

465 FD SERVICE MANUAL



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SERVICE MANUAL

RMi 465 FD

FOREWORD

The RMi 465 Freeze Dry Coffee Dispenser was developed to meet a growing need for an intermediate simple operating and easily maintained freeze dry coffee dispensing

The unit is completely self contained and has a capacity of 465 - 7 oz. cups. It will also dispense hot chocolate, tea or Sanka and soup in addition to freeze dry coffee. The specifications and operating functions are listed on the following pages.

SPECIFICATIONS

Dimensions - 64" High (including 6-inch legs)
 25 $\frac{1}{4}$ " Deep
 26" Wide

Weight - 225 lbs.

<u>Capacity</u>		<u>No. of Drinks</u>
Cups - 7 oz.	- 465	
Freeze Dry Coffec	- 2.0 lbs.	600 @ 1.5 gms.
Creme	- 3.3 lbs.	743 @ 2 gms.
Sugar	- 5.5 lbs.	413 @ 6 gms.
Chocolate	- 8.0 lbs.	90 @ 25 gms.
Soup	- 5.5 lbs.	413 @ 6 gms.
Tea	- 3.0 lbs.	756 @ 1.8 gms.

Electrical Requirements

120 volts AC, 60 HZ, 15 AMPS.

THE COIN SYSTEM

The RMI 465 FD is designed to accept all single price coin acceptor mechanisms (110 volts) presently in use on cup drink vending equipment.

The coin insert bezel has been placed high for the user's convenience. The coin return plunger is located in a manner to prevent physical abuse without restricting its intended use. The internal linkage between the return plunger and the acceptor is rugged and direct. Coin guides inside the door are easily removed if necessary for cleaning. The coin box is located under the coin changer and may be secured with a padlock.

In the event that multiple pricing is required, a kit is available to use in conjunction with a MULTI-PRICED CHANGER.

ELECTRICAL SEQUENCE OF OPERATION

When a coin is inserted or the free play switch (located in the electrical box) is depressed, the coin relay (K-1) is energized and passes a pulse to the push button selector switch which will be illuminated at this point. When the button is depressed, the pulse is transferred to the following three components:

1. Cup drop motor which is located under the cup mechanism.
2. Cup drop relay coil which is also located under the cup mechanism.
3. Program timer motor located in the electrical box.

The functions of these three components are as follows:

1. The cup drop motor cycles the cup dispenser drop and dispenses one cup. The cup drop motor is controlled by a cycle switch which is adjacent to the motor.
2. The cup drop relay (K-2) is the holding circuit to the cup drop motor during the sequence of the cup drop motor cycle switch change over. It functions through contacts 1-7 of coin relay and contacting 4-7 of coin relay.
3. The program timer motor turns all the cams on the cam shaft and is controlled by the cut-off switch (1). The cut-off switch also supplies power to the rotary selector switch during the entire cycle of the program timer motor.

ROTARY SELECTOR SWITCH FUNCTION

The switch used in the RM1 465 FD is a Stackpole Rotary Selector Switch which allows the following selections: Coffee - 4 ways; Chocolate; Tea - 4 ways; and Soup.

The rotary selector switch is operated by a large, easy-to-turn dial, which has a clearly defined indexing marked to assure proper selection.

As the program timer turns, power is fed from the cut-off switch of the program timer to the rotary selector switch. Depending on the beverage selected, the power will be transferred through the rotary selector switch to the corresponding product cam switches of the program timer. These switches will in turn transfer the power to their respective valves and ingredient motors.

PROGRAM TIMER

The program timer is the heart of the operation of the RMI 465 FD. This timer is located within the electrical box. It has 13 cam sets on a single shaft driven by a synchronous motor.

When a coin is inserted and you push the lighted button, a pulse is sent to the program timer motor to start its operation. As the shaft turns, all cam sets turn and operate their respective switches.

Cam sets consist of a Black and a White plastic cam.

The Black half of a set will operate its switch at the proper time in the cycle to begin the action for which it is responsible. This cam is factory set and normally never need be adjusted. The Black cam controls "WHEN" products or liquid is released. This timing is important from the viewpoint of getting dry products in a running stream of liquid, or getting the liquid running toward the cup in the shortest possible time after a selection has been activated.

The White cam controls the total time of release of any specific ingredient during a cycle. Since the delivery rate of either dry products or liquids is constant from start to finish, the amount is determined by how long the delivery is made. The White cam controls "HOW MUCH" by

regulating the duration of the delivery.

