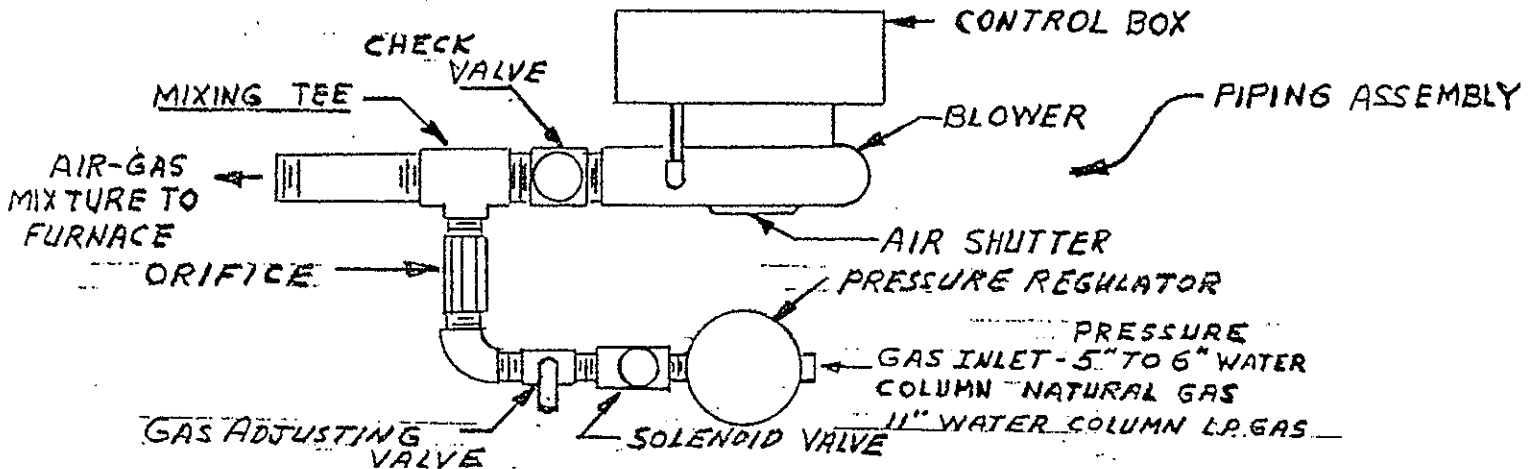


OPERATING INSTRUCTIONS FOR BLOWER TYPE FURNACE WITH
ELECTRIC IGNITION, SAFETY & MANUAL CONTROL
565-820-521 FURNACES



AFTER WIRING AND PIPING HAVE BEEN COMPLETED, SEE FORM #302 AND POSITION THE SPARK IGNITER AND THERMOCOUPLE.

NOTE: IF THE FURNACE HAS BEEN IN OPERATION, ALWAYS WAIT AT LEAST (5) MINUTES BETWEEN SHUT-DOWN AND STARTING UP OF THE FURNACE. (Time required for controls to re-cycle to the "Starting Position")

READ THE FOLLOWING INSTRUCTIONS THOROUGHLY BEFORE STARTING THE FURNACE!

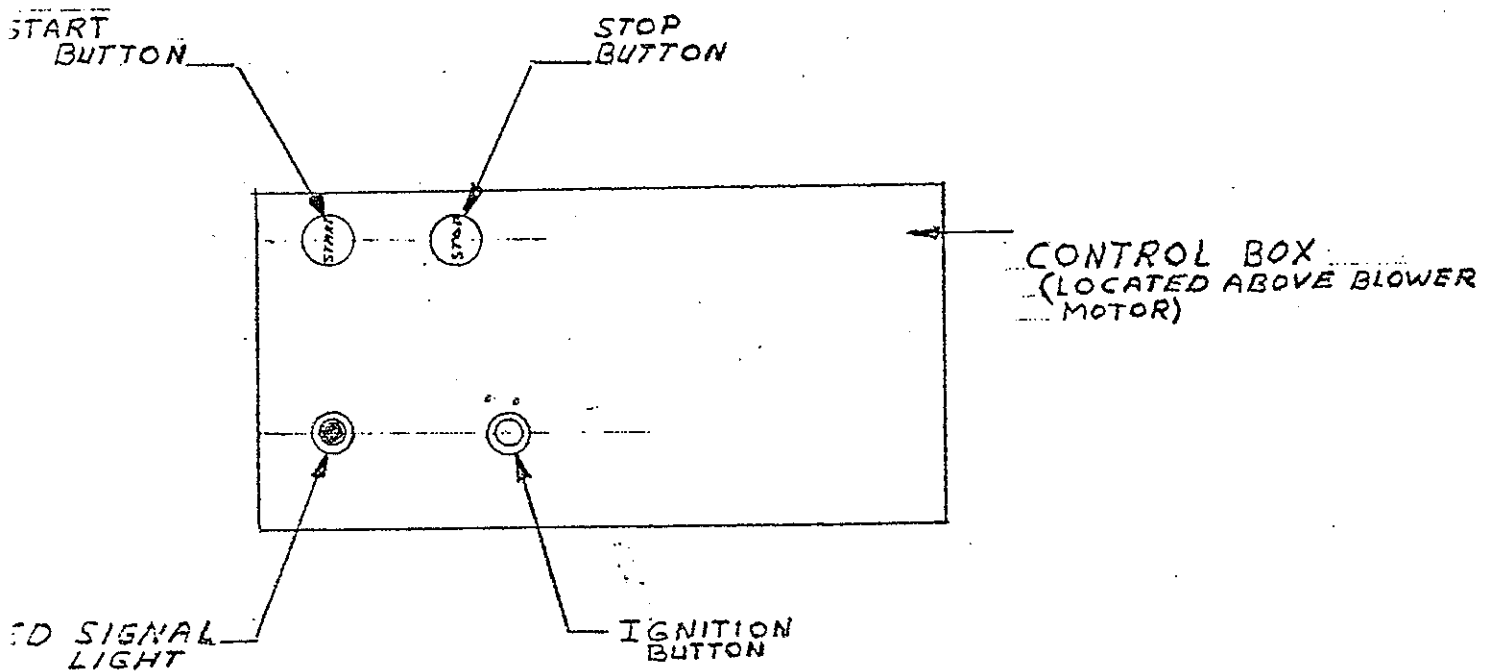
1. MAKE SURE THE GAS ADJUSTING VALVE IS IN THE "OFF" POSITION; SET THE BLOWER AIR SHUTTER ABOUT $3/4$ " OPEN.
2. DEPRESS AND RELEASE THE "START" BUTTON. THE BLOWER MOTOR WILL BE RUNNING, THE RED LIGHT WILL COME ON AND IF THE ROOM IS NOT TOO NOISY, YOU WILL HEAR THE SPARK IGNITER "BUZZING".
3. DEPRESS AND HOLD IN THE IGNITION BUTTON. SLOWLY, OPEN THE GAS ADJUSTING VALVE UNTIL THE BURNERS IGNITE, THEN OPEN THE VALVE SOME MORE TO OBTAIN A STEADY BURNER SOUND. WATCH THE RED SIGNAL LIGHT. WHEN THE LIGHT GOES OUT, YOU CAN RELEASE THE IGNITION BUTTON. THE SAFETY SYSTEM ALLOWS $1\frac{1}{2}$ MINUTES TO DEPRESS THE START BUTTON, IGNITE THE BURNERS AND FOR THE THERMOCOUPLE TO BECOME HOT ENOUGH TO ENGAGE THE SAFETY SWITCH. IF YOU HAVE NOT COMPLETED THE LIGHTING CYCLE IN THIS TIME, THE SAFETY SYSTEM WILL SHUT OFF THE GAS. YOU MUST THEN DEPRESS AND RELEASE THE STOP BUTTON, WAIT 2 TO 3 MINUTES AND THEN, REPEAT STEPS 1, 2 & 3.
4. AFTER THE FURNACE HAS RUN FOR 10 TO 15 MINUTES, ADJUST THE GAS VALVE TO OBTAIN A SHARP TAIL OF FLAME OUT THE FURNACE STACK. IF YOU DO NOT HAVE ANY FLAME, INCREASE THE AMOUNT OF GAS. IF YOU HAVE A LONG, LAZY FLAME, DECREASE THE AMOUNT OF GAS.
5. TO INCREASE THE AMOUNT OF GAS TO THE FURNACE, OPEN THE GAS VALVE SLIGHTLY TO OBTAIN A HIGHER TAIL OF FLAME OUT THE STACK, THEN GRADUALLY OPEN THE BLOWER AIR SHUTTER TO REGAIN THE SHARP TAIL OF FLAME. REPEAT THIS PROCEDURE UNTIL THE DESIRED OR MAXIMUM GAS INPUT IS REACHED.

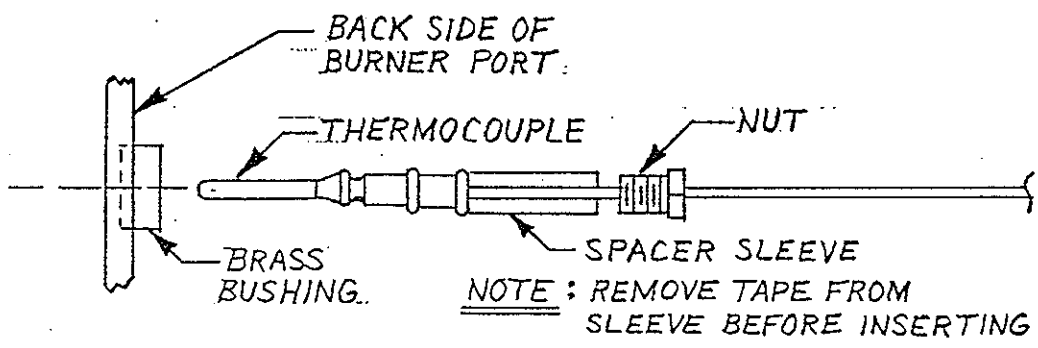
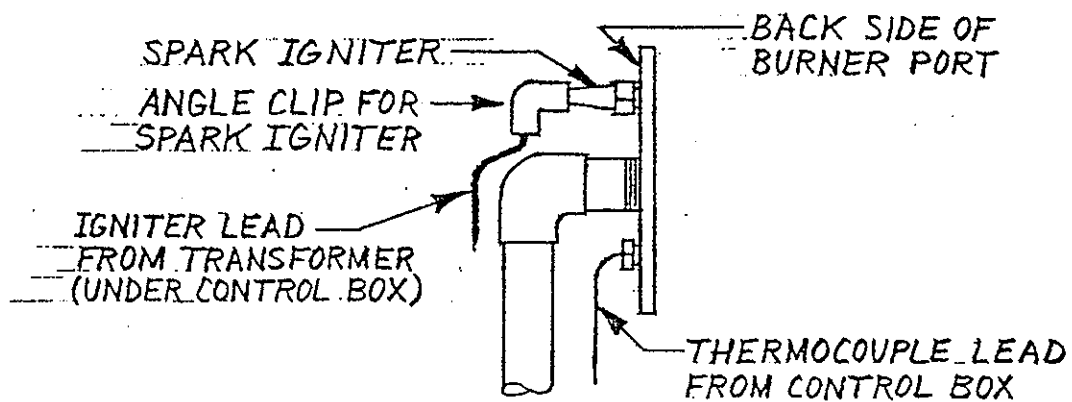
OPERATING INSTRUCTIONS FOR BLOWER TYPE FURNACE WITH
ELECTRIC IGNITION, SAFETY AND MANUAL CONTROL (Cont'd)

Page 2, Continued

NOTE: IF YOU TURN THE GAS TOO HIGH AND GET A LONG, LAZY TAIL OF FLAME OUT THE STACK OR TURN IT TOO LOW; THE THERMOCOUPLE MAY COOL DOWN AND SHUT OFF THE FURNACE. YOU WOULD THEN HAVE TO DEPRESS AND RELEASE THE STOP BUTTON, WAIT 5 MINUTES AND THEN, RE-START THE FURNACE.

