# SERVICE & PARTS MANUAL

## STEAM-IT, STYLE F GAS OPERATED COOKER

## MODEL ST-AG

MARKET FORGE INDUSTRIES INC.
An Employee Owned Company

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35 Garvey Street, Everett, MA 02149-4403

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# SECTION 1 INTRODUCTION

This service and parts manual contains general information, installation, operation, principles of operation, trouble-shooting, and maintenance information for the Market Forge Steam-It, Style F, Gas Operated, Model ST-AG. Also included is a parts list in which each replaceable part is identified and shown in an accompanying exploded view.

## 1.1 DESCRIPTION

The Market Forge Model ST-AG Steam-It Cooker is a gas fired pilotless, direct spark ignition system cooker. The unit is designed to operate from a natural, propane, butane or manufactured gas supply. It consists of a cooking compartment fitted with electrically controlled steam circuits for application of steam for the duration selected by the operator. The cooking compartment and all control components are enclosed within stainless steel cover panels with operator controls displayed on a front mounted panel. (See Figure 1-1)

The major assemblies of the Model ST-AG steam cooker are, the stainless steel cabinet enclosure, a cooking compartment with pan supports for cooking trays, the gas burner and ignition control assembly for the direct spark electrode, and a steam exhaust valve assembly. Located on the lower front panel is a 60-minute timer with a pilot light (red) "on" indicator and a reset switch marked RESET. The RESET switch is used to re-cycle the unit in the event of shut off during a cooking period.

The unit is designed to be mounted on a stand which is offered and highly recommended as an optional unit. However, the Steam-It unit may be mounted on any heat-resistant table, counter top etc. as long as certain clearance from combustible materials are maintained (refer to Section 2 for complete installation instructions) and the unit is perfectly level.

## 1.2 BASIC FUNCTIONING

The Model ST-AG steam cooker becomes operational when water is loaded into the cooking compartment and the 60-minute timer is set to the desired cooking time. With the time set, the electric ignition comes on, the exhaust valve closes automatically and the burner ignitor is energized. The gas is ignited by the electrodes to heat the water in the cooking cylinder.

As the pressure builds up, cold air is forced out of the cylinder through the thermostatic steam trap. The air will continue to escape as pressure builds up and the steam trap will close after all the air has been forced out of the cooking compartment. When the pressure reaches approximately 9-10 psi,the contact on the pressure switch will close, thereby closing the circuit to the clock motor and starting the actual cooking time period. When the pressure in the cooking compartment reaches 15 psi, the contacts on the pressure switch will open. These contacts will shut off gas to the main burner when they are open, causing the pressure to stop rising. When the cooking compartment cools and the pressure drops to 13 psi, the contacts on the pressure switch will close, gas will flow to the main burner and be re- ignited by the electrodes. Any number of such "OFF" and "ON" cycles might occur during the selected cooking time.

## 1.3 SERVICE

Required service, both preventive and corrective, is explained in Section 6. Should repairs be required, a network of authorized agencies is available to assist with prompt service. A current Directory of Authorized Service Agencies may be obtained by contacting:

Product Service Department
Market Forge
35 Garvey Street
Everett, Massachusetts 02149
Telephone: (617) 387-4100

The Model and serial numbers must be referenced when corresponding with Market Forge. The data plate containing the serial number pertaining to the equipment is located on the front top of the cabinet.

# SECTION 2 INSTALLATION

## 2.1 UNPACKING AND ASSEMBLY

The Steam-It cooker is shipped in a carton with protective padding and mounted on a wooden pallet. Carefully remove the carton, padding and the bolts securing the unit to the wooden pallet. Inspect assemblies as follows:

1. Inspect unit overall for dents or deformations in stainless steel cabinet enclosures.
2. Make sure visible attaching hardware for all assemblies are not missing or damaged.
3. Inspect timer, indicator light, RESET switch and pressure gauge to see they are not damaged.
4. Remove caplug from door handle and install handle.
5. Install pan supports so that the horizontal keyhole is at the rear of the cooking chamber and so that the flange and embossments face the middle of the chamber.

NOTE

The cooker is carefully inspected and packaged before leaving the factory. If there are missing components or unit is damaged, notify the carrier or dealer immediately.

## 2.2 SETTING IN PLACE

If possible, a location should be selected under an exhaust hood which will remove small amounts of water vapor emitted when the cooker door is opened. Level the unit in final location, using the cabinet top as a reference to obtain level adjustment left-to-right and front-to-back.

NOTE

If the Steam-It cooker is installed without the optional stand, it may be set on a heat-resistive table, counter or back bar. The minimum clearance from combustible construction must be 2 inches from left side, 12 inches from right side and 2 inches from back.

## 2.3 GAS CONNECTION

The gas connection is made by removing the lower front panel to gain access to the gas supply line elbow (Figure 7-3, Index 37).

WARNING

Gas lines should be thoroughly blown out and cleaned before connection to the Steam-It is made. This will prevent dirt, dust or pipe compound from reaching the sensitive gas solenoid valve.

Installation must conform with the National Fuel Gas Code, ANSI Z223.1-1974. The gas line should not be smaller than 3/8-inch pipe. A gas shutoff valve is supplied with the unit and must be installed as close as possible to the gas connection of the Steam-It, adjacent to the outside of the unit. (Refer to Figure 2-1.)

### 2.3.1 Pressure Regulator Setting

The pressure regulator must be set to the proper flow, depending upon the type of gas used. Setting is as follows:

1. Remove pressure regulator access cover (Figure 7-1, Index 29) and remove cap from pressure regulator (Figure 7-3 Index 39).
2. For natural or manufactured gas supply, set regulator at 4.0-inch W.C. (See Subsection 6.4.1.)
3. For propane or butane gas supply set regulator at 10.0-inch W.C. (See Subsection 6.4.1.)
4. Reinstall protective cap.
5. Check to see that proper burner orifices are installed. Use a #47 DMS (yellow) for natural gas; a #55 DMS (purple) for propane or butane gases; a #31 DMS (brown) for manufactured gas. Refer to Figure 7-3, Index 43,44 and 45 for proper part numbers.

### 2.3.2 Canadian Gas Connections

Special instructions are required for installing the Steam-It cooker in Canada. Instructions are as follows:

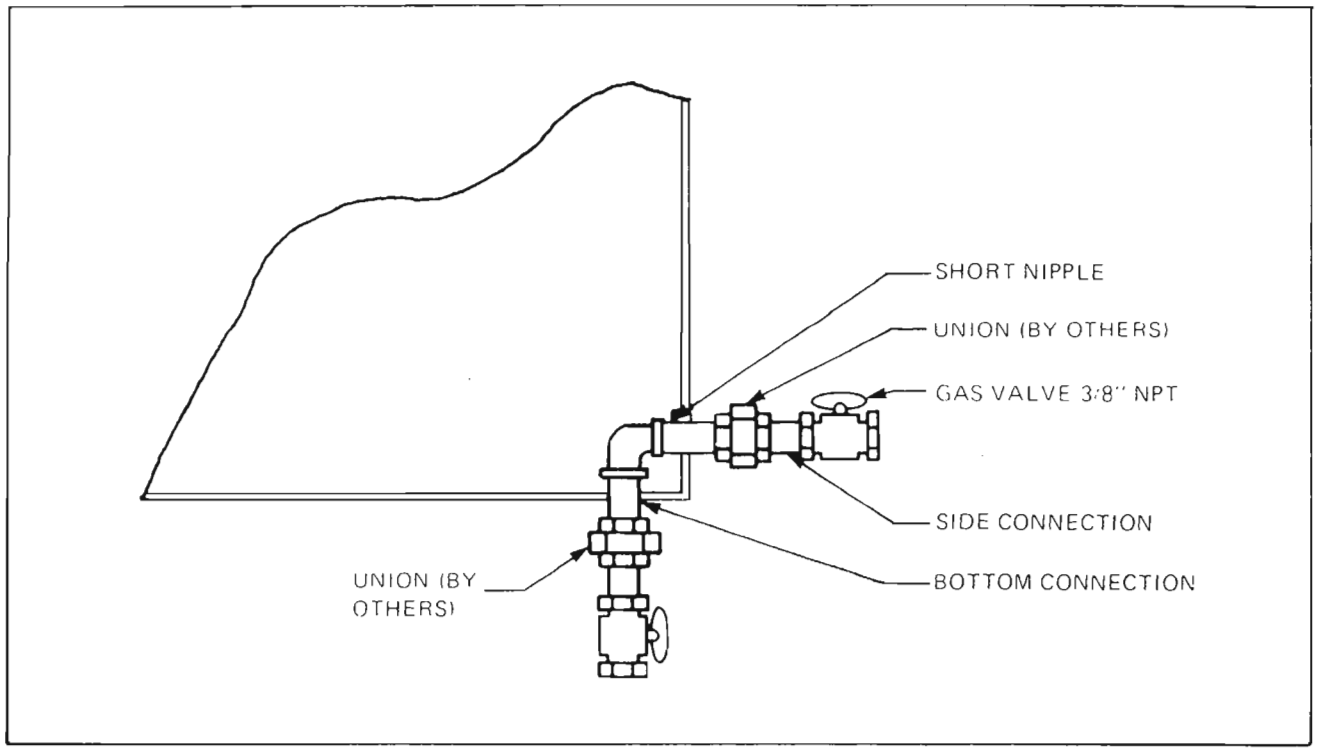



*Figure 2-1. Installation of Gas Shutoff Valve*

1. Installations in Canada are to be conducted in accordance with C.S.A. Standard B149 (Gas Installation Code), C.S.A. Standard C22.1 (Electrical Installation Code) and/or Local Codes.
2. The minimum size supply pipe when used with Natural Gas is 1/2-inch N.P.T.

## 2.4 ELECTRICAL CONNECTION

Connect 120 volt ac, single phase (2 amp) 60 Hz power supply to the terminal box as follows:

1. Remove terminal box cover (Figure 7-1, Index 13).
2. Disconnect power from main power source and connect input power wires to terminals L1 and L2. Neutral wire connects to terminal L2 and hot wire to L1 (refer to wiring diagram, Figure 5-1.)

WARNING

Be sure to ground unit chassis from ground terminal box to an outside ground.

## 2.5 WATER AND DRAIN CONNECTIONS

The Steam-It cooker design incorporates provisions for manually adding and draining water, therefore no external connections for water and drain are required.

## 2.6 INSTALLATION CHECKOUT

After the Steam-It cooker is completely assembled and properly located with electrical and gas supply connected, the cooker must be given a thorough checkout before being put into cooking operation.

Before making this checkout the operator must be thoroughly familiar with the operating procedures in Section 3, and with the function of each control described in Table 3-1. Reference Figure 3-1 for identification of controls required in the following procedures. If the unit fails to perform as described below, consult Tables 5-1 and 5-2 of the troubleshooting guides for corrective action.

### 2.6.1 Initial Control Settings

Before beginning cooker checkout procedures, perform the following steps:

1. Check to see that 120 volt ac, single phase 60 Hz power is available from power source and properly connected to unit terminal box.
2. Check to see that the gas supply line shutoff valve is closed.
3. Check to see that the timer is off.
4. Visually check interior of cooking compartment and remove any materials, papers, etc. Check to see that pan supports are properly installed (refer to paragraph 2.1 step 5) and secured.
5. Check pressure gauge to see that it registers zero pounds.

### 2.6.2 Cooker Checkout

The cooker checkout procedures are as follows:

1. Secure drain plug (Figure 7-6, Index 18), then pour 6 quarts of water into Steam-It cooking compartment through the door opening.
2. Close the door and lock in position by placing the tongue of the door lock under the roller on the drain casting and pressing downward until door lock comes to a firm stop. This lock makes the initial seal. (When steam pressure builds up in the compartment it will force the door to a tighter closed position.)
3. Open gas shut-off valve.
4. Turn the Steam-It on by setting the timer to the desired cooking time. Observe pressure increase indicated by pressure gauge.
5. At the close of the preset cooking period, the timer pointer will stop at the "0" position on the dial. This will shut down the Steam-It and automatically open the exhaust valve. The Buzzer will continue to sound until the dial pointer is manually turned to the "OFF" position.
6. Observe that the indicator light (Figure 3-1, Item 2) goes out when timer is at the "0-minute" position.
7. Check the pressure gauge to see that the pressure reads zero.
8. The door will not open while there is steam pressure working against it from within the cooking compartment. The door must be kept locked until the cooking cycle has completely finished, then the door opened to allow vapor to clear.
9. Shut off gas supply by closing the gas shutoff valve.

### 2.6.3 Shutdown Procedure

No special shutdown procedures are required with the exception that the door is left open, timer must be in the OFF position and the gas supply valve closed, (consult local codes for daily shut-off requirement.)

NOTE

Before using the Steam-It for cooking, it is recommended that checkout operations be performed 2 or 3 times in order to determine that it is working properly and to insure cleanliness of the cooking compartment.

# SECTION 3 OPERATION

## 3.1 OPERATING CONTROLS AND INDICATORS

The controls required to operate the Steam-It cooker are listed in Table 3-1, together with a functional description of each. Figure 3-1 shows the physical location of each control and indicator.

## 3.2 OPERATING PROCEDURES

The following paragraphs outline the sequence of daily operation for the Steam-It Model ST-AG cooker. The checkout procedures outlined in Section 2 should be performed prior to daily use for cooking. If any malfunction develops during the normal use of the cooker, refer to the troubleshooting tables in Section 5.

### 3.2.1 Preliminary Procedures

Perform the following steps prior to preheating and cooking:

1. Be sure that gas supply is connected to unit, shut off valve is closed and 120 volt ac (to operate controls) is connected.
2. Place the drain plug (Figure 7-6 Index 18) located at front center of cooking compartment securely in place.
3. Check that pan supports are hung on pan support studs on cylinder side walls. The horizontal keyhole on the support should be at rear of compartment and the vertical keyhole near the front.
4. Insert drain plug, located inside compartment into drain opening and pour approximately six quarts of water directly into Steam-It compartment.
5. In geographical locations where a high amount of lime and alkaline (salt like substances) deposits are present in the water supply, add two tablespoons of vinegar directly into six quarts of water in the Steam-It compartment prior to starting the cooking cycle. If more water is added to maintain the required level, an occasional tablespoon of vinegar may be added as well, in order to compensate for new mineral deposits of the fresh water.

CAUTION

A high degree of mineral salts in the water can cause pitting of the cooking compartment unless the above directions are followed, the cooking compartment thoroughly cleaned and drained each night, and the door left open. Do not use distilled water in the cooking compartment.

### 3.2.2 Preheating (Figure 3-1)

Before each initial operation of the cooker and at any time when the cooking compartment is cold, a 5- to 8-minute preheating period is required. To preheat the cooking compartment, proceed as follows:

1. Insert drain plug (7) into drain opening and add 6 quarts of water into cooking compartment.
2. Close cooking compartment door and lock securely in place by pressing down on latch handle (5).
3. Place gas supply shutoff valve in the open position. (Normally left in open position.)
4. Set 60-minute timer (1) to I minute. Indicator light (2) will come on.
5. When preheating is ended (5 to 8 minutes) and the buzzer (6) sounds, turn timer (1) to OFF and allow pressure to return to zero psi on pressure gauge (4).
6. Open compartment door slightly by pulling up on latch handle (5) to allow remaining vapor to escape before raising door to full open position.

### 3.2.3 Cooking Procedures (Figure 3-1)

After the preheating cycle, the compartment may be loaded for cooking. Cooking procedures are as follows:

1. Carefully slide cooking pans onto pan supports.
2. Close door and lock in position.
3. Set timer (1) to desired cooking time (see Test Kitchen Bulletin #21), turning timer past desired setting and then back. This will insure accuracy of setting.

