	US	2004133653
		WO	0212112	WO	0229752	WO	9948065
		WO	2004051583				
US	2002130136	NIL					
US	2003079613	BR	0213744	CA	2465347	EP	1450654
		WO	03037150	ZA	200403302		
WO	0245559	AU	21322/02				
WO	0212112	AU	31925/99	AU	81397/01	AU	96695/01
		AU	2003295946	BR	9908908	CA	2324563
		EP	1062644	MX	PA00009200	US	6457038
		US	2001054083	US	2002016829	US	2002194387
		US	2004133653	WO	0229752	WO	9948065
		WO	2004051583				

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX