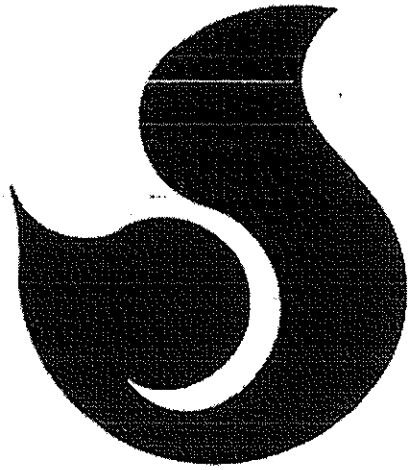


JOHNSON FURNACE INSTRUCTION MANUAL

#122 FURNACE - MANUAL TEMPERATURE CONTROL & THERMOCOUPLE SAFETY.

INSTALLATION INSTRUCTIONS FOR #122 & #133 FORGES WITH ELECTRIC IGNITION & SAFETY EQUIPMENT.

CONSULT FORMS 221 & 274 WHILE READING THIS.

WHEN PLACING THE FORGE IN THE DESIRED LOCATION, MAKE SURE THE BACK OF THE FORGE (BURNER SIDE) IS PLACED FAR ENOUGH AWAY FROM ANY WALL SO THE LID CAN SWING AWAY FROM THE TOP SLOT OF THE FORGE AND SPACE IS SUFFICIENT FOR SERVICING. ALLOW ENOUGH SPACE AT THE FRONT OF THE FORGE FOR THE OPERATOR TO PERFORM HIS DUTIES.

TO REMOVE EXHAUST GASES AND FUMES, USE A HOOD WITH AN EXHAUST FAN. THE HOOD SHOULD BE HIGH ENOUGH SO THAT IT DOES NOT INTERFERE WITH THE OPERATOR.

IF NECESSARY, PROTECT NEARBY WALLS AND CEILINGS FROM RADIANT HEAT BY USING INSULATION BOARD, ETC.

CONNECT 115 VOLT ELECTRICAL SOURCE TO THE BLACK AND WHITE LEADS EXTENDING FROM THE CONTROL BOX AT THE FRONT OF THE FURNACE.

CONNECT GAS LINE TO GAS INLET PIPE. THE GAS PRESSURE SHOULD BE 2 to 3 OUNCES FOR NATURAL GAS AND 6 OUNCES FOR LP GAS. PRESSURE SHOULD BE CHECKED WHEN THE FORGE IS IN OPERATION AT A HIGH RATE.

INSTALL THE HANDLE ON THE LID. (SEE FORM 221) TO RAISE OR LOWER THE LID, TURN THE LOCKING LEVER TO THE UN-LOCKED POSITION: ADJUST TO THE DESIRED HEIGHT: THEN RETURN LOCKING LEVER TO THE LOCKED POSITION. (SEE FORM 274)

INSTALL THE THERMOCOUPLE AND SPARK PLUG IGNITER IN THE BURNER MANIFOLD. (SEE FORM 274) MAKE SURE THE BRASS SLEEVE IS POSITIONED PROPERLY ON THE THERMOCOUPLE: INSERT THE THERMOCOUPLE INTO THE BRASS BUSHING: SCREW IN THE BRASS NUT AND SNUG UP THE NUT WITH A WRENCH.

INSERT THE SPARK PLUG IGNITER IN THE OPENING IN THE BACK OF THE BURNER MANIFOLD AND TIGHTEN IN PLACE WITH A WRENCH. PUSH THE CONNECTOR OVER THE END OF THE SPARK PLUG.

SEE FORM FOR LIGHTING INSTRUCTIONS.

LIGHTING & OPERATING INSTRUCTIONS FOR #122 & #133 FORGE WITH SPARK IGNITION & SAFETY

CONSULT FORM 277 OR 278 WHILE READING THIS.

NOTE: IF THE FORGE HAS BEEN IN OPERATION, ALWAYS WAIT AT LEAST FIVE (5) MINUTES BETWEEN SHUTDOWN AND STARTING UP OF THE FORGE. (TIME REQUIRED FOR CONTROLS TO RECYCLE TO STARTING POSITION.)

1. SET AIR CONTROL HALFWAY BETWEEN OPEN AND CLOSED POSITIONS. SET GAS CONTROL TO CLOSED POSITION.

2. SWING THE LID TOWARD THE BACK SIDE OF THE FURNACE SO THAT IT IS NOT OVER THE TOP SLOT.

3. DEPRESS AND RELEASE THE START BUTTON. THE BLOWER MOTOR WILL BE RUNNING, THE RED LIGHT WILL COME ON AND IF THE ROOM IS NOT TOO NOISY, YOU WILL HEAR THE SPARK PLUG IGNITER "BUZZING". THE IGNITER WILL STAY ON FOR ABOUT 1½ MINUTES SO THE STARTING CYCLE HAS TO BE COMPLETED IN THAT TIME.

4. DEPRESS AND HOLD IN THE IGNITER BUTTON. SLOWLY, TURN THE GAS CONTROL TOWARD THE OPEN POSITION UNTIL THE BURNERS IGNITE. THEN, TURN THE CONTROL SLIGHTLY PAST THIS POSITION TO OBTAIN A STEADY ROAR FROM THE BURNERS. AFTER ABOUT TWENTY (20) SECONDS, THE RED LIGHT WILL GO OUT AND YOU CAN RELEASE THE IGNITION BUTTON. IF THE LIGHTING CYCLE WAS NOT COMPLETED IN 1½ MINUTES, A THERMAL RELAY WILL SHUT OFF THE GAS AND THE SPARK IGNITER. YOU WILL THEN HAVE TO PUSH THE "STOP" BUTTON AND WAIT FIVE (5) MINUTES. YOU CAN THEN REPEAT STEPS 1, 2, 3 & 4 AND START THE FORGE.

5. AFTER THE FORGE HAS BEEN STARTED, ADJUST THE GAS CONTROL TO GIVE A SHARP TAIL OF FLAME THAT EXTENDS JUST ABOVE THE TOP OF THE FORGE. WORK CAN BE PLACED IN THE FLAME. THE WORK RACK AT THE FRONT OF THE FURNACE CAN BE SLID OUT TO SUPPORT THE WORK. THE LID SHOULD BE CENTERED OVER THE TOP SLOT.

TO INCREASE THE AMOUNT OF GAS, TURN THE GAS CONTROL TOWARD THE OPEN POSITION TO GET A HIGHER FLAME. THEN, TURN THE AIR CONTROL HANDLE TOWARD THE OPEN POSITION TO OBTAIN THE SHARP TAIL OF FLAME. REPEAT THESE STEPS UNTIL THE DESIRED OR MAXIMUM GAS INPUT IS REACHED.

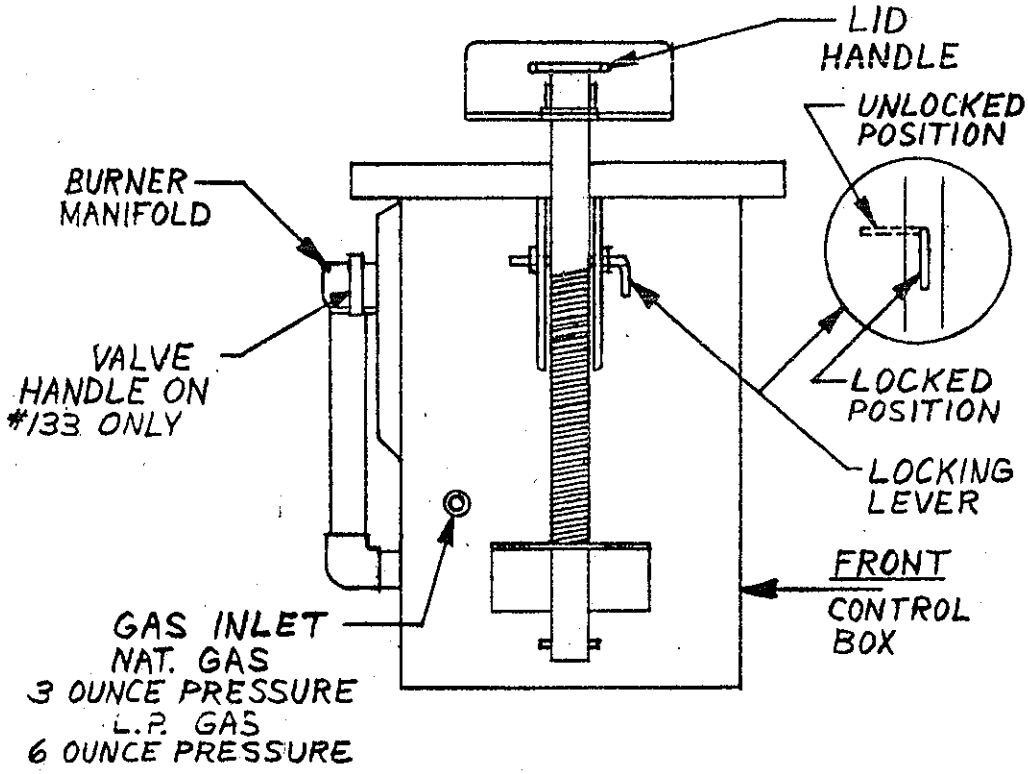
TO DECREASE THE AMOUNT OF GAS, TURN THE GAS CONTROL HANDLE TOWARD THE CLOSED POSITION UNTIL THE SHARP TAIL OF FLAME ALMOST DISAPPEARS. THEN, TURN THE AIR CONTROL TOWARD THE CLOSED POSITION UNTIL THE TAIL OF FLAME RE-APPEARS. REPEAT THIS PROCEDURE UNTIL THE DESIRED OR MINIMUM GAS INPUT IS REACHED.

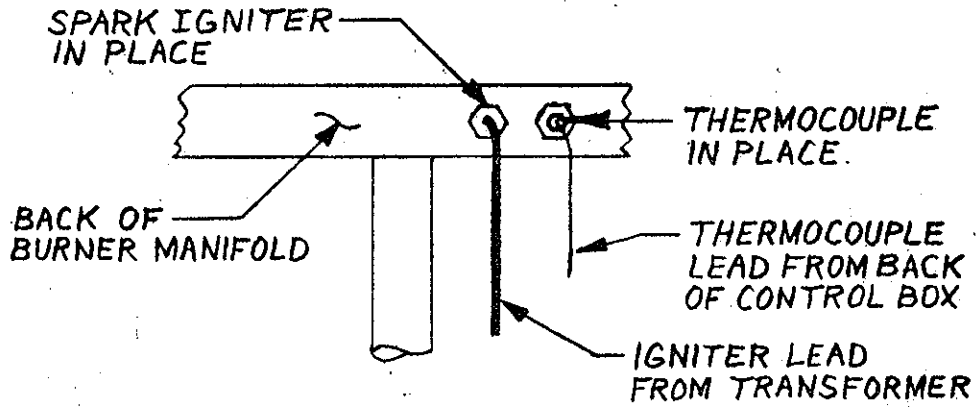
ON THE #133 FORGE, THE TWO OUTSIDE BURNERS CAN BE TURNED OFF BY SCREWING IN THE HANDLES AT EACH END OF THE BURNER MANIFOLD.

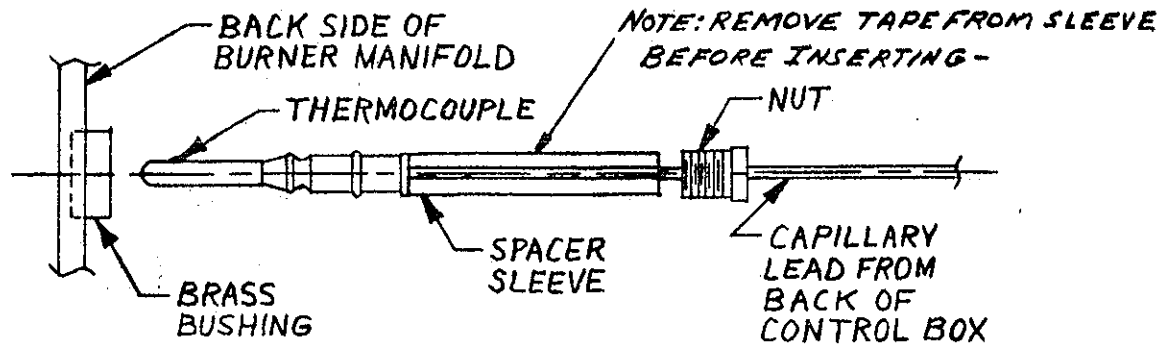
NOTE: IF YOU TURN THE GAS TOO HIGH AND GET A HIGH, LAZY FLAME OR TOO LOW AND GET AN INTERMITTENT FLAME, THE THERMOCOUPLE MAY COOL DOWN AND SHUT OFF THE BURNERS. YOU WILL HAVE TO PUSH THE STOP BUTTON: WAIT FIVE (5) MINUTES AND RE-START THE FORGE.

TO SHUT DOWN THE FORGE, TURN GAS CONTROL TO THE CLOSED POSITION AND PUSH THE STOP BUTTON.

INSTALLATION DIAGRAM FOR #133-122 FORGE WITH ELECTRIC IGNITION AND SAFETY

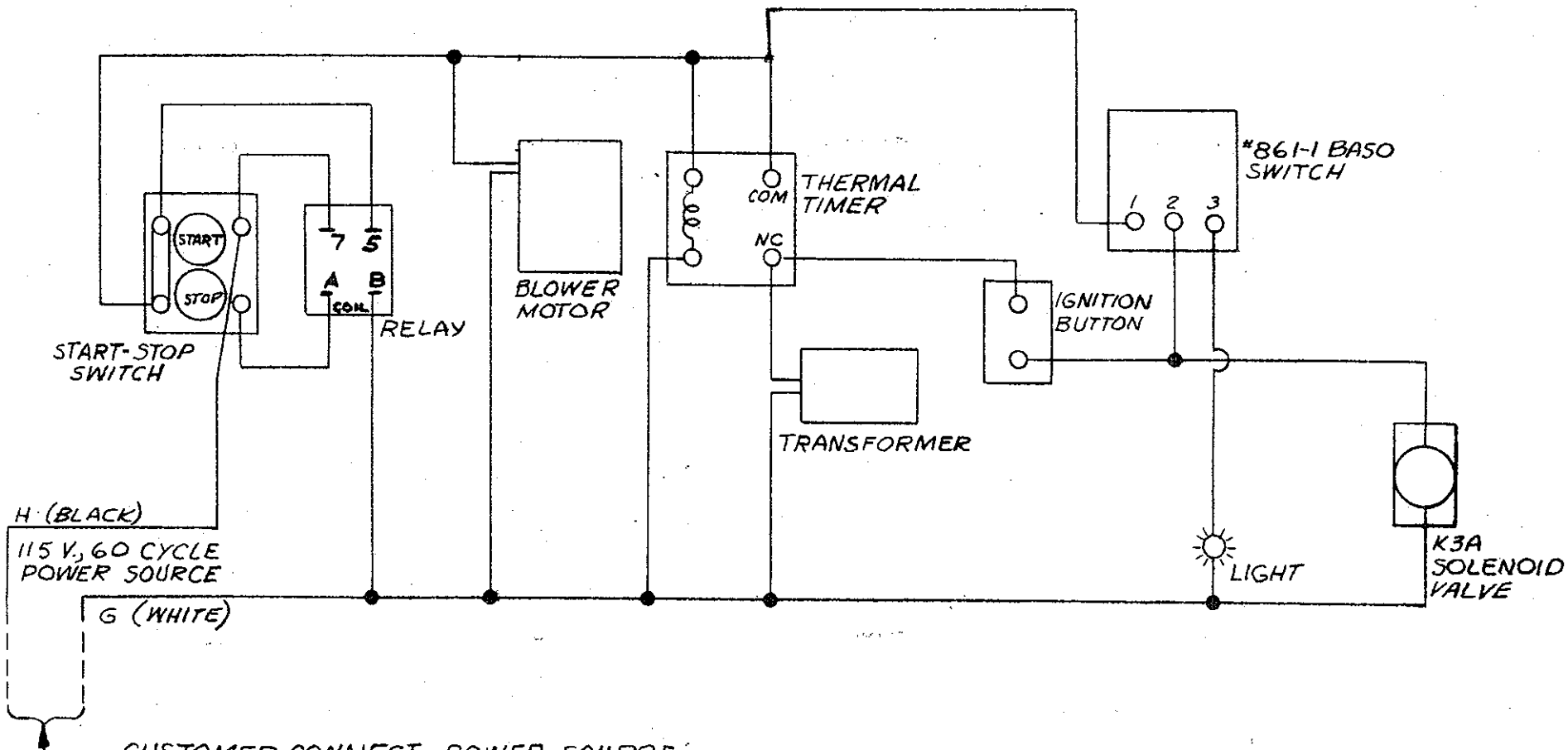






FORM 311

WIRING DIAGRAM FOR NO. 133 FORGE WITH ELECTRIC IGNITION AND SAFETY