TABLE 3-1
CONTROLS AND INDICATORS
(See Figure 3-1)

| Figure 3-1 Ref. | Description | Function |
|---|---|---|
| 1 | 60-Minute Timer | Controls cooking duration. Time is manually set from 0-60 minutes. |
| 2 | Indicator Light (Red) | When lit, it indicates that cooking cycle is in operation. |
| 3 | RESET Switch | Used to reset electrical circuits during a power loss or shutdown. This switch also serves as a protective device in the event of an electrical overload. |
| 4 | Pressure Gauge | Indicates steam pressure (psi & Kg/cm²) inside cooking compartment during cooking operations. |
| 5 | Latch Handle | Secures cooker door in closed position. Lift to open door. |
| 6 | Buzzer | Signals end of cooking cycle (not shown) |
| 7 | Drain Plug | Lift to empty water (Inside compartment - not shown) |

NOTE

The timer will not start until cooking compartment is at a minimum of 9 psi pressure (as observed on pressure gauge).

4. At end of cooking cycle, steam will automatically exhaust. When pressure reaches zero on pressure gauge (4) door can be released by pulling up on door latch handle (5). Allow a few seconds for remaining vapor to leave cylinder before completely opening the door. To stop buzzer, turn timer to "OFF" position.

NOTE

If it is noticed that steam is escaping around door while pressure is building up, door seal adjustment must be made. Refer to subsection 6.3.1 for instructions.

5. Remove pans and transfer to serving area. Perforated pans, if they are to be transferred to the serving area, should be underlined with solid pans.
6. Check that water level is at six-quart capacity before starting another cooking cycle. If strong flavored foods, such as onions or seafood have been cooked, compartment should be drained, cleaned and flushed and a fresh supply of water added for the next cooking operation.
7. Clean unit thoroughly at the end of each cooking day (Refer to Section 6.2), making sure water is emptied and compartment is left dry and the door open.

### 3.2.4 Low Water Cut-Off Operation

If the Steam-It is operated with no water or the water has evaporated away, the temperature of the cooking compartment will rise and by heat induction effect the Low Water Cut-Off. Electric current flow will be broken at the Low Water Cut-Off and the unit will shut down. With the replacement of water in the cooking compartment, the unit will again be operative.

NOTE

Should a cooking cycle be interrupted due to safety action of the Low Water Cut-Off, the food loaded will be undercooked. Compensation must be made for the cooking performed and, with proper amount of water in the cooking compartment, a new cycle determined and set to complete the process.

### 3.2.5 Shut-Down Procedure

No shut-down procedure is required for the Steam-It cooker except that the timer is in the OFF position, the compartment door is open, the compartment drained of water, and the gas supply shutoff valve is closed (only if required by local code).

## 3.3 CLEANING

After each period of daily operation (more frequently as required to maintain cleanliness), the Steam-It cooker should be thoroughly cleaned by completing the following steps:

1. Drain water from compartment by opening drain plug (Figure 3-2) into suitable container (to hold at least 6 quarts).

*Figure 3-2. Drain Plug*

2. Remove left and right side pan supports (Figure 3-3) by lifting front up and forward to disengage from mounting studs. Wash with detergent, rinse, and set aside for reassembly.

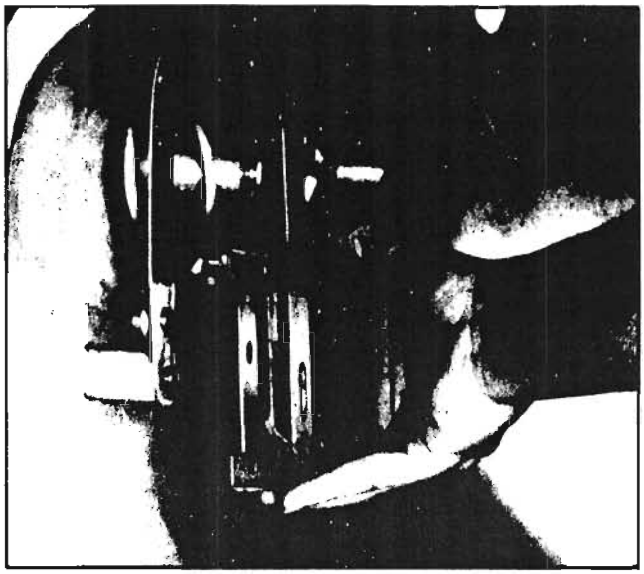


*Figure 3-3. Pan Support Removal*

3. Wash cooking compartment interior using mild non-abrasive solution. Rinse and dry thoroughly.

CAUTION

Failure to wash compartment may result in pitting of the aluminum surfaces. Use only mild detergent suitable for use with aluminum.

4. Replace pan supports in compartment and leave door open.

### 3.3.1 Exhaust Silencer

The exhaust silencer (Figure 7-1, Index 51) should be removed and cleaned periodically. As the cooking compartment is exhausted of steam through the silencer, impurities can build up from food particles. Cleanings should be frequent enough to prevent clogging. For this reason, the exhaust silencer is made easily accessible and simple to remove. To Clean silencer proceed as follows:

1. Remove the one-piece exhaust silencer from the unit by unscrewing it in a counter-clockwise direction from exhaust valve elbow.
2. Clean the silencer by sloshing it in hot soapy water and rinse it in clear water. If dirt has clogged the silencer, presoak it in an alkaline cleaning solution.
3. After cleaning, stand the silencer on edge to allow it to drain.
4. Screw it back into the elbow of the exhaust valve (clockwise).

# SECTION 4 PRINCIPLES OF OPERATION

## 4.1 GENERAL

The Steam-It cooker consists of a cooking compartment into which pans of food are loaded through an inward opening door. The compartment is filled with water (for steam generation) which is heated by gas burners located under the cooking compartment. The gas burners are ignited by a pilotless, direct spark (electrode) ignition system which is electrically controlled by the ignition control board. Internal compartment pressure is regulated by the exhaust system which is mounted at the top rear of the cabinet. The pressure may be monitored (by the operator) by viewing the pressure gauge which is connected in the steam pressure line. Cooking cycles are controlled by a 60-minute electric timer which is mounted on the lower front panel.

## 4.2 DETAILED OPERATION

With electrical power applied, gas supply valve open and the timer set to the desired cooking time, the electrical control circuits are activated. The exhaust valve closes automatically and the burner electrodes are energized. Gas passes through the gas regulator and valve body to the burners where the gas is ignited by the direct spark ignition electrodes. The gas flame on the main burner heats the water in the cooking compartment and within a few minutes, steam pressure begins to build up.

## 4.3 STEAM CIRCUIT (Figure 4-1)

The steam circuit consists of the steam pressure gauge, steam trap assembly, pressure switch, steam exhaust valve assembly (including an exhaust valve silencer), a 15 psi pressure relief valve and associated steam circuit fittings. These are shown in Figure 4-1.

### 4.3.1 Steam Trap

As the pressure builds up in the cooking compartment, cold air is forced out of the compartment through the thermostatic steam trap located in the collar at the top rear of the Steam-It. The air will continue to escape as pressure builds up and the steam trap will close after all the air has been forced out of the cooking compartment.

### 4.3.2 Pressure Switch

When the pressure reaches 9 to 10 psi (the Steam-It is set to operate at 15 psi) of pressure the contact on low pressure switch (Close on Rise) will close, thereby closing the circuit to the clock motor and starting the actual cooking time period. When the pressure in the cooking compartment reaches 15 psi, the contacts on high pressure switch will open. These contacts being wired in series with the cycling coil of the gas valve (through the ignition control board), will shut off gas to the main burner when they are open, causing the pressure to stop rising.

When the cooking compartment cools and the pressure drops to 13 psi, the contacts on the high pressure switch (Open on Rise) will close, gas will flow to the main burner and be reignited by the electrodes. Any number of such "OFF" and "ON" cycles might occur during the selected cooking time.

### 4.3.3 Steam Pressure Gauge and Safety Relief Valve

Located at the top rear of the Steam-It and mounted into the forward face of the flue for visibility, the Steam Gauge registers the pressure within the Steam-It cooking compartment.

The Safety Valve is set to automatically relieve the cooking compartment of excessive pressure buildups by opening at a point between 151/2 psi and 16 psi.

### 4.3.4 Steam Exhaust Valve and Silencer

The steam exhaust valve is located in the collar at the top rear of the Steam-It and it lets the pressure escape from the compartment when the timer is shut off. When the timer is turned on this valve is closed permitting the pressure to build up.

To overcome objectionable noises, the exhaust valve is equipped with an exhaust silencer which will permit the exhaust valve to release steam at the end of the cooking cycle without any objectionable noises.

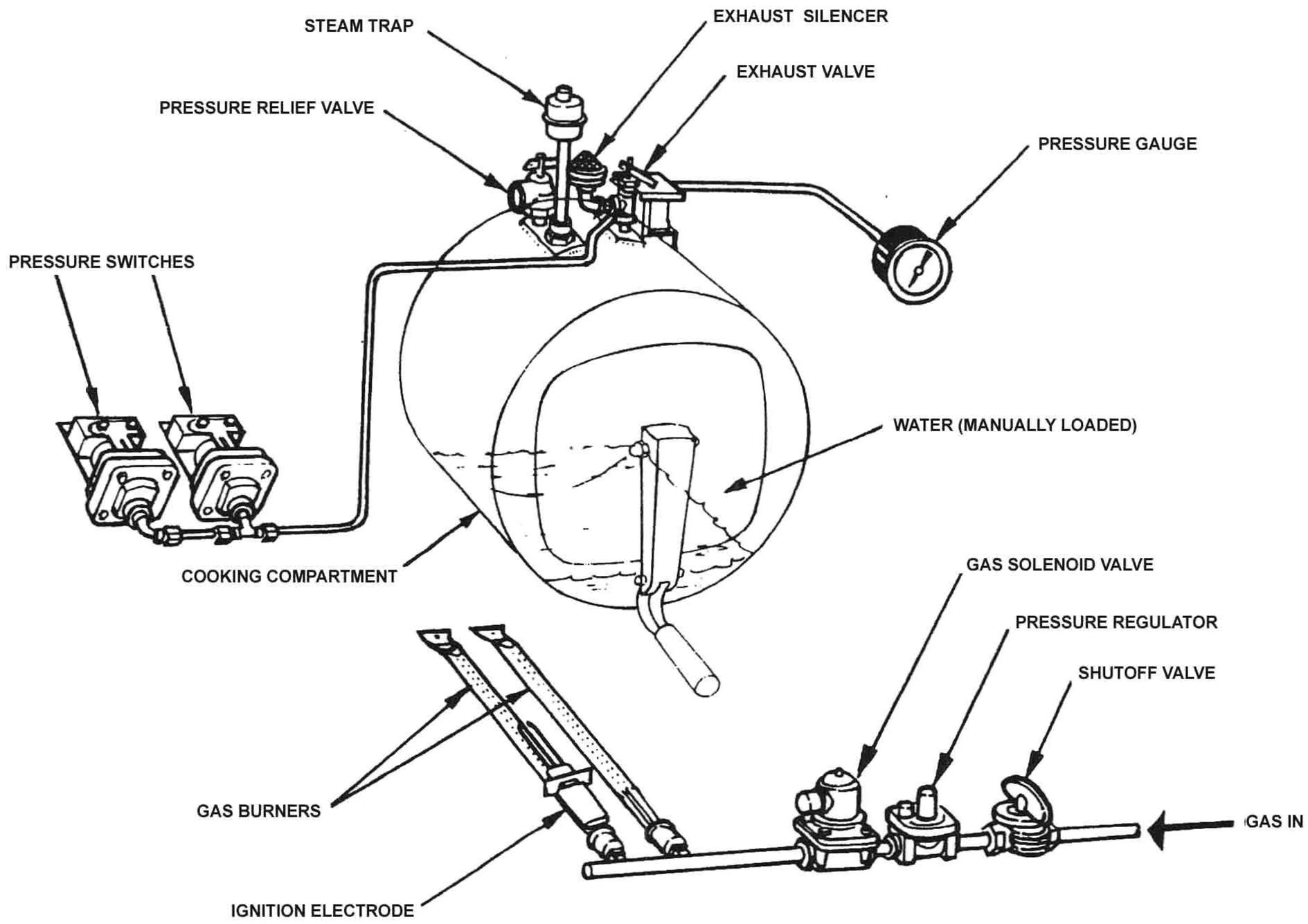



*Figure 4.1 Steam and Gas Circuits*

## 4.4 ELECTRICAL CIRCUITS (Figure 4-2)

The electrical circuits of the cooker provide the 120 volt ac (2 amp) power required to operate the timer motor, indicator light and buzzer, pressure switches and spark ignition control board. Power to the burner electrodes, RESET switch and gas valve solenoid are in turn supplied with the required voltage from the ignition control board. The 120 volt ac input power is connected to the 2-pole terminal block, mounted to the cabinet frame, (behind an access cover) and located on the lower left side.

### 4.4.1 Control Circuit Components

The control circuit is shown in the simplified schematic diagram Figure 4-2. A brief description of the electrical control circuit components is in the following paragraphs.

**4.4.1.1 Low Pressure Switch.** The copper tube which extends from the top of the compartment to the Low Pressure Switch constantly reflects internal compartment steam pressures upon the Pressure Switch's built-in bellows. While compartment free-venting is occurring, the switch keeps the timer circuit open. After free-venting has terminated and when the compartment pressure has built up to approximately 10 psi, the contacts (N.O.) will be forced closed by back-pressure working on the bellows, the timer circuit will be completed, and the timer motor will begin to operate.

**4.4.1.2 High Pressure Switch.** The same copper tube which connects the low pressure switch (Par. 4.4.1.1) to the compartment also connects with the high pressure switch. Once the compartment has reached 10 psi and the timer motor begins operating, the

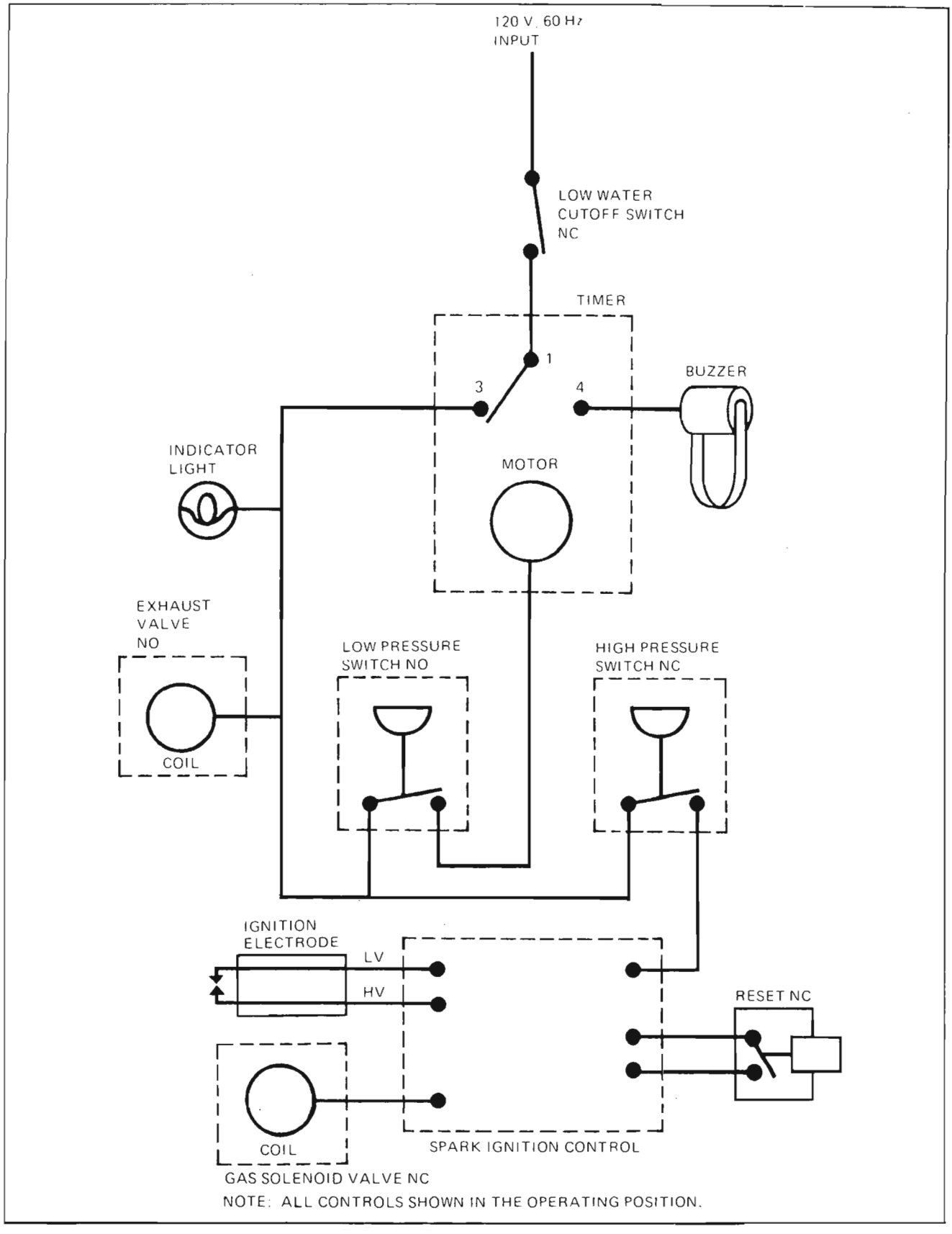



*Figure 4-2. Pictoral Diagram, Electric Circuits, 120V*

pressure will continue to rise until the contacts of the high pressure switch (N.C.) are forced open (at approx 13 psi) by pressure working on the bellows. When contacts are opened the gas solenoid valve is closed by the ignition control board. As the compartment cools the pressure drops until the contacts return to the closed position, activating the spark ignition control board in the firing sequence.

**4.4.1.3 60-Minute Timer.** The timer contains a 120 volt ac synchronous motor which drives a timing dial through a gear reduction and clutch mechanism. The timer dial is manually set for any interval of operation from 0- to 60-minutes as read on the calibrated dial face. The manual rotation of the dial moves the common element (1) of the timer switch from the neutral position to contact (3) which connects with pressure controls and gas firing system. The Steam-It is put into an automatic cycle of cooking with the setting of the Timer to any of its calibrated periods of cooking. Its timing cycle, however, is automatically delayed by the Low Pressure Switch until free-venting has occurred and a compartment pressure buildup to 10 psi has been reached. When the timer motor has operated for the preset duration, the common element is transferred to contact (4), ending gas firing cycle, returning exhaust valve to open position and energizing the buzzer. Contact to the buzzer circuit remains closed until the dial is manually turned to the OFF position, returning the common element (1) of the timer switch to the neutral position.

**4.4.1.4 Buzzer.** The buzzer is an alarm device which operates by oscillation of a striker against the core of an electromagnet. When the timer dial reaches "0-minutes" the buzzer coil is energized to sound the buzzer. Movement of the timer dial to the OFF position opens the contact to the buzzer coil to shut it off.

**4.4.1.5 Indicator Light.** The Indicator Light is located at the lower right front of the front panel adjacent to the timer knob. It is wire to operate only when the timer is set to cooking cycle. The circuit will be broken when the timer returns to the "ZERO" position. Thus, when lit, it signifies that the Steam-It is in the process of cooking.

**4.4.1.6 RESET Switch.** The RESET switch is located on the left side of the lower front panel. The switch is used to reset the electrical circuits of the ignition control board in the event of an ignition failure.

**4.4.1.7 Direct Spark Ignition System.** The direct spark ignition system consists of the electrodes, ignition control board and associated wiring. On a call for heat, input power is applied to the control board, sparking is then initiated and the gas valve is energized. Sparking continues with the gas valve powered for a "trial for ignition" period of 3.3 seconds. If flame has not been established by the end of the trial period, the system will lock out, the gas valve will close, and the reset function will then trip out. Reset action is manually accomplished by pressing RESET switch. In normal operation, as soon as flame is established and proven by the flame sensing circuitry, sparking will cease immediately and the system will remain "on", monitoring the flame until the end of the duty cycle. Should flame-out occur during the duty cycle, the system will reactivate the spark to provide for reignition.

The flame will either be reestablished or the system will lock out in the normal manner. Should lock out occur, the system is reactivated with the RESET switch for recycling. Control for operation of the solenoid gas valve, gas pressure switch and RESET switch is provided from the circuits contained on the ignition control board.

# SECTION 5 TROUBLE-SHOOTING

## 5.1 GENERAL

The information in this section is intended to assist both the operator and service personnel in locating the general source of problems which may occur with the Steam-It cooker. Before following any of the procedures given in this section, the operator should be thoroughly familiar with the operating instructions and the function of all controls which are described in Section 3. If the problem cannot be readily corrected, the operator should contact the nearest authorized Market Forge service agency for assistance.

## 5.2 TROUBLE-SHOOTING GUIDES

An operator's trouble-shooting guide for use by the Steam-It operator is given in Table 5-1. Table 5-2 gives additional, more extensive information for use by service personnel.

## 5.3 ELECTRICAL FAULT ISOLATION

Correction of an electrical failure first requires isolation of the fault to a single circuit or component. In most cases the nature of the failure and its effect upon the operation of the Steam-It will be sufficient to isolate it to one or more circuit elements. Table 5-3 is provided as a guide for isolating electrical faults.

**TABLE 5-1**
**OPERATOR'S TROUBLE-SHOOTING GUIDE**

| PROBLEM<br>Probable Cause | Remedy |
|---|---|
| 1. INDICATOR LIGHT FAILS TO LIGHT. | |
| a. Power to Steam-It off. | Locate external circuit breaker for incoming power and place in ON position. |
| b. 60-Minute timer not set. | Set 60-Minute timer. |
| c. RESET switch not pressed. | Due to power interruption. The RESET switch must be pressed to reset control functions of control board. |
| 2. GAS BURNERS FAIL TO IGNITE | |
| a. External gas supply shutoff closed. | Open gas supply shutoff valve. |
| 3. STEAM FAILS TO BUILD UP IN COMPARTMENT | |
| a. Compartment does not latch securely. | Close door and engage handle in latch. |
| b. Low water in compartment. | Add water, as required, to bring up to 6 quarts. |

## TABLE 5-2

| GENERAL TROUBLESHOOTING GUIDE | | |
|---|---|---|
| **CONDITION** | **CORRECTION** | **P/N** |
| **1) INDICATOR LIGHT FAILS TO LIGHT WITH TIMER SET** | | |
| a) Power to STAG off | Make sure external circuit breaker for incoming power is in ON position | N/A |
| b) Indicator light burned out | Replace light | 10-6683 |
| c) Faulty wiring | Inspect condition of wiring and tightness of all connections | N/A |
| d) Timer contacts faulty | Replace Timer | 10-6291 |
| e) Unit will not stay on | Reverse Polarity (reverse black & white wire) | N/A |
| **2) GAS BURNERS FAIL TO IGNITE** | | |
| a) External gas supply | Open gas supply shut-off valve | N/A |
| b) Gas solenoid valve fails in closed position | Clean or replace valve | 10-7694 |
| c) Faulty ignition control board | Replace ignition control board | 10-7696 |
| d) Electrode unit malfunctioning | Clean carbon off electrode or replace | 10-7697 |
| e) Damaged or loose wiring | Trace all wiring from control board to controls. Check to see that all wiring is secure, and that high and low voltage leads to electrode are properly connected | N/A |
| f) Gas pressure not per specification (Water Column 3 1/2" Nat, 10 " L.P.) | Adjust or replace pressure regulator | 09-7018 NAT. 09-7019 L.P. |
| **3) STEAM FAILS TO BUILD UP IN COMPARTMENT** | | |
| a) Compartment door not latched securely | Close door and engage handle in latch. If steam fails to build up after door is secured, the problem may be that the door seal requires adjustment or replacement | 10-2666 |
| b) Steam trap not sealing properly | Clean steam trap w/ hot soapy water or replace | 10-6156 |
| c) Gas burners not igniting | Refer to Problem # 2 | N/A |
| d) Safety valve fails to close | Replace safety valve | 10-7955 |
| e) Safety valve opens intermittently | Open and close valve to clear blockage | N/A |
| **4) EXCESSIVE STEAM PRESSURE IN COMPARTMENT (ABOVE 15 LBS.)** | | |
| a) Safety valve fails in closed position | Replace safety valve | 10-7955 |
| b) Pressure switch setting too high | Adjust or replace pressure switch | 95-3720 |
| **5) BUZZER FAILS TO SOUND AT END OF COOKING CYCLE** | | |
| a) Faulty wiring | Check wiring from buzzer to terminal block and timer | N/A |
| b) Faulty buzzer | Replace buzzer | 10-6682 |
| c) Faulty timer | Replace timer | 10-6291 |

TABLE 5-3
ELECTRICAL FAULT ISOLATION GUIDE

| Failure | Fault Location |
|---|---|
| 1. Will not operate when 60-Minute timer is set. | a. Incoming power.<br>b. Faulty timer<br>c. Wiring<br>d. Ignition system control board<br>e. Low water cut-off |
| 2. Intermittent operation | a. Damaged control system. Refer to paragraph 5.4.3. |
| 3. Exhaust valve fails to close | a. Exhaust solenoid valve coil<br>b. Wiring<br>c. Faulty timer |
| 4. Indicator light off (system operating) | a. Indicator light<br>b. Wiring |
| 5. Buzzer fails to sound at end of cycle | a. 60-Minute timer contacts<br>b. Buzzer<br>c. Wiring |
| 6. Will not stop operating | a. 60-Minute timer motor |
| 7. System fails to operate upon pressing RESET switch. | a. RESET switch<br>b. Wiring<br>c. Ignition control board |

## 5.4 ELECTRICAL TROUBLE-SHOOTING PROCEDURES

Before performing the trouble-shooting procedures in this section the serviceman must be familiar with the function of all controls as described in Section 3 and with the Principles of Operation described in Section 4.

Electrical trouble-shooting procedures which follow require access to components and terminals of the operating controls and ignition control board. Electrical controls are reached by removing the lower front panel as described in paragraph 6.3.2. Wiring and terminal locations are shown in Figure 5-1. Figure 5-2 shows the circuit schematically.

### 5.4.1 Incoming Power

Before trouble-shooting any of the electrical parts or assemblies, verify that power is being supplied to the Steam-It input power terminals. Incoming power is connected at the terminal block (Figure 7-1, items 15, 16). With power connected to the Steam-It, an ac volt-meter is used to measure 120 volts across terminals to lines coded L1 (hot lead to wire number 5) and L2 (neutral lead to wire number 4). If power is not present, the connection to the Steam-It is faulty. If 120 volts is present, and the cooker will not operate, the fault lies within the electrical circuits of the Steam-It.