All product switches (Coffee, Creme, Sugar, Tea, Chocolate and Soup) are closed when the switch goes in the valley of the cam. All water switches are closed when the switch arm rides on the high side of the cam. The cam switch assemblies have the following functions starting from the motor end (left to right):

1. Cut-Off - This has a three-fold function:
 - a. It completes the circuit for the push button selector (lighted switch) when the switch arm is in the valley of the cam.
 - b. It allows the program timer motor to complete one full cycle when the switch is on the high side of the cam.
 - c. It also provides power to the rotary selector switch when the switch arm is on the high side of the cam.
2. Relay Lock - This switch has a dual function. When in the valley of the cam it is the holding circuit to both the coin relay and the cup dispenser relay. It also keeps the coin return electro-magnet of the coin changer energized when in the valley of the cam. (CAUTION SHOULD BE TAKEN WHEN ADJUSTING THIS CAM). The White cam should be adjusted so that the switch arm is depressed just after the switch arm of the Cut-Off switch is depressed. IF IT IS OPENED TOO FAR IT CAN CAUSE THE CUP DISPENSER TO DISPENSE TWO CUPS IN SUCCESSION. IF IT IS CLOSED TOO MUCH IT WILL NOT ALLOW THE PROGRAM TIMER MOTOR TO MAKE A COMPLETE CYCLE.
3. Creme - This switch controls the amount of coffee creme dispensed when the switch arm is in the valley of the cam. The amount of creme can be decreased by turning the White cam downward and increased by turning the White cam upward . Downward decreases

- the valley and upward increases the valley of the cam.
4. Extra Creme - This switch has a dual function. When coffee is selected and the extra creme button is depressed, additional creme will be dispensed. The amount is determined by allowing the extra creme switch arm to remain longer in the valley than the switch arm of the creme switch (3). Make sure that the extra creme White cam is higher than the creme White cam. When tea is selected, the amount of creme for tea will be determined by the length of the valley from the Black cam to the White cam. If more tea creme is required, increase the valley of the cams by turning the BLACK CAM downward.
 5. Sugar - This switch controls the amount of coffee sugar dispensed when the switch arm is on the valley of the cam. The amount of sugar can be decreased by turning the WHITE CAM downwards and can be increased by turning the WHITE CAM upwards. Remember - downward decreases the valley and upwards increases the valley of the cam.
 6. Extra Sugar - This switch has a dual function the same as the extra creme switch. When coffee is selected and the extra sugar button is depressed, additional sugar will be dispensed. The amount is determined by allowing the extra creme switch arm to remain longer in the valley than the switch arm of the sugar switch (5). Make sure that the extra sugar White cam is higher than the sugar White cam. The amount of sugar for tea will be determined by the length of the valley from the Black cam to the White cam. If more tea sugar is required, increase the valley of the cams by turning the BLACK CAM downward.

7. Chocolate - This switch determines the amount of chocolate dispensed. Chocolate can be increased by turning White cam upward and decreased by turning White cam downward. It is controlled by the valley of the cams.
8. Chocolate Water and Whipper - The amount of liquid dispensed is controlled by the high side of the cam. To increase the amount of water dispensed, turn the White cam UPWARD . To decrease the amount of water, turn the White cam DOWNWARD . SPECIAL NOTICE TO ALL UNITS BELOW SERIAL NO. 105 . On all these units the amount of water is governed by the BLACK CAM. To increase turn the BLACK CAM upward, to decrease turn the BLACK CAM downward.
9. Coffee - This switch determines the amount of freeze-dry coffee dispensed. The switch is controlled by the switch arm of the valley. To increase the amount of coffee, turn the White cam upward and to decrease the amount of coffee, turn the White cam downward.
10. Tea - This switch determines the amount of tea dispensed. The switch is controlled by the switch arm in the valley. To increase the amount of tea, turn the White cam upward and to decrease the amount of tea, turn the White cam downward.
11. Coffee and Tea Water - This switch determines the amount of liquid for both tea and coffee. The switch is controlled by the high side of the cams. To increase the amount of liquid, turn the White cam upward. To decrease, turn the White cam downward.

SPECIAL NOTICE: ALL UNITS BELOW SERIAL NO. 105 . ON ALL THESE UNITS, THE AMOUNT IS GOVERNED BY THE BLACK CAM.

TO INCREASE - TURN UPWARD. TO DECREASE - TURN DOWNWARD.

12. Soup - This switch determines the amount of soup dispensed. The switch is controlled by the switch arm in the valley. To increase the amount of soup, turn the White cam upward and to decrease the amount of soup, turn the White cam downward.
13. Soup Water - This switch determines the amount of soup water dispensed. The switch is controlled by the high side of the cam. To increase the amount of liquid, turn the White cam upward. To decrease the amount of liquid, turn the White cam downward.

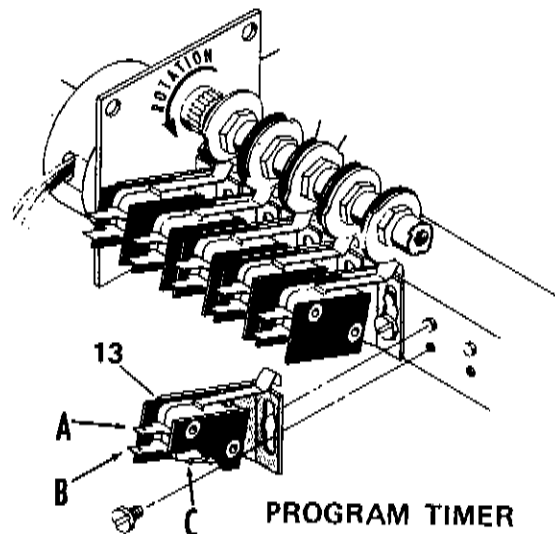
SPECIAL NOTICE: ALL UNITS BELOW SERIAL NO. 105. ON ALL THESE UNITS THE AMOUNT OF LIQUID IS CONTROLLED BY THE BLACK CAM. TO INCREASE THE AMOUNT, TURN THE BLACK CAM UPWARD. TO DECREASE THE AMOUNT, TURN THE BLACK CAM DOWNWARD.

IMPORTANT

1. DO NOT TOUCH THE BLACK CAM ON THE RELAY LOCK CAM SET.
2. On all product and relay lock cams, the valley is used. The Black cams on the product cam sets should not be changed unless it is necessary to allow the product to be dispensed later than pre-set in order to dispense the powdered product into the flow of the water so that the product is not dispensed into a dry trough.

HOW TO ADJUST THE CAMS OF THE PROGRAM TIMER

This program timer is adjusted with the two small cam wrenches shipped with the unit.



First of all, do not move the Black cam position unless you desire to change the starting point of a commodity release. The Black cams have all been carefully set to start the release of each beverage component at the correct time. Releasing dry ingredients into a dry trough and then adding water will not produce a quality beverage and will lead to gummy mixing chambers.

To change the volume or weight of the released product, proceed as follows:

1. Remove the electrical box cover.
2. Place one of the wrenches on the metal hex nut adjacent to the motor gear to prevent movement of the shaft.
3. Place the second wrench on the hex area of the White cam to be adjusted.
4. Move the White cam to effect the desired change.

To increase the liquid or product, move the White cam upward. To decrease the amount required, move the White cam downward.

THE CUP SYSTEM

Every beverage sold through the RMI 465 Freeze Dry requires a clean, disposable cup. Inside the machine is a storage area for a large number of cups, and device called a cup separator to dispense a single cup for each cycle of the machine. Included in the cup system is a "sold out" switch, which will light the sold out lamp when there are no cups available to dispense and will de-energize the Coin Return Electromagnet (C.R.E.M.). The C.R.E.M. will return the coins in the event of a failure.

THE CUP MAGAZINE

The storage system on the RMI 465 Freeze Dry is unique. Cups are stored in an inline flat magazine mounted on the inside surface of the cabinet door. This magazine is completely covered to protect the cups from accidental contamination. The entire magazine may be swung out, for easy access to the inside of the cabinet door, without having to remove the cups from their place. The base plate of the magazine holds the cup dispenser separator.

Cups are moved from the storage position to a position over the dispensing mechanism (often referred to as the "cup drop") as needed. When a stack of cups over the drop has been reduced to four or five cups, the spiral cup motor switch will be closed, which permits the spiral motor to run. The spirals turn simultaneously to advance the remaining stacks of cups on the base plate toward the cup drop opening.

When the stack nearest the drop opening is pushed to the right it will drop into the remaining cups found in the drop mechanism. The new cups will open the cup spiral motor switch and disconnect the spiral motor from its voltage source.

The spirals are so designed that a stack of standard vending cups will nestle between the turns. It is important that the spirals are properly oriented with each other so that the stacks of cups will advance in a vertical position. Figure 13 of this section illustrates the relationship between the three spirals. When the spirals are properly adjusted the return wire at the end of the spirals will point as shown. When the upper two (which should be adjusted to the same position) point to 12 o'clock the lower spiral should be advanced to a 2 o'clock position. This is done because the lower end of a cup stack is smaller in diameter than at the top rims, where the spiral touches it. The spirals are properly set before the 465 Freeze Dry leaves the factory and should not have to be adjusted before putting the machine into service. If they are not properly set, see the "Adjustment" heading of this section.

The synchronized movement of the three spirals is maintained by the toothed drive belts which connect the spiral sprockets together and to the spiral drive motor sprocket.

NOTE: NEVER ATTEMPT TO ADJUST THE SPIRAL POSITIONS BY "JUMPING" THE DRIVE BELTS ON THEIR GEARED PULLEYS.

ADJUSTMENTS

The cup magazine has two adjustments. These are made when it is desired to change the cup size from either 7 or 8-1/4 ounce cups to a 9 ounce cup. The reverse procedure of items 8 and 9 must be followed when changing from a 9 ounce cup to either the 7 ounce or 8-1/4 ounce cups.

CHANGING TO A 9 OUNCE CUP

1. Remove the cup magazine cover.
2. Remove the cups from the magazine.
3. Remove the two screws (Figure 12) on each of the upper bearing plates for the spirals which are found on the left hand side of the magazine, as you face it.

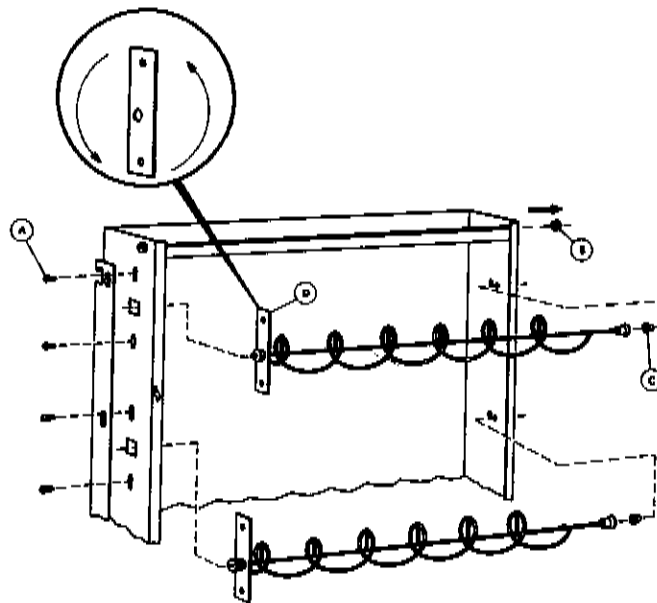


Figure 12 (Changing to a 9 ounce cup)

4. Remove the nut (B) from the right hand end of the magazine support angle.
5. Spring the right side of the magazine enough to free the end of the upper and center spiral shafts. Pull them out toward yourself.
6. Remove the belts from the upper and center pulleys and slip the pulley end of the spiral shafts out of the hole in the left hand side of the magazine.
7. Remove the nyliners (C) from the holes in which the spiral shafts had been and relocate them in the forward set of holes.

8. Rotate the bearing plate (D) so that the screw holes for mounting are lined up to the left of the shaft, as you view it from that end. This must be done for both the top and center spirals.
9. Re-install both the upper and center spiral assemblies. Leave the mounting screws on the bearing plates just loose enough so that the plates can still be hand adjusted.
10. Put the drive belts in place. Leave them loose; do not tighten them at this point.
11. Turn the bottom spiral until the wire on the right hand end points to 2 o'clock as previously described. (Figure 13).

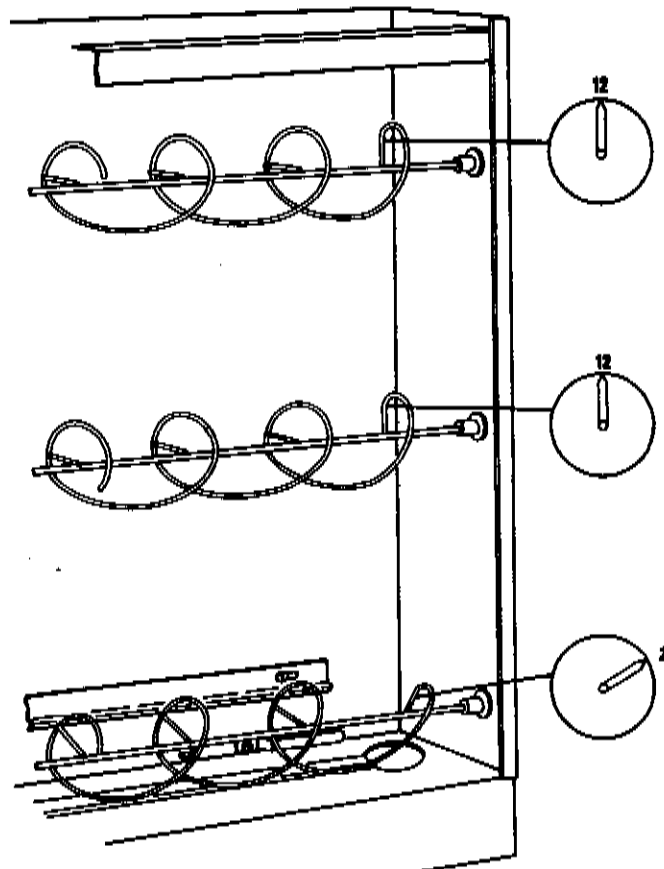


Figure 13 (Spiral adjustment)

12. Position the wire on the right hand end of the center spiral at 12 o'clock. (Figure 13)
13. Tighten the drive belt between the center and bottom spirals by pressing upward on the center spiral and tightening the mounting screws. Maintain the 12 o'clock and 2 o'clock relationship between the center and lower spirals when tightening the belt.
14. Position the wire of the right hand end of the top spiral at 12 o'clock.
15. Follow a similar belt tightening procedure for the top spiral as was performed on the center spiral. Be sure that the center and upper spirals both point in the direction of 12 o'clock while the bottom spiral points to 2 o'clock (refer to Figure 13).

THE LISERN CUP DROP SEPARATOR

If it is desired to change the cup size on a RMI 465 FD machine equipped with the Lisern mechanism, e.g., 7 or 8-1/4 oz. to 9 oz. the mechanism itself must be replaced with one made for the particular cup size.

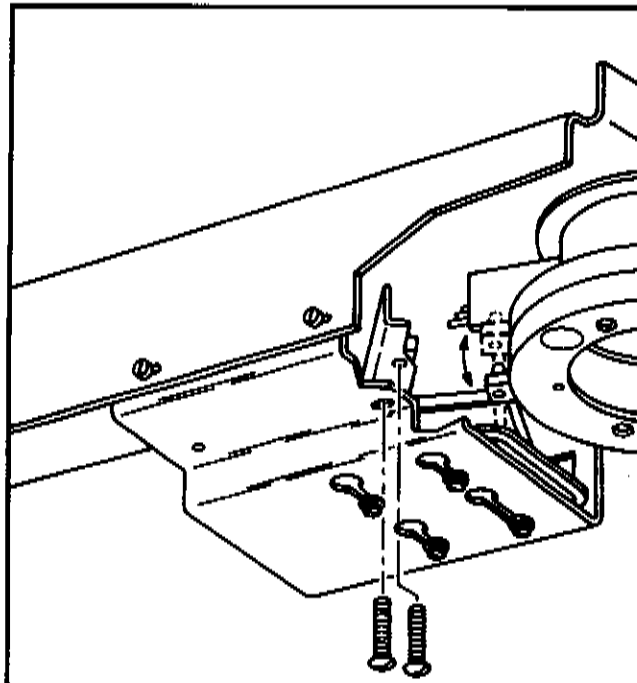


Figure 14 (Lisern mechanism)

ADJUSTING THE STOPPING POINT

Figure 14 is a representation of the switch assembly used with the Lisern mechanism. When this mechanism is at rest the actuator lever of the Lisern Separator is pulled back against the switch arm. When it is properly adjusted the actuator is approximately 1/32" to 1/16" from its limit of travel. If it is necessary to make an adjustment, slightly loosen the switch mounting screws and reposition the switch until the proper stopping point has been attained. Retighten the mounting screws after making the adjustment.

THE WATER SYSTEM

The water system in the RM1 465 FD unit is a dependable, open, anti-syphon gravity system. The temperature control will maintain the water temperature at approximately 170°. The anti-syphon feature assures that if the water pressure of the supply mains should drop, no water will back-syphon from the tank or piping. The letters used in this description will relate to Figure 15.

WATER INTAKE SYSTEM

There are two possible configurations in the intake system. The standard method is a direct connection to the combination safety overflow and water inlet valve (A). The optional method provides for a water filter (R) to be installed as a part of the original equipment. The filter housing includes a shut-off valve as an integral part.

FILLING THE HOT WATER TANK

When the unit has been connected to the water supply and power has been applied, water will enter the unit through the inlet valve (A) pass through the filter (R) and into the top of the hot water tank. Water will fill the tank to the level of the float (T) which is connected to the Water Inlet Switch (C) located on the lid of the hot water tank. When this switch has been raised by the float, the water inlet valve will be de-energized and stop the flow of

water to the hot water tank. Water will enter the tank after each drink has been dispensed, thus maintaining a constant head pressure for consistent beverages.

HEATING THE WATER IN THE HOT WATER TANK

After the initial filling of the tank and the float has allowed the switches to raise, power will be applied from the low water control switch (D) through the thermostat (P) to the heating element (Q). The indicator light will go on and will remain lit until the thermostat has been satisfied. All of these controls are located on the lid of the hot water tank. The thermostat (P) is a fixed non-adjustable thermostat and will maintain the tank temperature at approximately 170°. If hotter water is required, higher temperature thermostats can be obtained. The heating element is a 1500 watt heater and can be easily removed from the top of the tank if ever necessary.

LOW WATER CONTROL SWITCH

This switch is mounted to the right of the water inlet switch and its only function is to protect the heating element from burning out in the event that the heating element is connected when there is no water in the tank.

WATER OUTLET SYSTEM

Three valves comprise the water outlet system. They are: a valve for the coffee and tea water (F); the chocolate water outlet valve (G); and the soup water outlet valve (H). These three valves are all contained in the manifold housing (K). Each valve is controlled by its corresponding switch on the program timer and can be individually set to dispense the proper amount of water for the individual beverage.

Each valve has a vented elbow fitting at its outlet port. The vent is provided to assure that all the water released into the tubes is drained fully. Venting eliminated "after drip" from these tubes.

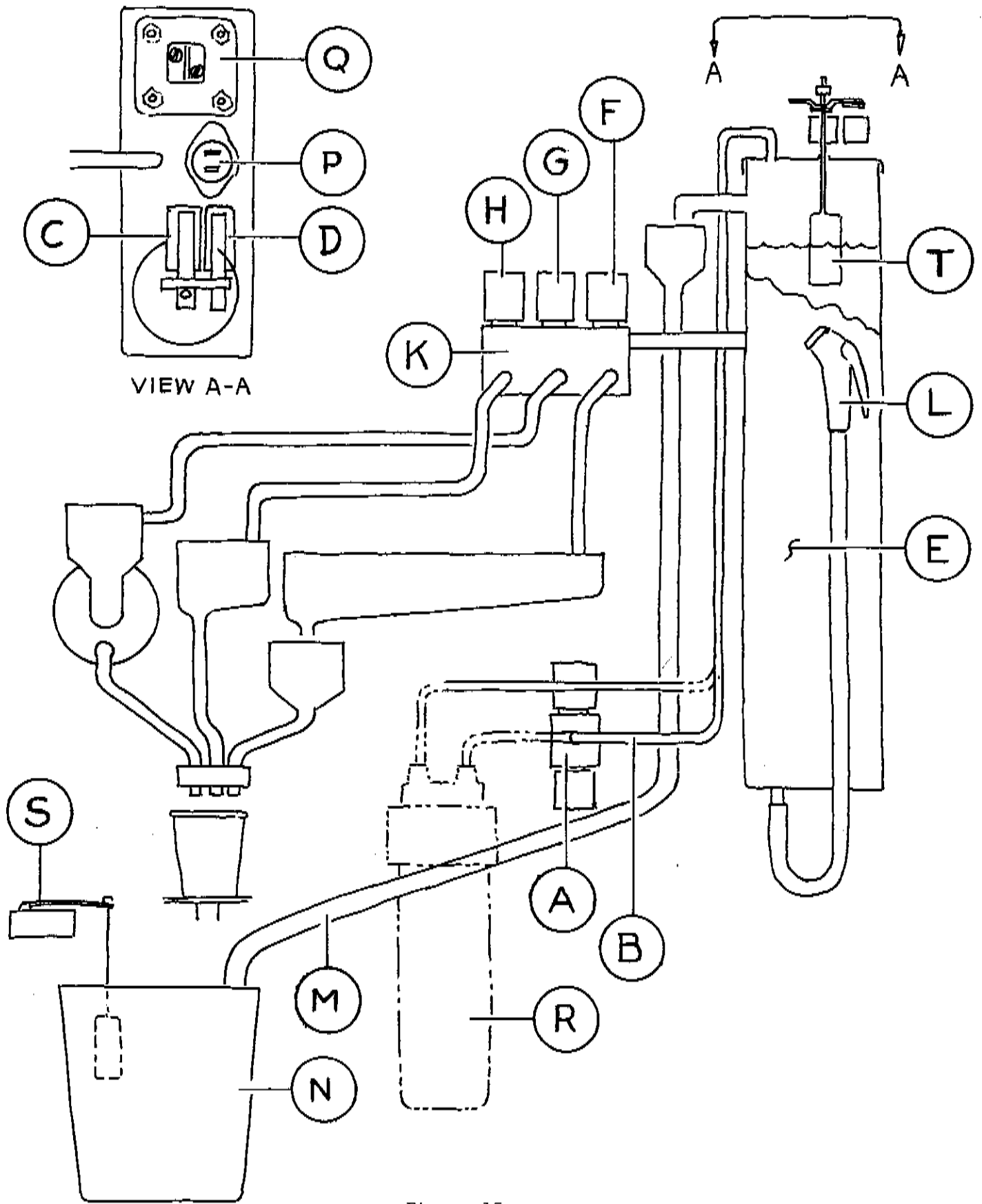


Figure 15

WATER SYSTEM 465 F.D.

OTHER FEATURES

1. Rinse Hose

A convenience feature is the rinse hose (L). This is provided for maintaining proper machine sanitation. It is long enough to reach each part of the machine which will normally require cleaning. To avoid any possibility of this hose leaking, a storage bracket has been provided which holds the outlet of the hose above the water level in the hot water tank.

2. Overflow Tube

The overflow tube (M) is connected to an outlet above the normal level of the tank. Should the water level rise too high, regardless of the reason, the excess will run directly to the waste pail (N).

3. Safety Overflow Switch

If the overflow condition continues, the level in the waste pail will rise and eventually raise the float of the safety overflow switch (S) shutting the combination safety and water inlet valve and place the machine on a "sold out" status. When on "sold out" any coins inserted will be returned.

COMMODITY SYSTEM

The support for the entire dry product commodity system is of open construction with a minimum of horizontal surfaces to catch dust and spillage. The motors which drive the canister augers are all located behind the cover. Each motor may be removed individually by loosening four screws and lifting it out. Water tubes to direct the water to the trough and chocolate homogenizer may also be removed for cleaning or changing if necessary.

THE COMMODITY CANISTERS

The commodity canisters are constructed of translucent rugged plastic. They are designed to dispense products on a first in - first out basis in order to insure freshness of product.

The augering system used to dispense the products runs on reinforced glass-filled nylon bearings to insure long trouble-free life. The dispensing spouts of the canister are tapered upward to eliminate the possible sifting of dry product.

CHOCOLATE HOMOGENIZER

The chocolate is augered into the chocolate homogenizer which is controlled by 10,000 rpm whipper motor. This entire assembly can be easily disassembled for sanitation purposes without the use of tools. It is held together by spring clips. The unit is also shock mounted in order that other products are not disturbed by the vibration due to the speed of the motor.

HUMIDITY BAR

The unit is equipped with a humidity heat bar which is directly over the commodity canister spouts. It will eliminate the possible bridging of commodities due to high humidity within the unit. IT IS A VERY NECESSARY ITEM AND MUST BE USED AT ALL TIMES.

STEAM EXHAUST CONTROL SYSTEM

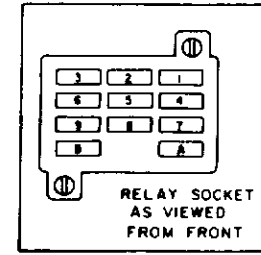
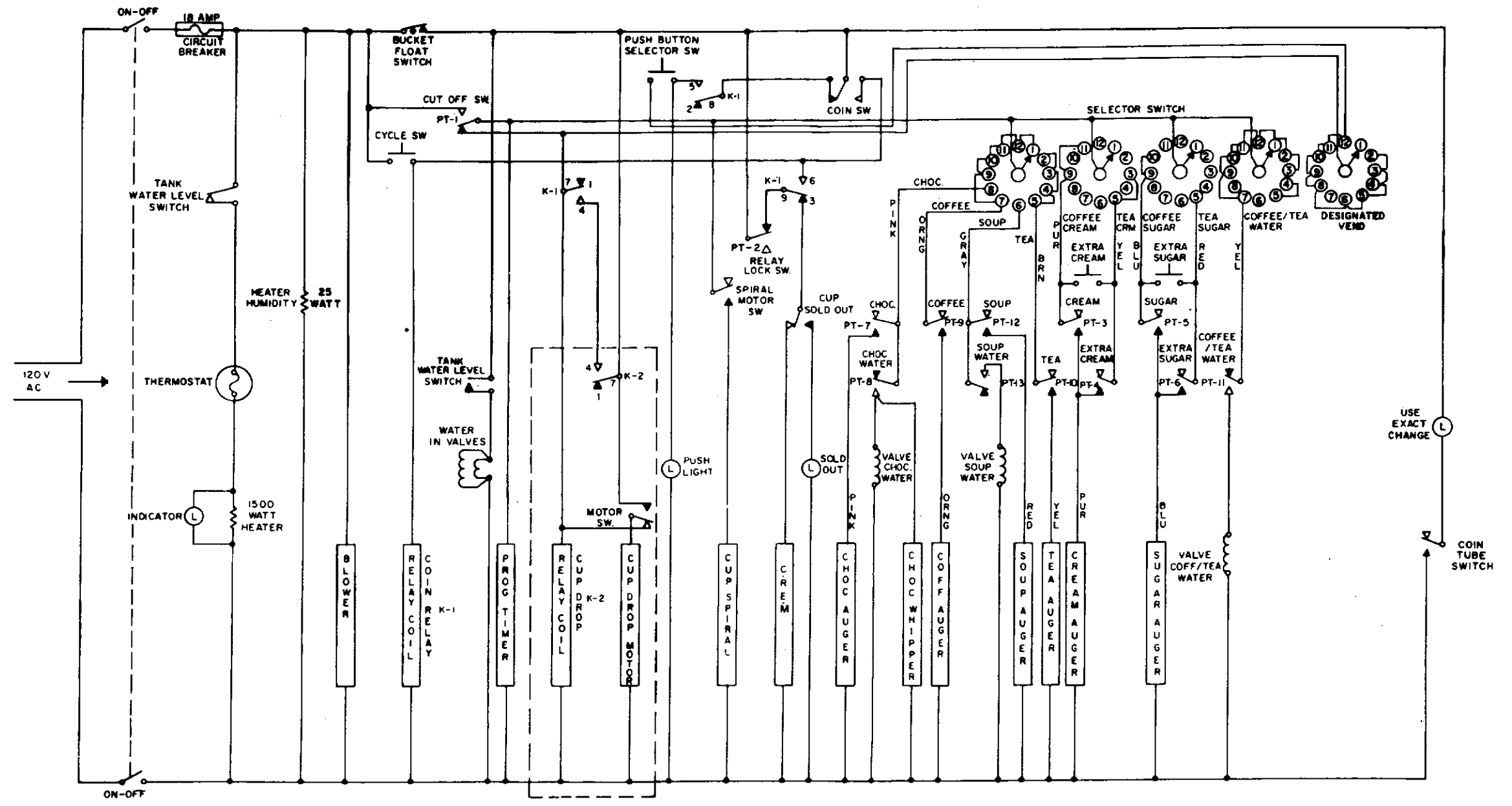
The steam from the hot water is controlled by this system. Uncontrolled steam in a vending machine will create several problems through caking and hardening of the dry products. Such a condition will prevent proper dispensing.

By moving low velocity air in high volume through the areas where the steam is generated, the steam is removed before it can reach the dry product dispensers. The air is moved by a fan blade on an externally mounted motor and pushed through the air duct to the outside of the rear of the cabinet.

NOTE: The motor is fully protected as it is not on the discharge side of the steam or product.

Steam is generated whenever the unit dispenses a beverage. The hot water passes through the respective troughs and mixing chambers as the dry products are dropped. Immediately behind the trough is a vacuum box which is connected to the exhaust duct. Directly over the trough is the steam deflector and commodity chute through which products are dropped into the moving liquid in the trough. The design of this deflector is such that a constant stream of dry air is pulled down through the commodity chutes of the deflector and also helps delivery of the product to the water. At the same time, this deflector prevents the steam vapor from rising into the area of the commodity canister outlets.

The trough, steam deflector, fan blade, and exhaust duct are easily removed for cleaning. Cleaning is done by rinsing in hot water. (NOTE: THESE PARTS SHOULD BE THOROUGHLY DRIED AFTER SANITIZING.)

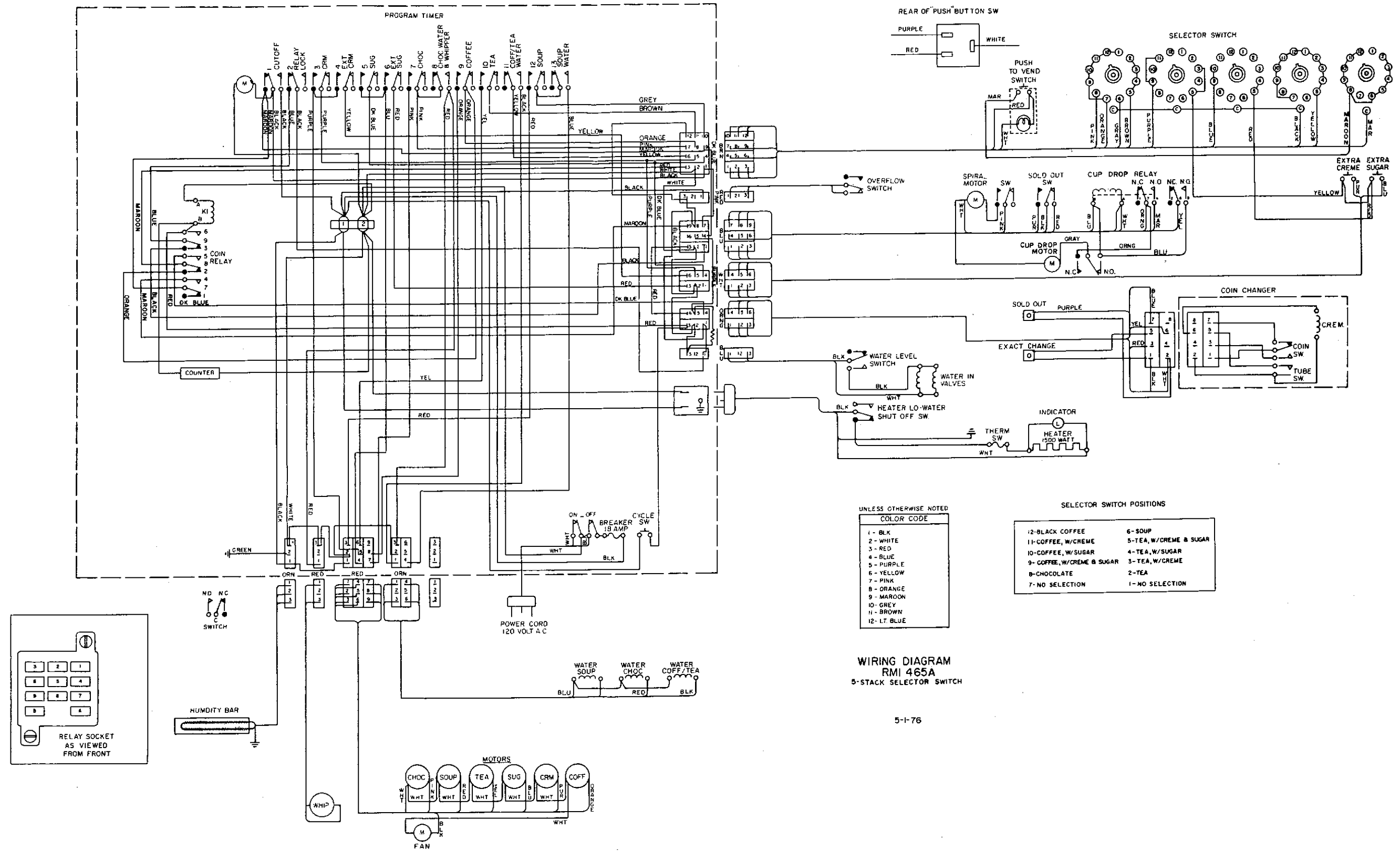


SELECTOR SWITCH POSITIONS

1- NO SELECTION	6-SOUP
12-BLACK COFFEE	5-TEA, CREAM & SUGAR
11-COFFEE & CREAM	4-TEA & SUGAR
10-COFFEE & SUGAR	3-TEA & CREAM
9-COFFEE, CREAM & SUGAR	2-TEA
8-CHOC.	
7-NO SELECTION	

PT - PROGRAM TIMER SWITCH
K - RELAY

465A SCHEMATIC DIAGRAM - 5 STACK SELECTOR SWITCH, 5-1-76



UNLESS OTHERWISE NOTED

COLOR CODE	
1 - BLK	
2 - WHITE	
3 - RED	
4 - BLUE	
5 - PURPLE	
6 - YELLOW	
7 - PINK	
8 - ORANGE	
9 - MAROON	
10 - GREY	
11 - BROWN	
12 - LT. BLUE	

SELECTOR SWITCH POSITIONS		
12 - BLACK COFFEE	6 - SOUP	
11 - COFFEE, W/CREME	5 - TEA, W/CREME & SUGAR	
10 - COFFEE, W/SUGAR	4 - TEA, W/SUGAR	
9 - COFFEE, W/CREME & SUGAR	3 - TEA, W/CREME	
8 - CHOCOLATE	2 - TEA	
7 - NO SELECTION	1 - NO SELECTION	

WIRING DIAGRAM
RMI 465A
5-STACK SELECTOR SWITCH

5-1-76