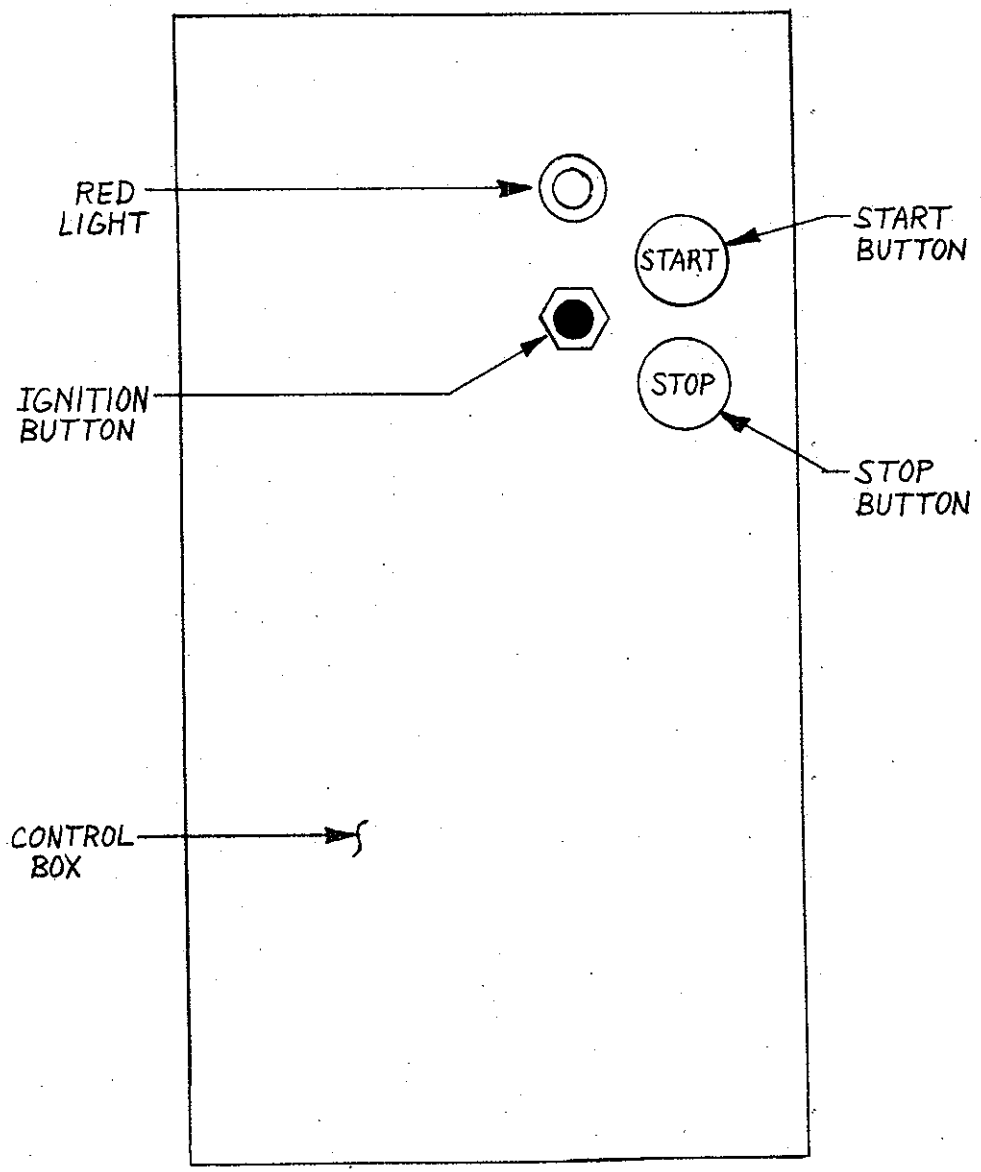
CUSTOMER CONNECT POWER SOURCE TO BLACK & WHITE LEADS EXTENDING OUTSIDE OF CONTROL BOX. ALL OTHER WIRING IS DONE AT FACTORY.

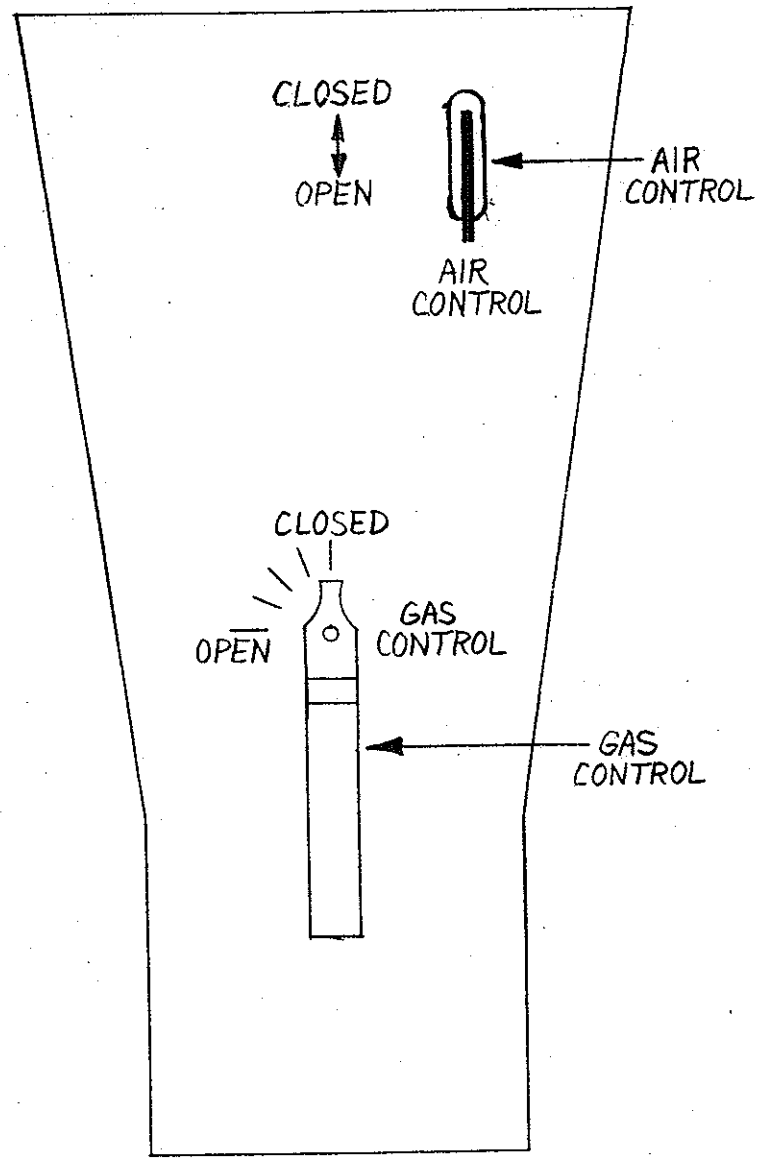
JOHNSON GAS APPLIANCE CO.
CEDAR RAPIDS, IOWA

Modified
10-12-05

FORM 311
2-13-67

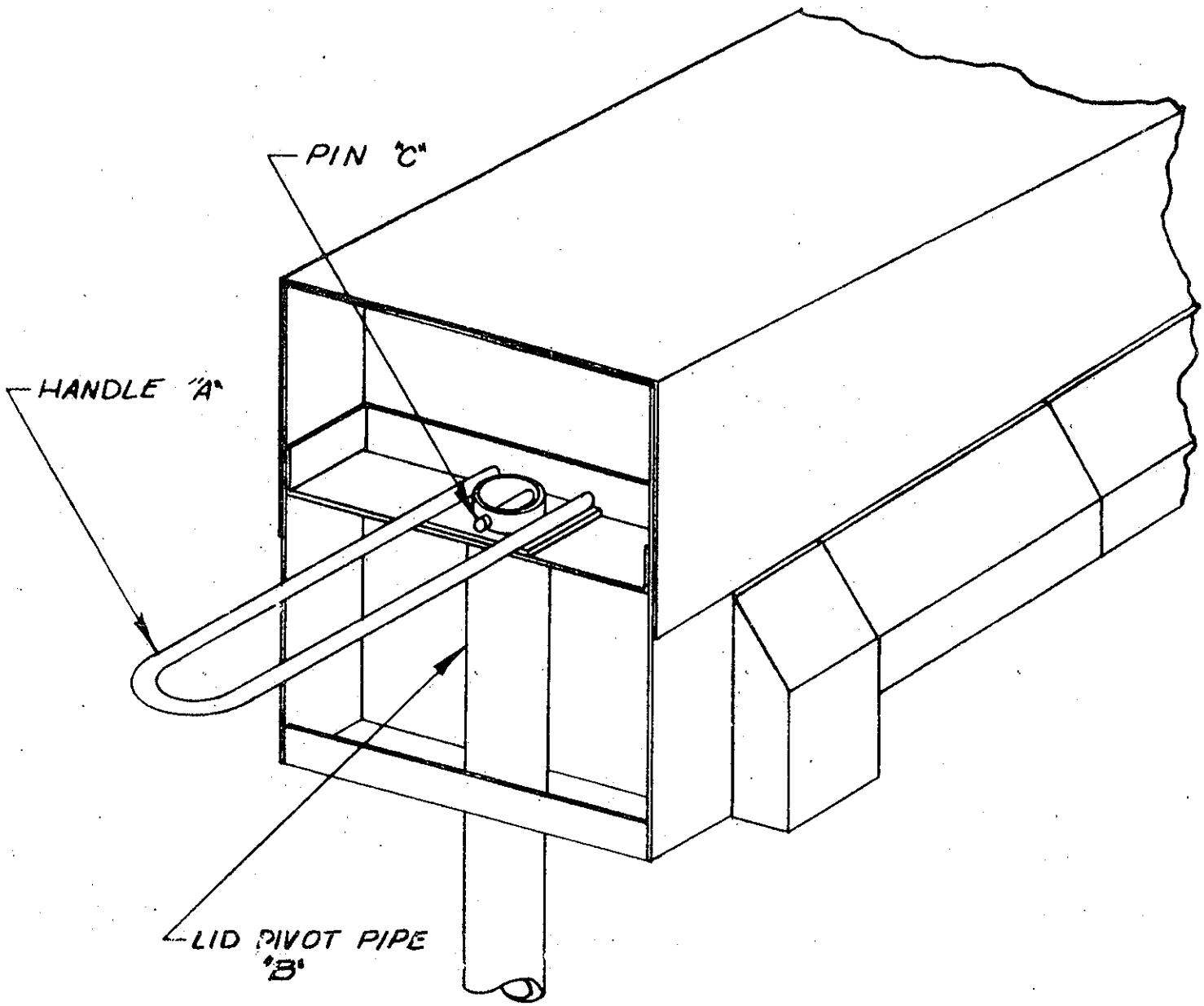
DIAGRAM OF CONTROLS FOR # 133 FORGE WITH ELECTRIC IGNITION AND SAFETY





JOHNSON GAS APPLIANCE CO.
CEDAR RAPIDS, IOWA

INSTALLING HANDLE ON #122 & #133 FORGE LIDS



1. PLACE HANDLE "A", PLATE SIDE DOWN, OVER TOP OF LID PIVOT PIPE "B".
2. DRIVE PIN "C" THROUGH DRILLED HOLES PROVIDED.

VENTING REQUIREMENTS

JOHNSON FURNACES

1. POT FURNACES, FORGES, AND MELTING FURNACES,

   SINGLE UNITS OR MULTIPLE INSTALLATIONS

   FOR EXHAUST HOODS APPROXIMATELY 6'6" TO 7' ABOVE FLOOR, THE EXHAUST FAN SHOULD BE SUFFICIENT TO PROVIDE A 200 FPM FACE VELOCITY AT THE HOOD.

2. OVEN TYPE FURNACES (INCLUDES OVEN FORGES)

   A. SINGLE INSTALLATIONS

   FOR SINGLE INSTALLATIONS THE VENT REQUIREMENTS SHOULD REDUCE FLUE GAS TEMPERATURE TO 500 OR BELOW. FOR CFM REQUIREMENTS, DIVIDE BTU INPUT OF THE FURNACE BY 225. (APPLICABLE WHERE THE VENT HOOD IS 6" TO 8" ABOVE EXHAUST OPENINGS)

   B. FOR SINGLE OR MULTIPLE INSTALLATIONS WHEN SINGLE EXHAUST HOOD IS 6'6" TO 7' ABOVE FLOOR, PROVIDE FOR A 200 FPM FACE VELOCITY.

MAINTENANCE INSTRUCTIONS FOR JOHNSON FURNACES

Johnson equipment is designed to give the longest possible service as the lowest maintenance cost. Due to the high temperatures reached by Johnson furnaces, certain repairs are required from time to time to keep them in good operating condition. We are listing below pertinent maintenance information.

OVEN TYPE HEAT TREATING FURNACES (#70, #120, #121, #142, #143, #654 AND #706)

A. GENERAL MAINTENANCE:

These furnaces are lined with high temperature insulating refractory. This refractory expands and contracts as the furnace heats and cools; and cracks will appear throughout the lining. These are normal and should not be cause for alarm and should **NOT** be filled with cement as it will cause the brick to spall. The door brick on the #70, #120, #121 and #654 furnaces should be replaced occasionally. It is furnished with inconel screws and washers to withstand the high temperatures. The door should **NOT** be used as a shelf or parts dragged across the door prick in the process of removing parts from the furnace. Also, avoid striking the sides of the furnace with tongs. The hearth plate will require replacement occasionally, as will the front and back hearth rests on which the plate is set. The HEARTH PLATE must be used with the CHANNEL EDGES UP. Parts to be heated should be pre-heated or brought up to temperature with the furnace when possible; avoid placing a cold piece on a hot hearth plate. When the gas is turned off to the furnace, turn off the blower at once so the lining will cool gradually.

B. FURNACE RELINING AND FURNACE EXCHANGE:

The furnace should be used until the complete lining is considerably deteriorated. It should then either be replaced with a new lining or new furnace body from the factory. Complete sets of fire brick linings with special shapes to fit the furnace and cement for sealing the brick are available with easy-to-follow installation instructions. Many operators, however, prefer to take advantage of the special price on replacement furnace bodies. Check our repair parts list for prices. This method is popular because it insured an expertly relined furnace in operation at all times; it eliminates the time and trouble of relining the furnace in the customer's shop; and it eliminates the "down" time for returning to the factory for relining. **WHEN ORDERING, SPECIFY IF FURNACE IS TO HAVE SAFETY PILOT PORT INSTALLED. FOR ADDITIONAL INFORMATION ON SAFETY EQUIPMENT, SEE PAGE 3.**

PYROMETER EQUIPMENT:

Occasional replacement must be made of the thermocouple elements, the protection tubes or of the complete thermocouple assembly. We carry replacement parts in stock for immediate delivery.

POT TYPE FURNACES (#920, #950, #568, #580, #565, #565A, #521, #575, #575a & #575B)

A. FURNACE RELINING:

These furnaces are lined with a high-quality, wear-resistant, castable lining poured with molds used in our factory. These linings are very rugged, and the furnaces should be used until the linings are considerably deteriorated, and then replaced with new furnace bodies. The new bodies are furnished complete, less blower equipment and ports or crucibles. Prices for the new bodies are given on the repair parts list. With this method, the customers are assured of an expertly lined furnace; and they are never without a furnace to use in their shops. If the lid lining needs replacement before the furnace body, material can be supplied to be mixed with water and molded into the furnace lid or a refractory lid can be supplied.

B. FURNACE RELINING #900 CRUCIBLE FURNACE:

This furnace is lined with a precast lining that can be replaced in the shop or a new replacement body can be supplied.

C. USE OF POTS:

DO NOT use a pressed steel pot for melting aluminum. A graphite crucible is used in the crucible furnaces. A cast iron pot is also suitable when contamination of aluminum by the cast iron is not objectionable.

To extend pot life, carry a neutral or slightly reducing flame (more gas than air). A flame that is too blue is oxidizing and will cause rapid scaling of the pot.

Avoid infiltration of cyanide or other salts in to the combustion chamber. If seepage or splashing is occurring, place a ring of dry, powdered fire clay under the flange of the pot.

Turn the pot a little each day so that a different part is exposed to the hottest gases.

Remove sludge or sediment from pot at least once a day. This acts as an insulator, causing local overheating of pot.

Remove the pot at regular intervals and thoroughly clean the inner surface. Also hammer off thin scale that forms on outside.

D. USE OF CRUCIBLES:

Crucibles should be kept in a warm, dry area. Before using a new crucible, anneal it by placing it in a warm furnace and gradually raising the temperature at about five minute intervals over a period of forty-five minutes until the crucible becomes red.

BLOWER MOTORS:

Motors on the blowers should be oiled occasionally. The brushes should be checked and replaced periodically to avoid wear on the armature. It is suggested by motor manufacturers that brushes be replaced every 500 hours of operation or when they are worn down to ¼" long.

FORGE FURNACES (#122 AND #133)

The forge furnaces are lined with hard firebrick on all wearing surfaces. Individual firebricks can be easily replaced when desired. Lining for the lid or complete lining can be replaced when necessary. Sets of linings are furnished with simple instructions for installation.

SOFT METAL MELTING FURNACES (#379, #313 AND #616)

A. FURNACE RELINING:

These furnaces can be relined with brick and castable material supplied by our Company. An instruction sheet accompanies the shipment.

B. GENERAL MAINTENANCE:

Avoid permitting metal to solidify in the pots. If the metal does "freeze" in the pot, turn one burner only on until the metal melts slowly; do not turn all burners on at once or the pot will crack. When melting metal, let small amount of metal form a molten pool before additional metal.

SMALL BENCH FURNACES (#101, #112, #108 AND #118)

The burner tubes on these furnaces are slotted on the ends to retain the flame, and care should be taken about striking the ends with soldering irons. These tubes are made of cast iron and will give long service, but when the slots are knocked off, the tubes should be replaced to insure good combustion. The #108 and #118 furnaces are equipped with individual valves for each burner. The #101 and #112 furnaces are equipped with double valves. After considerable use, the valve plugs will tighten causing the valves to "freeze." When this happens, the complete valve should be replaced as prompt replacement of the complete valve will avoid gas leakage. Linings for all these furnaces are carried in stock. Lining sets are supplied for those in which both hood and bottom are lined. This set consists of material to be molded into the furnace body and includes a new angle iron.