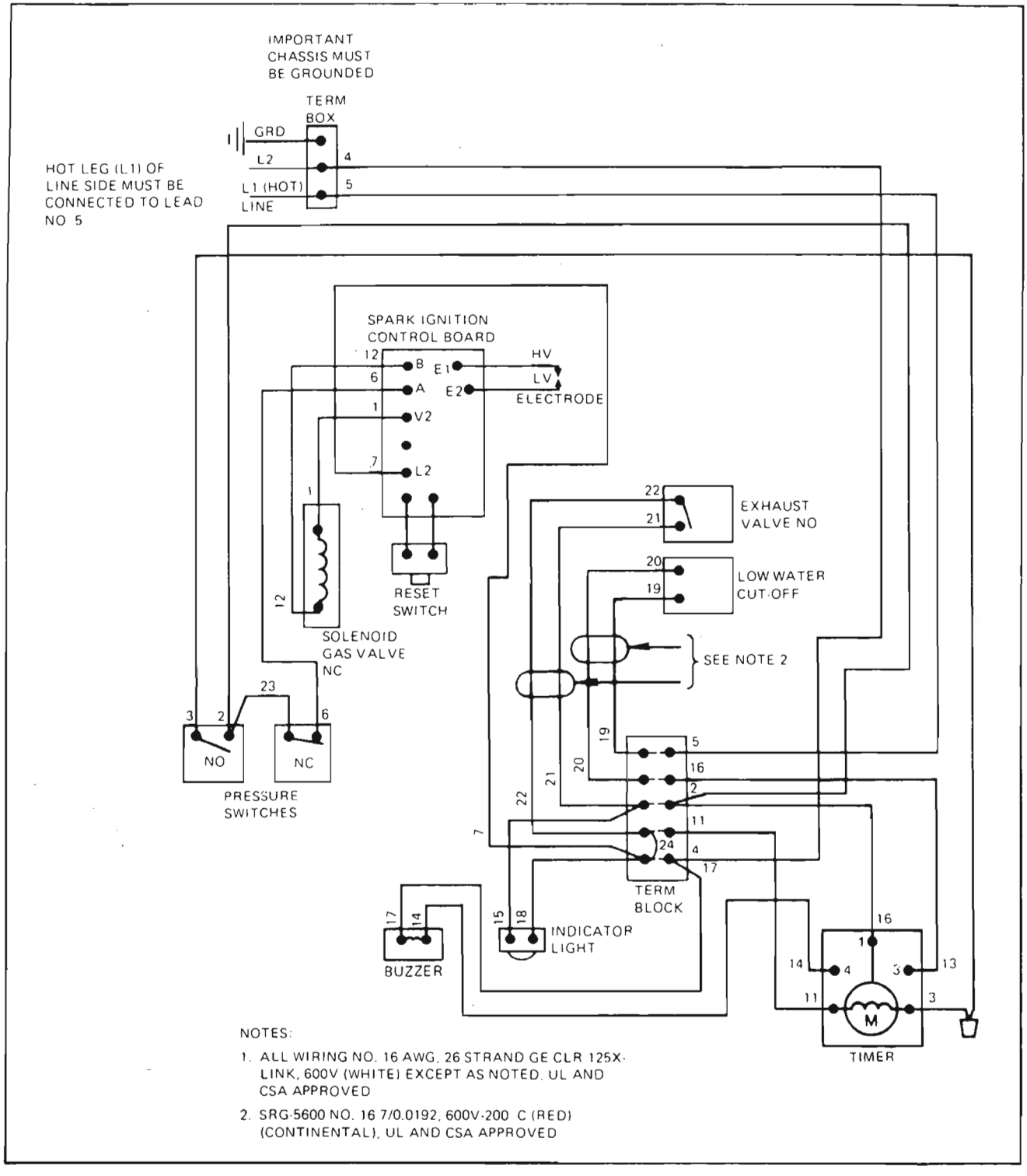



*Figure 5-1. Wiring Diagram, Steam-It, 120V, 60 Hz*

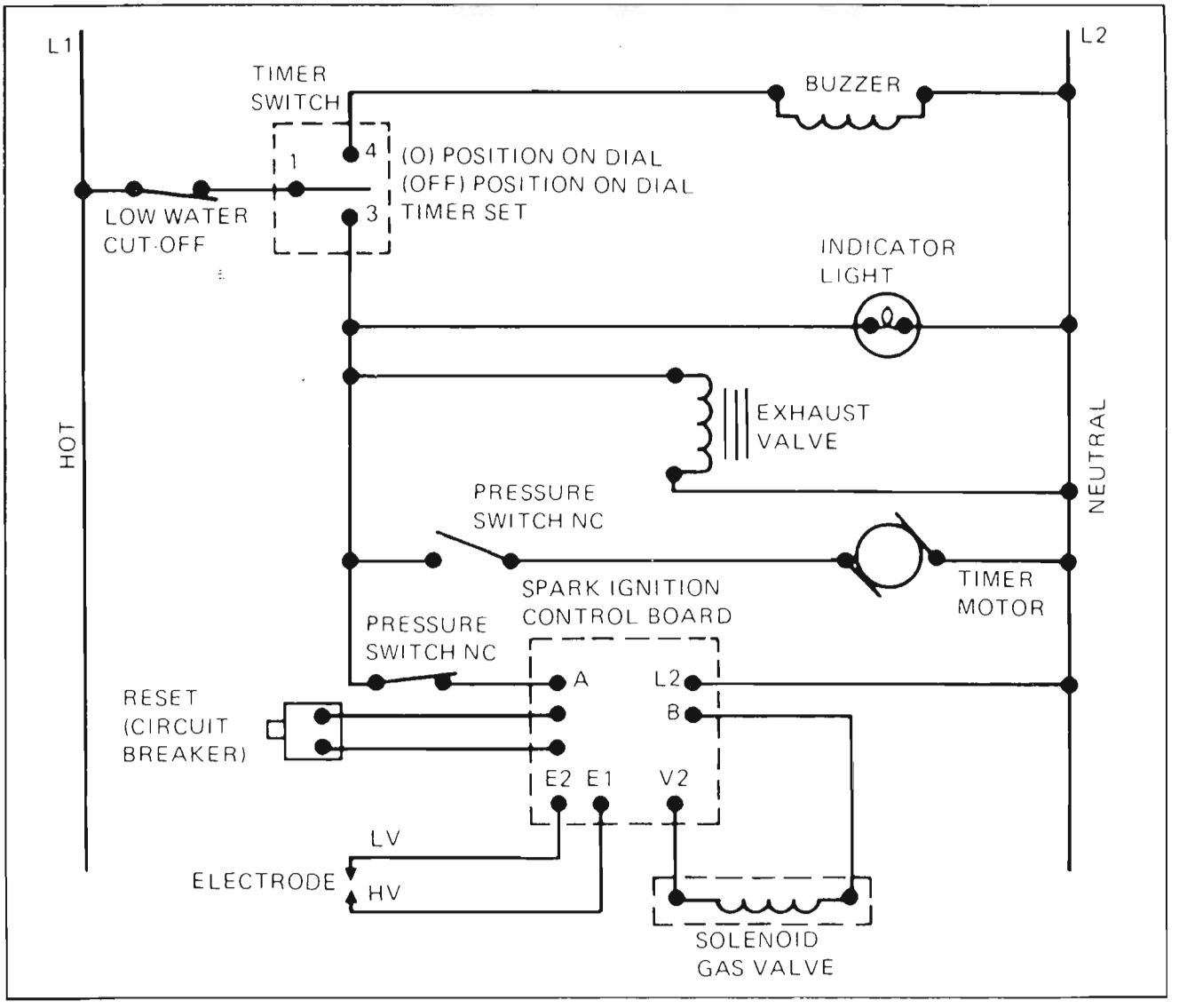



*Figure 5-2. Schematic Diagram Steam-It, 120V*

### 5.4.2 Electrical Inspection

The first step in any electrical trouble-shooting procedure is a thorough physical inspection of all wiring connections. To access electrical components remove the lower front panel (Figure 7-1, 11), and the chassis assembly (Figure 7-3) as explained in paragraph 6.3.4.

WARNING

Before removing panels or checking connections and wiring be sure that the main circuit breaker for incoming power to the Steam-It is OFF. When power is supplied all exposed terminals of the control panel carry 120 volts.

Check all wiring connections by hand to assure that both ends of all connection points are tightly secured. Use a screwdriver to tighten connection points if necessary. Visually inspect all quick-disconnect terminals for evidence of corrosion. Terminals in this condition should be separated, cleaned with sandpaper until shiny and tightly reconnected. If excessive corrosion is formed, the terminals must be replaced. Check all wiring for signs of cracked insulation. Replace any damaged wiring.

### 5.4.3 Direct Spark Ignition Control System

The ignition control board and associated components are the main electrical control for operation of the Steam-It cooker. If it is determined that the electrical controls

(solenoid valve, RESET switch, electrode, etc.) are not damaged and the interconnecting wiring is complete and not damaged, the trouble is due to a malfunction of the components on the ignition control board. Components on the control board are not replaceable and a damaged control board must be replaced with a functional unit. The following paragraphs outline possible problems and symptoms that may be encountered during the normal use of the Steam-It.

CAUTION

If a control board is replaced, be sure that the high voltage lead of the electrode is connected to terminal E1 and the low voltage lead is connected to terminal E2 of the control board.

**5.4.3.1 Improper Polarity.** If a spark is present and the gas valve opens, but the system shuts down after the trial period, check the 120 volt ac input voltage at terminals A (L1), and L2 of the control board, for proper polarity. Terminal A should be the hot side of the line and L2 neutral.

**5.4.3.2 Damaged Grounding.** If a spark is present and gas valve opens, but the system shuts down after the trial period, check to make sure the system is properly grounded to the burner and that the burner is properly grounded. Proper grounding is essential for the proof of flame safety device. If the system is not grounded to the burner, it cannot determine the presence of flame and will lock out. A restart will initiate the trial for ignition period, but the system will continue to go into "lock out" if it is not properly grounded, and the thermal reset timer will trip. Wait one minute before pushing the RESET button in. Check all power and ground terminals to make sure good contact is made. Clean any corrosion that might interfere with good electrical contact.

**5.4.3.3 Malfunction Due to High Voltage.** During the trial for ignition, if the spark is intermittent and the valve may (or may not) open, check the spark gap on the electrodes and system wiring as follows:

1. Remove the electrode from burner and check to see that the gap is 1/8 inch ±1/32 inch. If it is not, replace electrode.
2. Visually check the ceramic housing and lead wires for cracks or breaks.
3. Check terminals E1 and E2 for inadvertent grounding. They should be no closer than 1/2 inch from metal objects, which can cause arcing to ground. If the electrode or electrode lead wires are faulty, replace with new electrode and wiring.

**5.4.3.4 Malfunction of Gas Valve.** If the board is receiving proper power and there is a spark during the trial for ignition period, but the valve will not open, check the valve for an open coil or other malfunction. Be sure voltage rating of the valve is 120 volts ac. Use a voltage tester or volt-meter at terminals B and V2 of the ignition control board. The voltage should be the same as the valve.

**5.4.3.5 Erratic Operation.** If the system operates properly for a while but randomly shuts down during the duty cycle, or won't operate during "cold" starts, check the flame proving circuit with a dc microamp meter. Refer to Figure 5-3 and proceed as follows:

1. Locate ignition control board, Figure 7-3, Item 5.
2. Remove low voltage wire from terminal E2 and connect one lead of microamp meter to push-on connector attached to lead wire.
3. Connect second lead of meter to terminal E2 on ignition control board.
4. Energize control board and read current on microamp meter. Typical flame current is 2 to 20 microamperes.

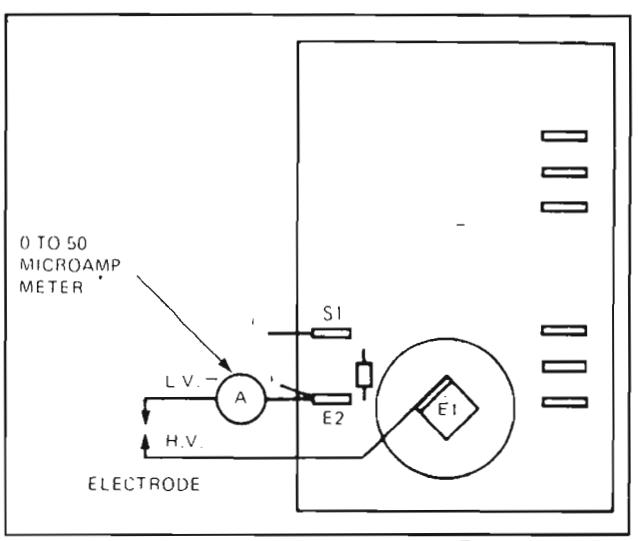



*Figure 5-3. Placement of Flame Current Meter*

If you have low or marginal flame current, it is tripping the thermal reset switch. If this is the case, you should relocate the electrodes or flame sensor into the flame to increase the flame current. If the ignitor is switched off and on several times in succession, the thermal reset switch will trip, and it will have to be reset. If ignition is not achieved after the first two or three attempts, check to insure that the other components in the system are functioning correctly.

### 5.4.4 60-Minute Timer

**5.4.4.1 Timer Contacts.** Defective timer contacts will result in failure of the Steam-It to operate properly. If the cooker fails to operate when timer is set to desired time, the fault is with the 60-minute timer contacts or its wiring. When this occurs, remove the control panel (paragraph 6.3.2), and proceed as follows:

1. Turn off power to the Steam-It at external (main) circuit breaker.
2. Disconnect all wires (13,14 and 16) from timer terminals. (See Figure 5-1.)
3. Connect an ohmmeter between terminal 1 and terminal 3 of timer.
4. Rotate timer dial beyond the 0-MINUTE point (any setting) to obtain a reading of zero ohms on the ohmmeter. If zero reading cannot be obtained, timer contacts are defective and the timer must be replaced.
5. Move ohmmeter leads to terminals 1 and 4.
6. Rotate timer dial to 0-MINUTE position. (An audible click indicates correct position.) If zero ohm reading cannot be obtained, the timer is defective and must be replaced.
7. Remove ohmmeter and replace all leads on timer terminals as shown in Figure 5-1.

**5.4.4.2 Timer Motor.** A defective timer motor will cause continuous operation with the timer dial failing to return to the 0-MINUTE position. If the timer motor fails to turn proceed as follows:

1. Turn off power and carefully check motor wire leads and tighten connections if found loose.

WARNING

Use care while working with control wiring. Terminals carry 120 volts.

2. Turn on power to the Steam-It.
3. Set 60-minute timer dial (any setting beyond "0-minute"). If operation is correct the motor will turn the dial dart through an arc toward "0-minute". If the motor fails to operate, it is defective and the entire timer must be replaced.
4. Shut off power to the Steam-It.

### 5.4.5 Solenoid Gas Valve

When the solenoid gas valve fails to operate, the fault may be a defective valve or control board. An ac volt-meter is used to check the voltage at the coil wire terminals, with the Steam-It operating. If voltage of 120 volts is present the valve is defective and must be replaced as a unit. If 120 volts is not present and all wiring connections are tight, the ignition control board is defective and must be replaced.

### 5.4.6 Buzzer

If the buzzer does not sound at the termination of cooking time (timer dial returned to "0-minute" position), the fault may be a defective buzzer. Buzzer operation is verified using an ac volt-meter at buzzer coil connections (permanently soldered), with input power on, and the 60-minute timer dial at the "0-minute" position. If voltage is 120 volts, the fault is in the buzzer which must be replaced. If 120 volts is not present, the fault is in the wiring.

### 5.4.7 Indicator Light

If the Steam-It functions correctly with the single exception that the indicator light fails to light during operation, the fault is a defective indicator light or wiring. A "burned-out" or defective light is verified by using an ac volt-meter at the leads on terminal block with input power on, and the 60-minute timer dial set (any setting beyond "0-minute"). If 120 volts is present the fault is in the indicator light and requires replacement. If 120 volts is not present the fault is in the wiring.

### 5.4.8 Wiring

All of the electrical components of the Steam-It (60-minute timer, pressure switches, gas solenoid valve, RESET switch, exhaust valve, low water cutoff switch and ignition control board, buzzer and indicator light) are connected to each other by wiring shown in Figure 5-1. If all of the electrical components are operating correctly (and the incoming power has been checked), but the cooker fails to operate the fault lies in the wiring.

Figure 5-1 is a wiring diagram which shows all terminals and interconnections within the electrical circuits. All numbered terminals are identified and all leads number coded as shown. Connections can be easily removed. Figure 5-2 shows the same information schematically and is an aid in isolating circuits for testing.

Using an ohmmeter, wiring continuity between the connections shown on the wiring diagram (Figure 5-1) are readily verified. This is best done in stages, removing only those wires required for each continuity check. As each lead is replaced it should be checked for evidence of corrosion and cleaned if necessary. All leads must be tightly attached so as to provide a good electrical connection.

# SECTION 6 MAINTENANCE

## 6.1 GENERAL

This section contains both preventive and corrective maintenance information. Preventive maintenance may be performed by maintenance personnel at the establishment in which the cooker is installed. It is recommended that user personnel never attempt to make repairs or replacements to the equipment without the assistance of authorized service. Assistance in service methods or a current Director of Authorized Service Agencies may be obtained from Market Forge. (See paragraph 1.3 in Section 1).

## 6.2 PREVENTIVE MAINTENANCE

A good preventive maintenance program begins with the daily cleaning procedure described in paragraph 3.3 in Section 3. Additional preventive maintenance operations are presented in this section. In establishments which employ full-time maintenance personnel, the tasks described can be assigned to them. For other installations, tasks requiring mechanical or electrical experience should be performed by an authorized service agency.

The following paragraphs set forth minimum preventive maintenance procedures which must be completed periodically to assure continued trouble-free operation of the Steam-It cooker.

CAUTION

Under no circumstances shall hardware (or parts) be replaced with a different length, size or type other than specified in the parts list. The hardware used in THE STEAM-IT COOKER has been selected or designed specifically for their applications and the use of hardware other than those specified may damage the equipment and will void any warranty.

### 6.2.1 Disassembly and Cleaning

The door assembly must be removed from the cooker compartment for weekly cleaning. Though no tools are needed, care in following procedure is necessary to insure that the door will pass through the compartment opening.

1. With cooking compartment door open, lift pan supports up and forward to disengage from mounting studs. Remove from compartment as shown in Figure 3-3.
2. Disengage left and right ends of door seal spring by counter-acting the force of the door lift spring with one hand while disengaging studs with the other hand (Figure 6-1).

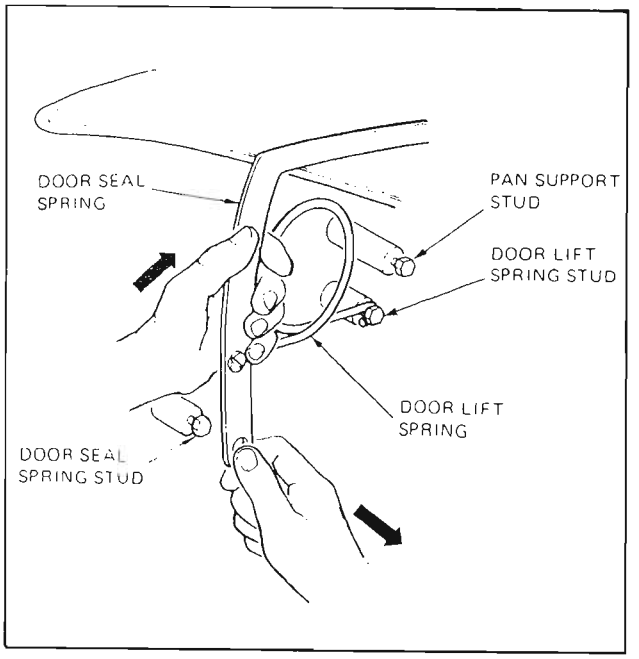



*Figure 6-1. Door Spring Disengagement*

3. Push door lift springs to the rear and off studs.
4. Rotate the door assembly out through the door opening, door handle first, as shown in Figure 6-2.
5. Inspect door gasket for cleanliness and wear. If food soil has become lodged behind the gasket or the gasket is torn, push it off perimeter of door and clean with mild detergent-water solution, or replace as needed (Figure 6-3). A gasket which is stuck to the door is easily removed by first soaking the entire door in hot soapy water.

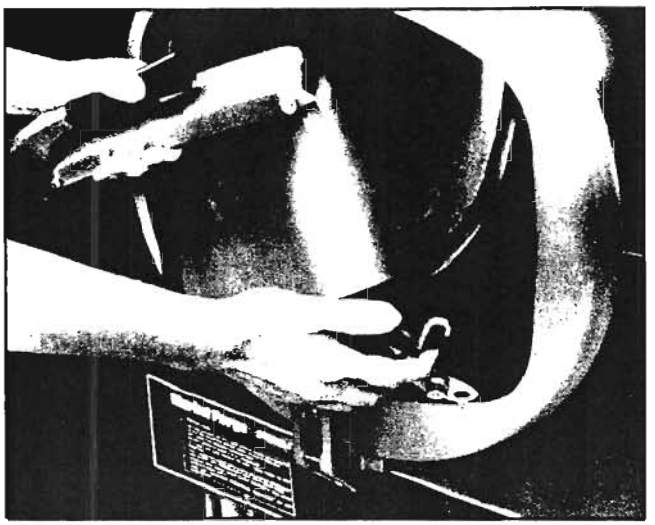


*Figure 6-2. Door Removal*

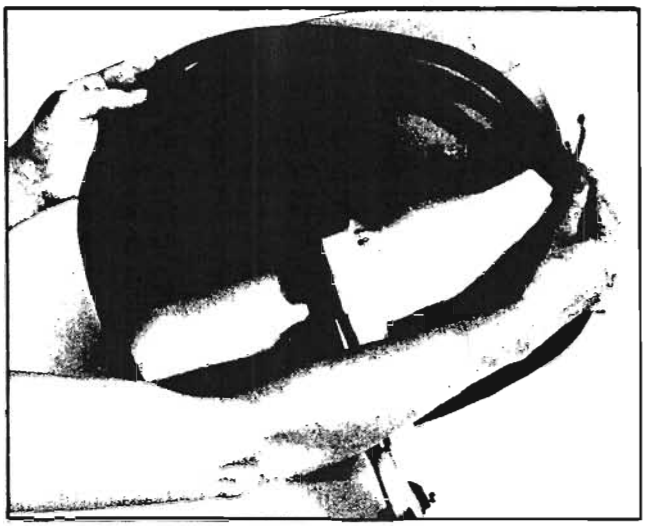


*Figure 6-3. Gasket Removal*

NOTE

To assure a pressure seal, the gasket must be cleaned of soil and scale, and be free of breaks.

6. Replace gasket on door and reassemble door assembly in compartment. Open and close door several times to check for correct operation and tight seal of door in closed position. See paragraph 6.3.1.2 to adjust door seal tension.

### 6.2.2 Safety Valve Check

The safety valve is a protective device which automatically relieves excessive pressure between 15-1/2 and 16 psi, in the unlikely event of equipment malfunction. If the safety valve should leak continually with a pressure build-up, or should it cause an interruption of the cooking cycle prematurely (less than 15-1/2 psi on the steam gauge), it must be assumed that the safety valve is defective and be replaced. However, the steam gauge should first be checked for accuracy before making this determination. The steam gauge should register zero with no pressure in the cooking compartment. If the normal zero setting has advanced somewhat through usage (a characteristic of steam gauges), the steam gauge should be replaced.

### 6.2.3 Door Fulcrum and Drain Cleaning and Lubrication

The door fulcrum and drain assemblies, located under the door opening, include the door latch anchor, drain components and the fulcrum adjustment screw. These parts are shown in Figure 7-6.

Periodic unscheduled cleaning of the drain and plug assembly with detergent-water solution will ensure trouble-free operation. The drain plug handle and drain hole must be free of food particles, with motion easy and unrestricted.

The anchor is equipped with a bronze roller bearing (11) which engages the hooked door latch. The entire roller assembly is shown as item (13) in Figure 7-6. The roller must be cleaned periodically to insure free-moving operation. Should accumulated dirt or food interrupt normal rolling, detergent-water solution should be used to free it. Cleaning should be followed by lubrication using graphite or other dry lubricant.

### 6.2.4 Cooking Compartment

A daily cleaning of the cooking compartment is required. Remove pan supports and thoroughly wash and rinse cooker compartment interior with mild soap or aluminum cleaner. Leave door open when cooker is not in use. See paragraph 3.3 in Section 3.

CAUTION

Do not use strong detergent or abrasive cleaners. Pitting of aluminum interior will result.

### 6.2.5 General Inspection

Prior to daily use the operator should visually inspect the unit to see that there is no missing or defective hardware, cracked glass on pressure gauge, cracked timer knob, and that pan supports are properly installed.

During operation the operator should observe that the timer is indicating proper cooking time, pressure gauge is reading correctly and steam trap and exhaust valve are operating properly. The first indication of defective steam trap operation will usually be evidenced by uneven cooking. If working properly, the steam temperature will be even and cooking will be uniform through the cooking compartment. Trouble may occur either through premature closing of the steam trap before all the cold air has been exhausted or by its failure to close sufficiently to enable a proper steam pressure build-up. Either case warrants the replacement of the steam trap.

## 6.3 REPAIR AND REPLACEMENT

WARNING

Be sure to disconnect 120 volt input power and shut off gas supply before disassembling components and making repairs and replacements.

Section 7 of this manual contains a listing of all replaceable parts and associated exploded views of the Steam-It. In most cases disassembly procedures will be obvious from the exploded views. Illustrated disassembly and assembly instructions follow for procedures which are not readily apparent.

NOTE

Complete disassembly of cabinet and panels are not required. Remove only the panels or components required to make repairs and replacements.

### 6.3.1 Door Assembly

The door assembly consists of the door latch and the latch fulcrum assembly. All parts are replaceable as shown in Figure 7-4, Door Assembly; Figure 7-5, Door Latch; and Figure 7-6, Door Fulcrum and Drain.

**6.3.1.1 Gasket Replacement.** The door gasket (Figure 7-4 index 6) is readily replaced by first removing the door assembly from the cooking compartment as explained in paragraph 6.2.1. The worn gasket is removed in the same manner as described for cleaning and a replacement substituted. A new gasket which is difficult to stretch onto the door can be made pliable by first soaking it in hot soapy water. Remounting the door in the compartment completes the replacement.

NOTE

The critical function of the door seal makes it imperative that the gasket be in good condition. For this reason it is recommended that at least one spare gasket be kept at all times.

**6.3.1.2 Door Seal Tension Adjustment.** An adjustment screw is built into the door anchor and fulcrum assembly to allow compensation for normal variation in gasket thickness caused by wear. The adjustment screw is shown in Figure 6-4. If steam escapes from around the door, sealing tension against the door opening can be increased by loosening the 1/4-20 jam nut and

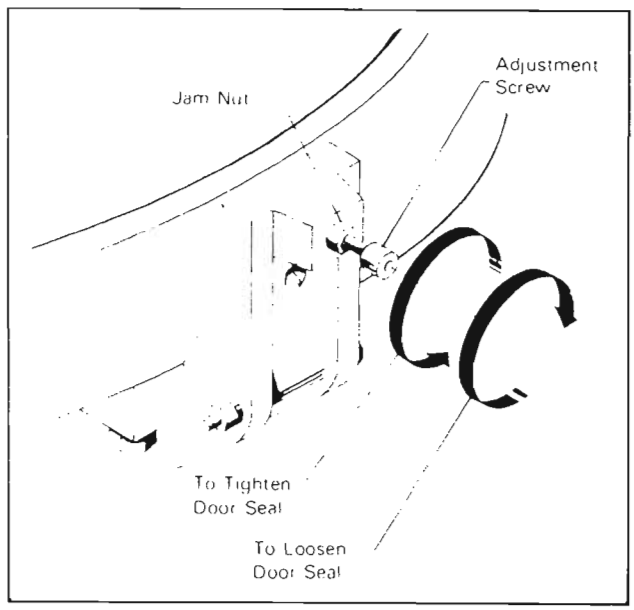



*Figure 6-4. Door Seal Tension Admustment*

turning the socket head adjustment screw counterclockwise with an allen wrench. Installation of a replacement door gasket may result in excessive door latching tension and require clockwise adjustment of the screw. Trial and error will achieve the screw adjustment which both seals the door against the compartment opening yet allows door latching with only moderate force applied to the handle. The final position is set by holding the cap screw with an allen wrench while tightening the 1/4-20 jam nut.

**6.3.1.3 Door Lift Spring Replacement.** Should either spring become damaged, it is necessary to replace both left and right springs as a set (Figure 7-4). The door assembly is removed from the cooking com-

partment as explained in paragraph 6.2.1. Springs are installed by removing spring bearings (2), screws (1), and worn springs (3 and 4) and mounting replacements. Springs are marked with tabs indicating the left and right side replacement springs for installation on the appropriate side as viewed from the front of the compartment.

### 6.3.2 Exterior Panel Removal

Access to all internal plumbing assemblies is from the top and front of the Steam-It cabinet. Whenever internal repairs or replacements are required, the applicable panels must first be removed. These parts are shown in Figure 7-1. The following procedure is required for removal of exterior panels.

1. Raise the cooking compartment door.
2. Remove screws (7) in lower front panel (11) and timer knob (Figure 7-3, 23).
3. Slide lower front panel (11) down from cylinder and lift off.
4. To gain access to terminal block (for primary power), remove screws (1) securing terminal box cover (13) to side panel.
5. To gain access to the gas pressure regulator, remove screws (28) securing access cover (29) to side panel.

### 6.3.3 Steam Exhaust Valve and Trap Replacement

The components of the steam exhaust valve assembly, trap, safety valve, silencer, pressure guage and associated plumbing and hardware are replaced by first removing flue assembly (Figure 7-1, index 32) and pressure gauge (33). To remove flue assembly proceed as follows:

1. Unscrew and remove exhaust silencer (Figure 7-1 index 51).
2. Detach the 3/16" copper tube connector from the pressure gauge at the ferrule nearest the pressure gauge. Then, remove the copper tube entirely by freeing it at the other ferrule.
3. Apply inward pressure at either side of the flue with a screwdriver. This will collapse the side walls slightly to allow the small fluted sections of sheet metal to clear the edges of the flue opening provided in the outer shell of the Steam-It. With the restrictions of the flutes removed, the flue may then be lifted up over the components.
4. Replacement of safety valve, trap plumbing and exhaust valve assembly (as required) may now be made. The components of the steam exhaust valve assembly are shown in Figure 7-2.

### 6.3.4 Direct Spark Ignition System

The ignition system components may be replaced by removing the burner chassis assembly (Figure 7-3). To remove complete burner chassis assembly proceed as follows:

WARNING

Be sure that electrical power and gas supply are shut off before removing burner chassis.

1. Complete exterior panel removal. (See paragraph 6.3.2)
2. Disconnect the lead wires No. 4 and 5 in the terminal box on left side of the Steam-It. (See Figure 5-1) These wires must follow the chassis as it is pulled forward.
3. Disconnect the gas connection at the right side (or bottom). The piping must be unscrewed from the gas elbow inside.
4. Disconnect the steam pressure line from pressure switch assembly (Figure 7-3, index 17).
5. Disconnect red low-water cut-off wires 19 and 20 and exhaust valve wires 21 and 22 from the terminal block.
6. Remove centering screw, nut and washer from front center bottom of chassis. The chassis assembly may now be pulled forward and completely removed from the Steam-It.

**6.3.4.1 Gas Burners.** The gas burners may be removed by first disconnecting wires to electrode (Figure 7-3, index 30). Remove stud, receiver (55) and carefully lift the back end of burners (32) until clear of holding pins in bracket then pull backwards. To replace burners, slide the front end over orifice holder then drop the back end into position and replace receiver (55). Reconnect wires to the electrode (See Fig.5-1).

**6.3.4.2 Ignition Control Board. (See Figure 7-3.)** To remove ignition control board (5), first disconnect wires at electrode (30), reset switch (20), gas valve (42), pressure switch assembly (17) and terminal strip (27). Remove screws (1) nuts (2) lockwashers (3) and spacers (4) and remove control board (5).

NOTE

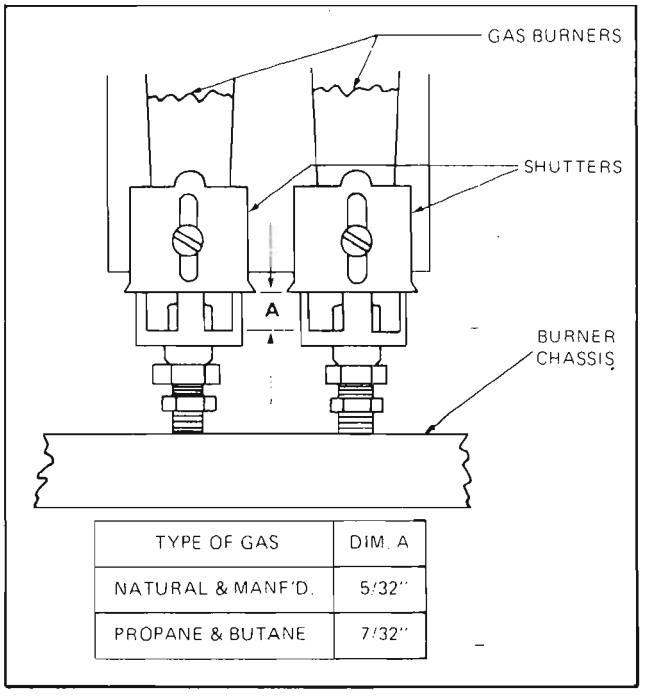
Ignition control board components are not replaceable. A damaged board must be replaced with a new assembly.

## 6.4 ADJUSTMENTS AND OPERATIONAL CHECKS

During normal use or when parts are replaced certain adjustments must be made. Components requiring adjustments or operational checks are outlined in the following paragraphs.

### 6.4.1 Gas Burners and Pressure Regulator

The burners and fixed orifices are sized at the factory for natural gas operation. The burner air shutters should be adjusted at the proper opening to produce a blue flame without yellow tipping. To adjust air shutters see Figure 6-5. Special size orifices are required for the gas burners. Refer to Figure 7-3 indexes 43, 44 and 45 for correct orifices to be used with certain gases.




| TYPE OF GAS | DIM. A |
|---|---|
| NATURAL & MANF'D. | 5/32" |
| PROPANE & BUTANE | 7/32" |

*Figure 6-5. Air Shutter Adjustment*

In addition, regulator (39) must be set to proper setting of4.0" W.C. for natural and manufactured gas and 10" W.C. for propane and butane gases. (Regulator is set at 4" W.C. pressure at the factory and must be changed to 10" W.C. pressure as required.) Regulator is adjusted by removing slotted cap and positioning marked spring guide as shown in Figure 6-6.

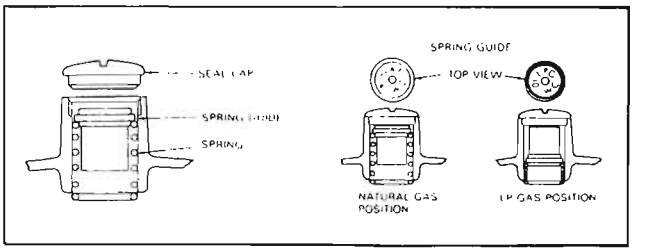



*Figure 6-6. Gas Regulator Adjustment*

### 6.4.2 Electrode Assembly

Electrode assemblies (Figure 7-3 index 30) are preset to a gap spacing of 0.125 inch ± 0.032 inch and should be checked periodically. If spacing is not correct adjustment is not to be made. The complete assembly must be replaced with a new unit. Electrodes are not field adjustable.

### 6.4.3 Solenoid Gas Valve

The solenoid gas valve (Figure 7-3 index 42) is used to control the flow of gas to the main burner which is under control of the pressure switch. To check valve operation proceed as follows:

1. Make certain the power disconnect for the unit is on.
2. Turn on gas supply and turn timer knob to 15 minutes. Electrodes will be energized.
3. Turn timer to zero. Listen carefully for the slight sound indicating the valve has closed.
4. If burner flame has not gone out, cycle the valve several times. The cycling should jar loose any dirt or impurities that may settle on the valve seat.
5. After check is made return timer to OFF and shut off gas supply.

### 6.4.4 Timer and Gas Control Switches

The timer control switch automatically delays the timer count-down at the beginning of the cooking cycle until the Steam-It has fully vented out all cold air from inside the cooking compartment and pressure has

reached 10 psi. The gas control switch governs the flow of heat to the cooking compartment to maintain compartment pressure at a near constant 14 psi. To adjust each switch for proper activation, turn adjustment nut (as applicable) clockwise to raise and counterclockwise to lower actuation pressure point.

# SECTION 7 ILLUSTRATED PARTS LIST

## 7.1 GENERAL

This section contains a complete listing of all replaceable parts of the Model ST-AG, Steam-It Style F, Gas Operated cooker. For the purpose of parts identification, the unit is broken down into functional assemblies, and each assembly is shown in an exploded view which is keyed to the accompanying parts list. Each parts list contains the figure index number, the Market Forge part number and an abbreviated description.

## 7.2 ORDERING INFORMATION

Orders for repair parts should be directed to the nearest authorized parts distributor. For a current Market Forge Authorized Parts Distributor List contact:

Product Service Department
Market Forge
35 Garvey Street
Everett, Massachusetts 02149
Telephone: (617) 387-4100

Product Service Department
Market Forge Canada, Ltd.
1375 Aimco Blvd., Unit 5
Mississauga, Ontario, Canada L4W 1B5
Telephone: (416) 621-9252

All orders should contain the Market Forge part number(s), the part description(s), and the model and serial numbers of the cooker for which the part(s) is ordered.

## 7.3 INDEX OF ILLUSTRATED PARTS LIST

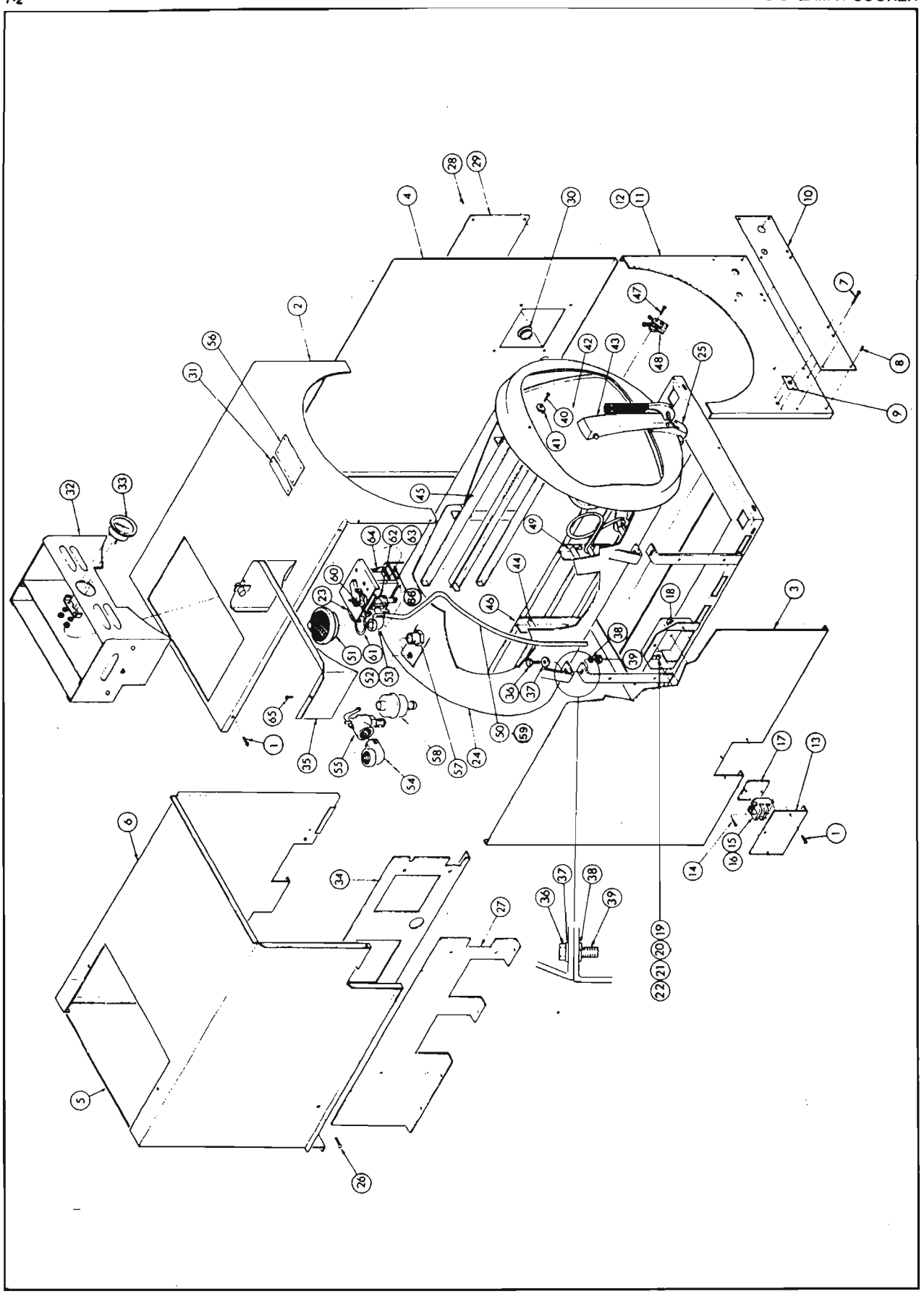


*Figure 7-1. Cabinet and Frame Assembly*

| FIG. 7-1 INDEX NO. | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1 | 10-1956* | Screw, phil. tr. hd., type A, stl, nickel pl. #8 x 3/8" |
| 2 | 95-3131 | Outer Case, top and front |
| 3 | 95-3757 | Outer Case, left side |
| 4 | 95-3768 | Outer Case, right side |
| 5 | 95-3126 | Outer Case, back |
| 6 | 95-3754 | Inner Case Subassembly |
| 7 | 10-1776* | Screw, mach., binding hd., st. stl., #10-32 x 1/2" |
| 8 | 10-2636* | Rivet, tubular, 1/2 oval hd., alum., 0.059 dia. x 1/8" |
| 9 | 10-7568 | Plate, reset button |
| 10 | 10-7569 | Panel, nameplate |
| 11 | 95-3756 | Panel, lower front |
| 12 | 10-6847 | Tape, insulator 3/4" wide x 6" lg. (Use with panel index 11) |
| 13 | 95-0689 | Cover, terminal box |
| 14 | 10-1717* | Screw, mach., rnd. hd., stl., cadmium pl., 8-32 x 3/8" |
| 15 | 10-5069 | Terminal Strip, contact section |
| 16 | 10-5070 | Terminal Strip, end section |
| 17 | 95-3528 | Insulator, terminal strip |
| 18 | 10-5243 | Conduit Nipple and locknut, malleable iron, cadmium pl., 1/2" |
| 19 | 10-1759* | Screw, mach., rnd. hd., stl., cadmium pl., #10-32 x 3/8" |
| 20 | 10-2505* | Lockwasher, stl., cadmium pl., #10 |
| 21 | 10-2340* | Nut, hex, stl. cadmium pl. #10-32 |
| 22 | 10-6969 | Lug, ground |
| 23 | 10-3360 | Elbow, 90°, brass, 1/8 IPS x 3/16 O.D. |
| 24 | 95-3190 | Body Assy |
| 25 | 95-0115 | Fulcrum and Drain Assembly (see Figure 7-6) |
| 26 | 10-1945* | Screw, mach., rnd. hd., stl., cadmium pl. 1/4-20 x 5/8" |
| 27 | 95-0918 | Inner Case Adapter, left side |
| 28 | 10-1863* | Screw, mach., phil. tr. hd., st. stl., #6-32-1/4" |
| 29 | 95-3766 | Access Cover, pressure regulator |
| 30 | 10-4667 | Button, plug, 1 1/4" dia. |
| 31 | 10-6924 | Plate, serial |
| 32 | 95-3135 | Flue Assy |
| 33 | 10-0883 | Gauge, pressure, 0 to 30 lbs, 1/8" IPS (mounting hardware and bracket supplied with gauge) |
| 34 | 95-3133 | Inner Case Adapter, right side |
| 35 | 95-0714 | Inner Collar Assy |
| 36 | 10-2105 | Bolt, square hd., stl., cadmium pl. 5/16-18 x 1.00" |
| 37 | 10-2405 | Washer, plain, stl., cadmium pl., 5/16" |
| 38 | 10-2511 | Lockwasher, stl., cadmium pl., 5/16" |
| 39 | 10-2307 | Nut, hex., stl., cadmium pl., 5/16-18 |
| 40 | 10-1774 | Screw, binding hd., type Z, st. stl., #8-32 x 3/8" |
| 41 | 10-0226 | Bumper, handle |
| 42 | — | Door Assy. (See Figure 7-4) |
| 43 | — | Door Latch Assy. (See Figure 7-5) |
| 44 | 10-1937 | Stud, support, pan and door pivot |
| 45 | 95-0096 | Pan Rack Assy., right |
| 46 | 95-0097 | Pan Rack Assy., left |
| 47 | 10-1842 | Screw, mach, rnd. hd., stl., cadmium pl., #8-32 x 3/8" |
| 48 | 10-6976 | Low Water Cut-Off |
| | | *NOTE: Available at local hardware store. |

| FIG. 7-1 INDEX NO. | PART NUMBER | DESCRIPTION |
|---|---|---|
| 49 | 10-1939 | Stud, Support, Door Spring |
| 50 | 95-3792 | Pressure Line, Steam |
| 51 | 10-4963 | Silencer, Exhaust |
| 52 | 10-3851 | Elbow, 90 , Brass, 3/8" |
| 53 | 10-3852 | Nipple, Brass, 3/8 IPS x 1 1/2" |
| 54 | 95-3834 | Elbow, Adapter Bushing and Nipple Kit |
| 55 | 10-7955 | Valve, Safety, 15 PSI |
| 56 | 10-6833 | Plate, Rating |
| 57 | 10-6158 | Adapter, Steam Trap |
| 58 | 10-6156 | Trap, Steam |
| 59 | 10-2904 | Connector, Male, Brass, 1/4" IPS x 1/4" OD |
| 60 | 10-3361 | Connector, Female, Brass 1/8" IPS x 3/16 OD |
| 61 | 95-3270 | Tubing, Pressure Gauge |
| 62 | 10-3420 | Nipple, Chrome Plated brass, 1/4 IPS x 1 1/2 |
| 63 | 10-3432 | Tee, Reducing, Brass, 1/4" x 1/8" x1/4" |
| 64 | 95-0771 | Exhaust Valve Sub-Assy. 120V 60Hz (see Figure 7-2) |
| 64A | 09-6544 | Exhaust Valve, 120V, 60 Hz, New Style ( see pg. 7-11) |
| 65 | 10-1956 | Screw, phil. tr. hd., type A, steel, nickel pl. #8 x 3/8" |
| 66 | 95-3189 | Deflector Plate, Exhaust Valve |
| 67 | 95-6017 | Kit, Corrosion Rod (Not Shown) |
| | | * NOTE: Available at local hardware stores |

| FIG. 7-2 INDEX NO. | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1 | 10-1663* | Pin , Cotter, 1/16 x1/2", st. stl. |
| 2 | 10-2425* | Washer, # 10 Flat, 3/16" ID x 1/2" OD x .086 thick cad. pl. |
| 3 | 10-4675 | Spring, Compression |
| 4 | 95-2077 | Body Assy., Diaphragm |
| 5 | 95-0372 | Ball and Pin Assy. |
| 6 | 95-0756 | Tee Assy. |
| 7 | 10-1678* | Pin, Roll, 1/8" x 1-1/8", cad. pl. |
| 8 | 10-1759* | Screw, rd. hd. #10-38 x 3/8", cad pl. |
| 9 | 10-2505* | Lockwasher,#10, cad. pl. |
| 10 | 95-0755 | Channel |
| 11 | 10-1701* | Screw, rd.hd., 1/4-20 x 3/8", cad. pl. |
| 12 | 10-2500* | Lockwasher, 1/4, cad. pl. |
| 13 | 95-0760 | Pin, Solenoid |
| 14 | 10-6292 | Solenoid, 120V, 60 Hz, complete |
| 15 | 95-0431 | Bracket Assy., Solenoid |
| 16 | 10-6658 | Coil, 120V, 60 Hz |
| | | * NOTE: Available at local hardware stores |

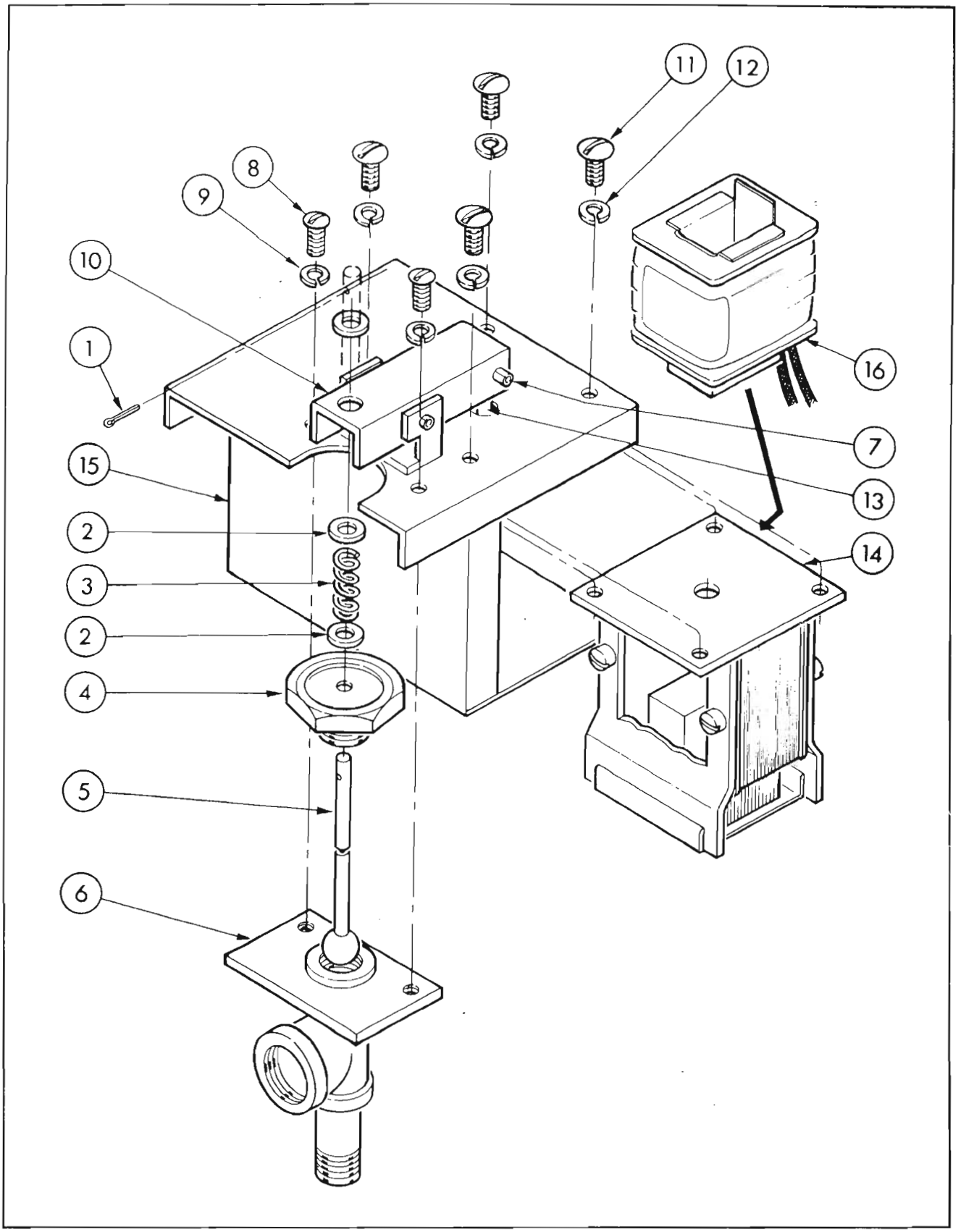



*Figure 7-2. Steam Exhaust Valve Assembly*

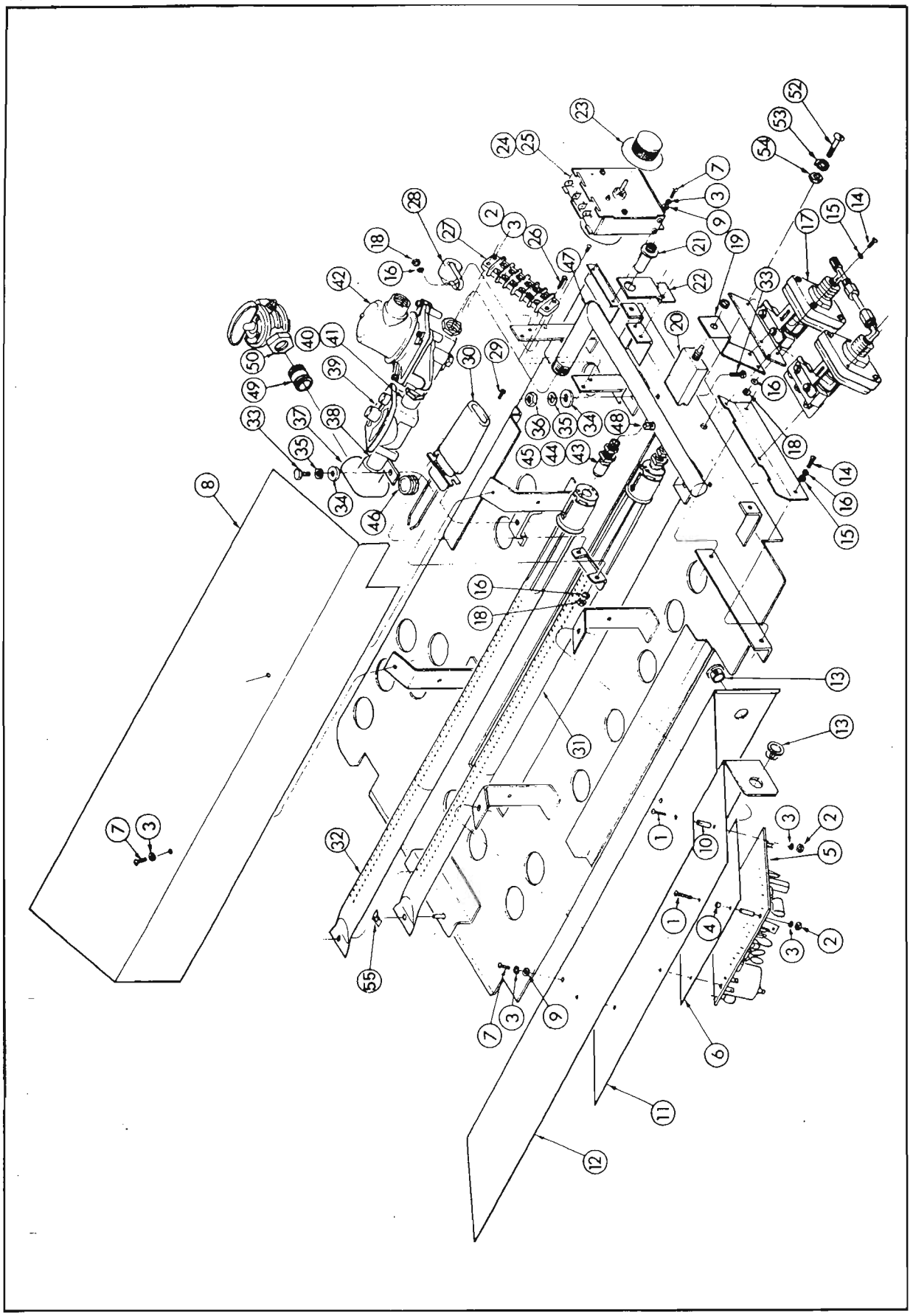


*Figure 7-3. Burner Chassis Subassembly*

| FIG. 7-3 INDEX NO. | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1 | 10-1842 | Screw, Mach, Rnd Hd. Cadmium Pl. # 8 - 32 x 7/8 |
| 2 | 10-2332 | Nut, Stl, Cadmium Pl. , # 8 - 32 |
| 3 | 10-2421 | Lockwasher, Stl. Nickle Pl. # 8 |
| 4 | 95-3750 | Spacer, Control Board Shield |
| 5 | 10-7696 | Ignition Control Board |
| 6 | 95-3734 | Shield, Ignition Control Board |
| 7 | 10-1717 | Screw, Mach., Rnd. Hd., St. Stl., # 8 - 32 x 3/8 |
| 8 | 95-3733 | Deflector, Right Side |
| 9 | 10-2425 | Washer, Plain, Stl., Cadmium Pl. # 8 |
| 10 | 95-3144 | Spacer, Deflector |
| 11 | 95-3729 | Shield, Left Side |
| 12 | 95-3732 | Deflector, Left Side |
| 13 | 10-0265 | Bushing, 9/16" ID |
| 14 | 10-1720 | Screw, Mach., Rnd Hd., St Stl., # 6 - 32 x 1/2 |
| 15 | 10-2428 | Washer, Plain, Stl., Cadmium Pl., # 6 |
| 16 | 10-2515 | Lockwasher, Stl., Cadmium Pl., # 6 |
| 17 | 95-3720 | Pressure Switch Assy |
| 18 | 10-2331 | Nut, Hex, Stl., Cadmium Pl. # 6 - 32 |
| 19 | 95-3719 | Bracket, Reset Switch |
| 20 | 09-8015 | Reset Switch |
| 21 | 10-6683 | Pilot Light, Red, 120V |
| 22 | 95-3705 | Bracket, Pilot Light |
| 23 | 10-6307 | Knob, Timer |
| 24 | 95-0462 | Bracket, Timer |
| 25 | 95-3393 | Timer, 60 Minute, 120V, Special |
| 26 | 10-1747 | Screw, Mach., Rnd. Hd., St Stl., # 8 - 32 x 5/8 |
| 27 | 10-6166 | Terminal Strip |
| 28 | 10-6682 | Buzzer, 120V |
| 29 | 10-1722 | Screw, Mach., Rnd. Hd., St Stl., # 6 -32 x 3/8 |
| 30 | 10-7697 | Electrode |
| 30A | 95-3769 | Insulator, Electrode ( Not Shown ) |
| 30B | 10-7698 | Lead Wire, High Voltage ( Not Shown ) |
| 30C | 10-7699 | Lead Wire, Low Voltage ( Not Shown ) |
| 31 | 95-3791 | Gas Burner ( includes electrode bracket ) |
| 32 | 10-8341 | Gas Burner, Plain |
| 33 | 10-1804 | Screw, Mach., Rnd. Hd., Stl., Cadmium Pl. 1/4 - 20 x 5/8 |
| 34 | 10-2400 | Washer, Plain, Stl., Cadmium Pl., 1/4" |
| 35 | 10-2500 | Lockwasher, Stl., Cadmium Pl. 1/4" |
| 36 | 10-2308 | Nut, Hex, Stl., Cadmium Pl., 1/4 - 20 |
| 37 | 10-3395 | Elbow, Side Outlet, Malleable Iron, 3/8" |
| 38 | 95-3744 | Nipple and Bracket Sub - Assy |
| 39 | 10-7695 | Pressure Regulator, 3/8" |
| 40 | 10-3362 | Close Nipple, Black Iron, 3/8" |
| 41 | 10-3389 | Reducing Bushing, Hex, Malleable Iron, 1/2 - 3/8" |
| 42 | 10-7694 | Gas Valve, 120V, 60 Hz, 1/2" |
| 43 | 10-0957 | Burner Orifice, # 47 DMS, Yellow, Nat Gas |
| 44 | 10-2921 | Burner Orifice, # 55 DMS, Purple, Lp Gas |

| FIG. 7-3 INDEX NO. | PART NUMBER | DESCRIPTION |
|---|---|---|
| 45 | 95-3504 | Burner Orifice, #31 DMS, brown (for use with manufactured gas supply) |
| 46 | 10-1190 | Plug, countersunk, malleable iron, 3/8" |
| 47 | 10-8925 | Manifold |
| 48 | 10-3755* | Pipe Plug, steel, 1/8" IPS |
| 49 | 10-3355 | Nipple, short |
| 50 | 10-8364 | Valve, gas, 3/8" NPT |
| 51 | 95-3829 | Gas Shutoff Valve Installation Kit (not shown) |
| 52 | 10-1759 | Screw, rnd. hd., #10-32 x 3/8" stl |
| 53 | 10-2505 | Lockwasher #10 |
| 54 | 10-2340 | Nut, #10-32 |
| 55 | 10-2347 | Stud Receiver |
| | | *NOTE: Available at local hardware store. |

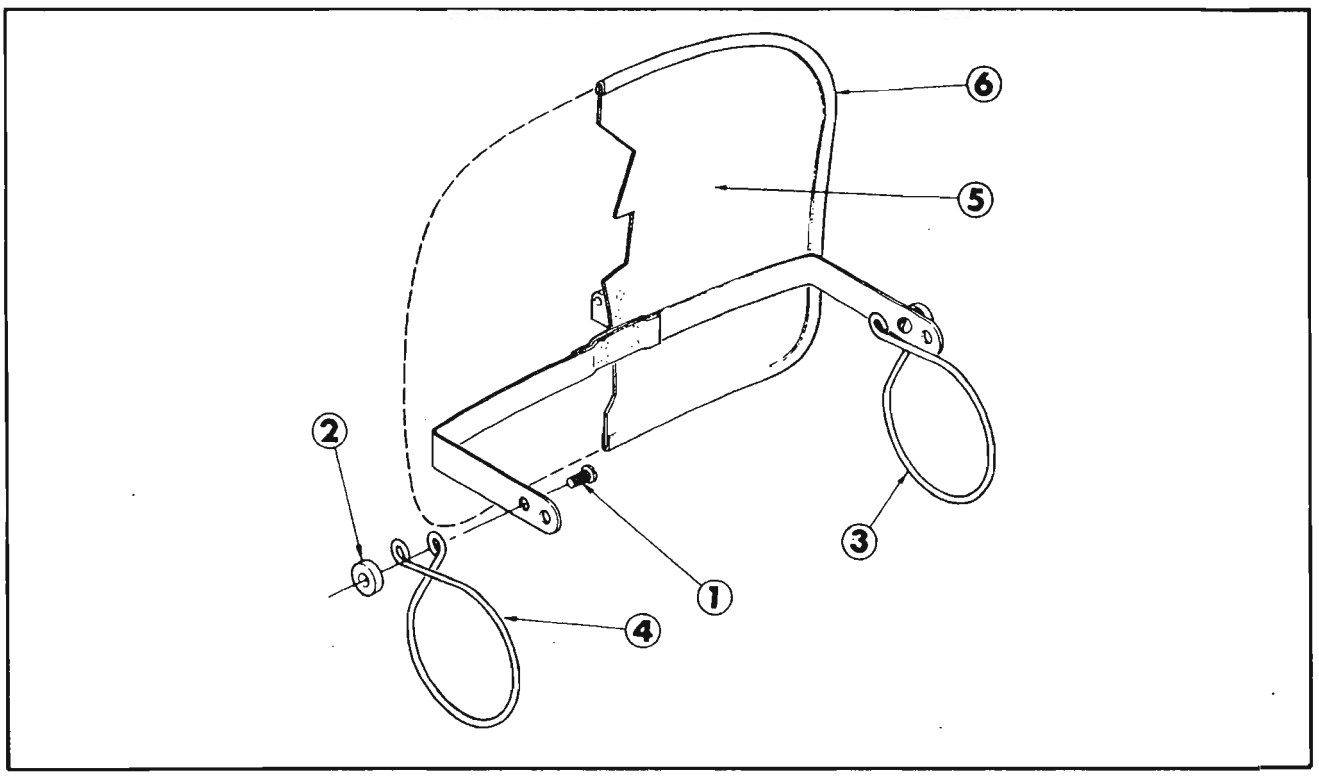



*Figure 7-4. Door Assembly*

| FIG. 7-4 INDEX NO. | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1 | 10-1776 | Screw, #10-32 x 1/2" long, st. stl. |
| 2 | 10-6765 | Bearing, spring pivot |
| 3 | 10-7980 | Spring, door lift, left hand |
| 4 | 10-7981 | Spring, door lift, right hand |
| 5 | 95-3204 | Door and Spring Assy. |
| 6 | 10-2666 | Gasket, door |

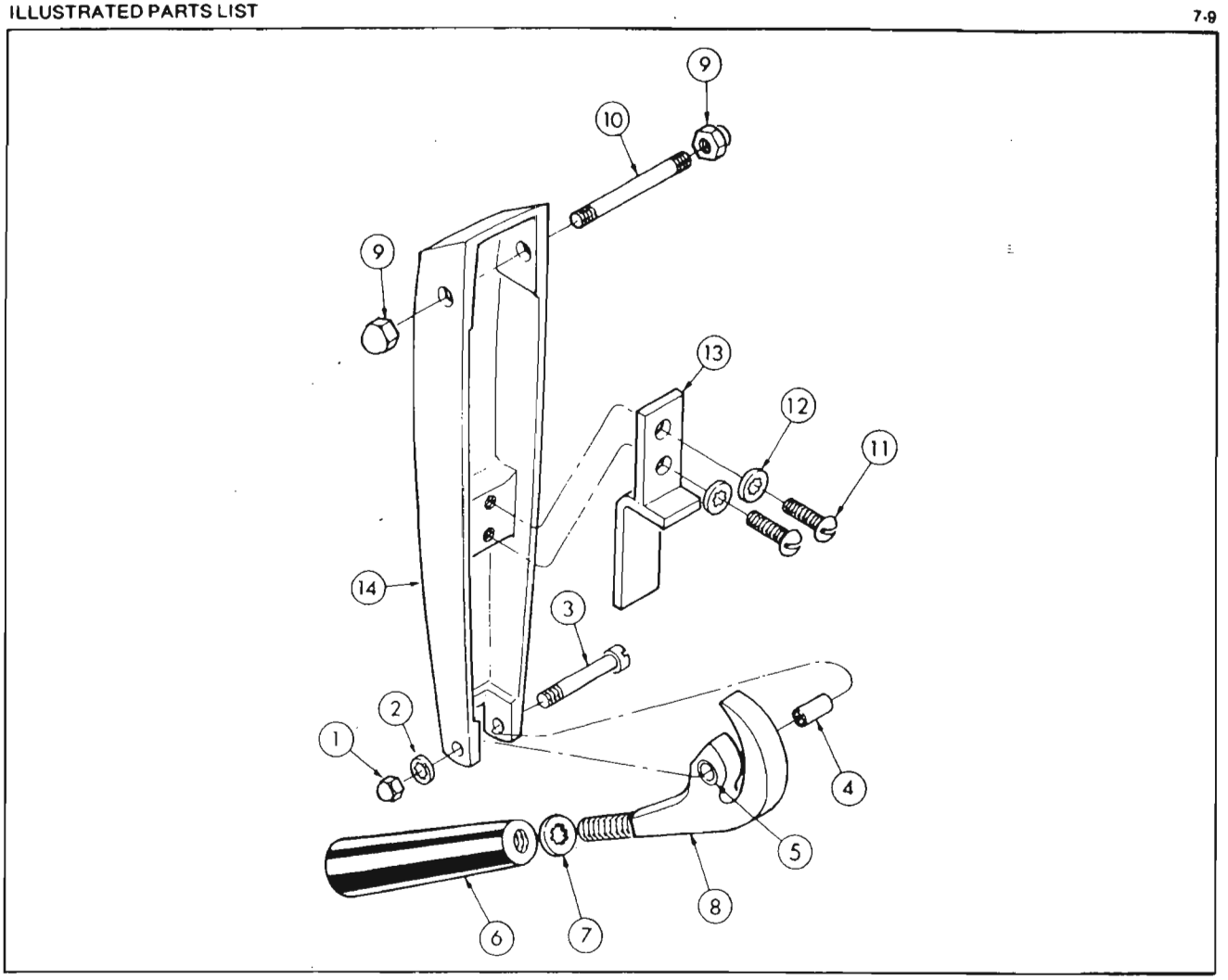



*Figure 7-5. Door Latch Assembly*

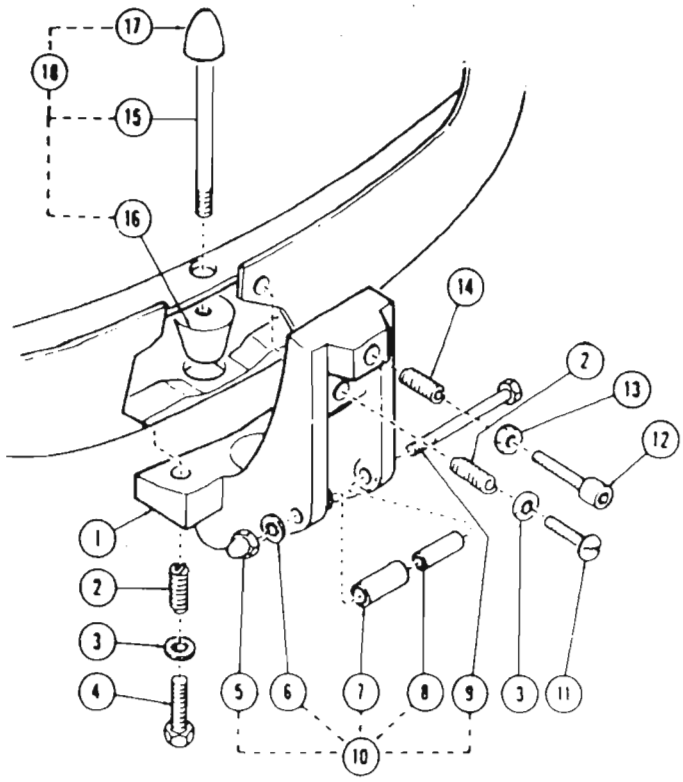
| FIG. 7-5 INDEX NO. | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1 | 10-2318* | Nut, acorn, st. stl., #10-32 |
| 2 | 10-2514* | Lockwasher, internal tooth, st. stl. #10 |
| 3 | 95-0571 | Screw, fillister hd., st. stl., #10-32 x 1 3/8 (special) |
| 4 | 95-0120 | Spacer, bearing |
| 5 | 95-0198 | Bearing |
| 6 | 10-0050 | Knob, door latch |
| 7 | 10-2517* | Lockwasher, internal tooth, st. stl., 3/8" |
| 8 | 95-0136 | Door Lock Casting Assy. |
| 9 | 10-2359* | Nut, acorn, alum., 1/4-20 |
| 10 | 95-0658 | Stud, handle bearing |
| 11 | 10-1731* | Screw, mach., rd. hd., st. stl., 1/4-20 x 5/8" |
| 12 | 10-2513* | Lockwasher, internal tooth, st. stl., 1/4 |
| 13 | 95-0659 | Handle Bearing Bracket Assy. |
| 14 | 95-0134 | Handle, door |
| | | *NOTE: Available at local hardware store. |

## OLD STYLE

**FULCRUM & DRAIN ASSEMBLY**
**Used from 4/75—10/85**

| Item No. | Description | Part No. |
|---|---|---|
| 1 | Fulcrum and Drain Casting | 95-0116 |
| 2 | ¼-20 x ⅜ Helicoil | 10-3111 |
| 3 | ¼" Shakeproof Washer | 10-2513 |
| 4 | ¼-20 Cap Screw, ⅛" long | 10-1790* |
| 5 | 10-32 Acorn Nut | 10-2318 |
| 6 | #10-Shakeproof Lockwasher | 10-2514 |
| 7 | Bronze Bearing | 95-0198 |
| 8 | Bearing Spacer | 95-0120 |
| 9 | 10-32 Machine Screw, 1½" long | 10-1999 |
| 10 | Roller Assembly (Items 5-9) | 95-0149 |
| 11 | ¼-20 Machine Screw, ¾" long | 10-1763* |
| 12 | ¼-20 Allen Set Screw | 10-2087 |
| 13 | ¼-20 Jam Nut | 10-2358 |
| 14 | ¼-20 x ⅜ Helicoil | 10-3116 |
| — | Complete Fulcrum Assy. (Items 1-14) | 95-0115 |
| 15 | Drain Plug Handle | 95-0658 |
| 16 | Drain Plug | 10-2227 |
| 17 | ¼-20 Acorn Nut | 10-2359 |
| 18 | Drain & Plug Handle Assy. (Complete) | 95-2604 |

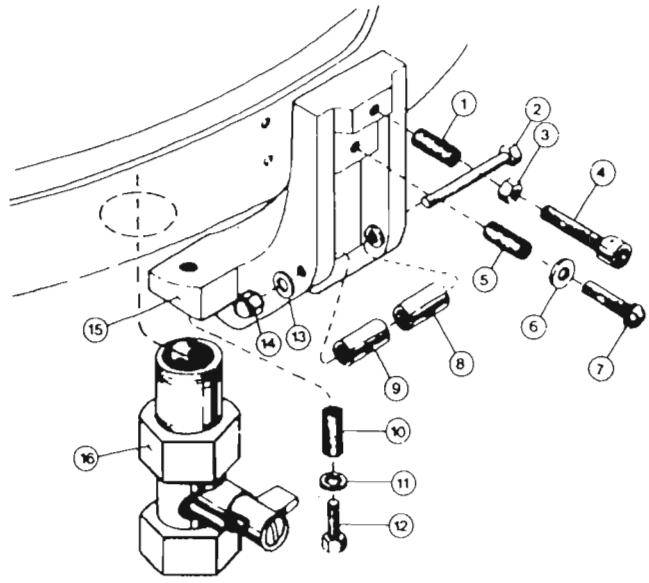
*Obtain at local hardware store




## NEW STYLE

**FULCRUM & DRAIN ASSEMBLY**
**Built after 10/85**

| Item No. | Description | Part No. |
|---|---|---|
| 1 | ¼-20 x ⅜ Helicoil | 10-3116 |
| 2 | 10-32 Machine Screw, 1⅛" long | 10-1999 |
| 3 | ¼-20 Fulcrum Nut | 10-2358 |
| 4 | ¼-20 Allen Set Screw | 10-2087 |
| 5 | ¼-20 x ⅜ Helicoil | 10-3111 |
| 6 | ¼" Shakeproof Washer | 10-2513 |
| 7 | ¼-20 Machine Screw ¾" long | 10-1763 |
| 8 | Bearing Spacer | 95-0120 |
| 9 | Bronze Bearing | 95-0198 |
| 10 | ¼-20 x ⅜ Helicoil | 10-3111 |
| 11 | ¼" Shakeproof Washer | 10-2513 |
| 12 | ¼-20 Cap Screw, ⅛" long | 10-1790 |
| 13 | #10 Shakeproof Lockwasher | 10-2514 |
| 14 | 10-32 Acorn Nut | 10-2318 |
| 15 | Fulcrum and Drain Casting | 95-3850 |
| 16 | Ball Valve | 10-1041 |
| | Fulcrum and Drain Assembly (Items 1—15) | 95-3992 |



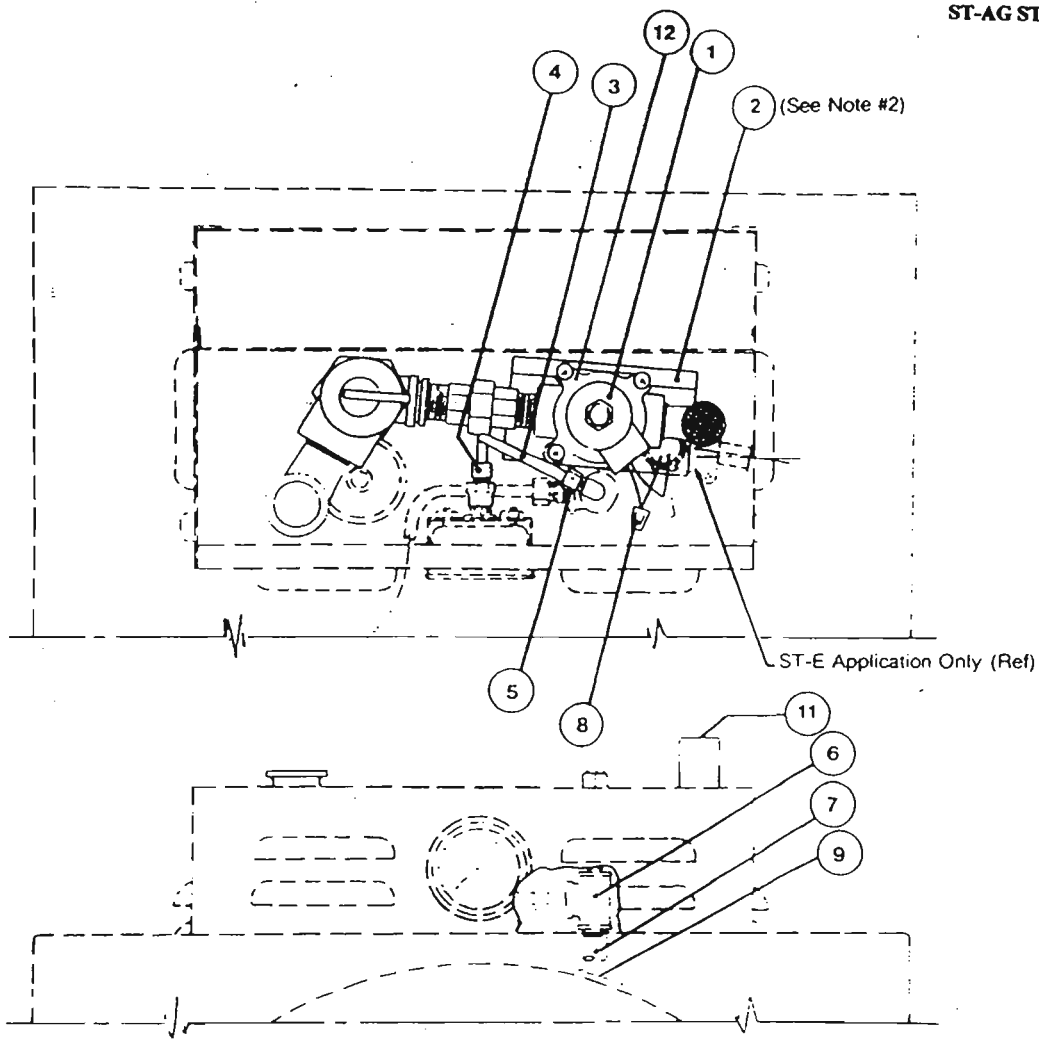

**FULCRUM & DRAIN ASSEMBLY**

The Fulcrum and Drain Assembly is located at the lower front of the cooking cylinder and furnishes a sturdy anchorage for the door locking system of the door handle. Also provided in this assembly is a means of adjustment for the door seal. The drain port and drain plug provide a means of discharging accumulations of water from the cooking cylinder.

**ROLLER ASSEMBLY**

Built Prior to 10/85 (Items 5, 6, 7, 8 & 9)
Built after 10/85 (Items 2, 8, 9, 13 & 14)
The Roller Assembly must be kept free-rolling at all times. Should this assembly be allowed to become frozen due to lack of lubrication, undue strain will be put on the door handle and the fulcrum casting while the door is being locked. *Use only a dry lubricant such as graphite*, as oil or grease will tend to attract dirt to this area.

## NEW STYLE EXHAUST VALVE—BUILT AFTER JULY 1983




| Item No. | Description | Part No. | Qty. |
|---|---|---|---|
| 1 | Assy piping exhaust, 120V 60Hz | C95-3995 | 1 |
| 2 | Heat Deflector Plate | C95-3990 | 1 |
| 3 | Tubing, Pressure Gauge | A95-3270 | 1 |
| 4 | Pem. Conn. Brass, !/8 I.P.S. x 3/16 O.D. | 10-3361 | 1 |
| 5 | 90° Comp. 1/8 I.P.S. male 3/16 O.D. | 10-3360 | 1 |
| 6 | Tee reducing - brass (existing) | 10-3432 | Ref |
| 7 | Nipple, brass chr. pl. (existing) | 10-3420 | Ref |
| 8 | Marr Connector | 10-5143 | 2 |
| 9 | Plug, Countersunk, 1/4 I.P.S. br. chr. pl. | P09-4838 | 1 |
| 10 | Packing, corrugated carton (8 x 8 x 6) | 10-1643 | 1 |
| 11 | Silencer, exh., Steam-It | 10-4963 | 1 |
| 12 | Exhaust Valve only 120V 60Hz | 09-6544 | 1 |

**Replacement Instructions**

A. Disconnect fitting pressure gauge

B. Remove flue enclosure.

C. Remove old exhaust valve by unscrewing 1/4 I.P.S. nipple from cylinder.

D. Remove safety relief valve assy. from 1/2 I.P.S. nipple.

E. Remove all fittings from the reducing tee and remove tee and nipple by unscrewing nipple from cylinder, remount nipple and tee in the front 1/4 I.P.S. tap hole.(Note that the use of the rear 1/4 I.P.S. tap hole is eliminated, install plug as shown).

F. Mount new exhaust valve assy. on to 1/2 I.P.S. nipple previously used to mount safety relief valve. (Before mounting exhaust valve assy. install heat deflector plate on valve as shown)

G. Reconnect 1/4 O.D. tubing (Steam pressure line) as shown.

H. Remount flue enclosure.

I. Install all new fittings, tubing, and wire joints as shown.

NOTES:

1. All parts shown potted are existing, to be reused with new assy.
2. Do not remove knockout from item # 2 for ST-AG units.
3. All items (except ref. items) and one print of this drawing to be included with this kit (item #10 used for shipping).