6. TO SHUT OFF THE FURNACE, IF YOU HAVE A MAIN GAS VALVE, TURN THE GAS OFF AND DEPRESS AND RELEASE THE STOP BUTTON. THE GAS ADJUSTING VALVE COULD THEN BE LEFT IN IT'S PROPER POSITION.





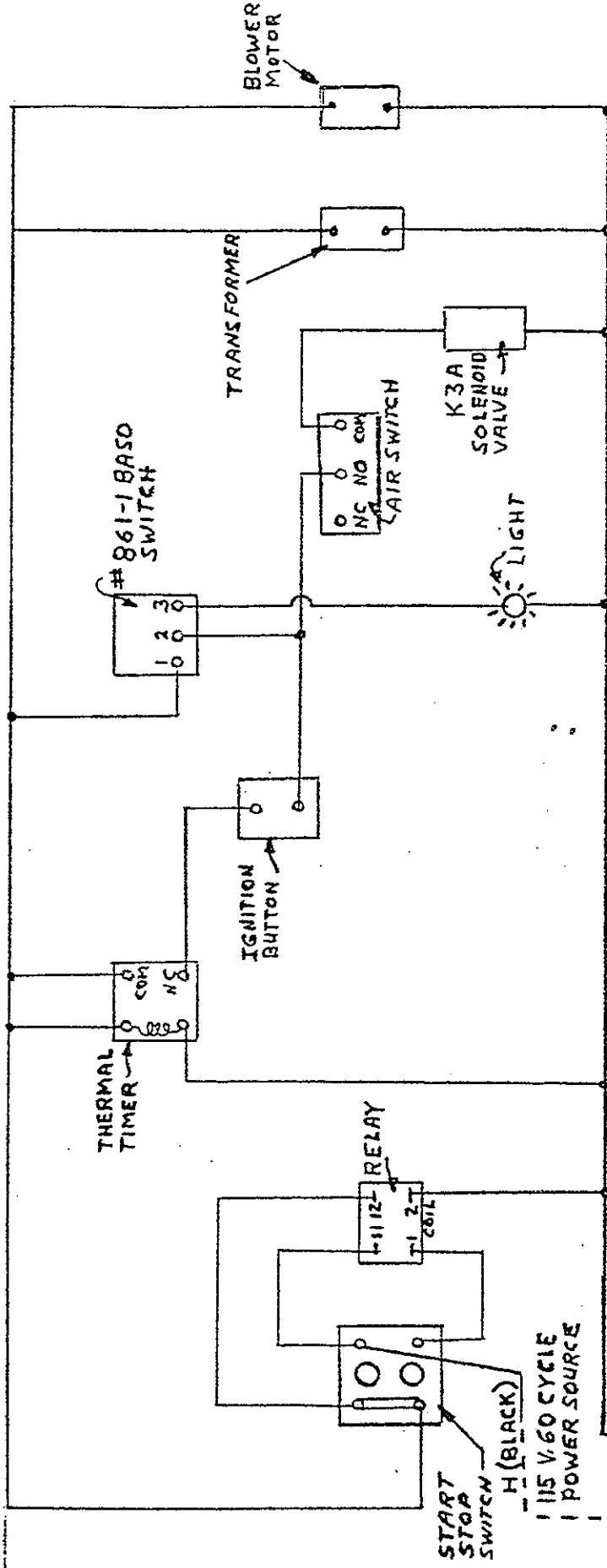
SPARK IGNITER INSTALLATION

THREAD SPARK IGNITER INTO TOP OPENING OF CAST IRON BURNER PORT.
CONNECT IGNITER LEAD (FROM TRANSFORMER) TO SPARK IGNITER.

THERMOCOUPLE INSTALLATION

REMOVE TAPE FROM SPACER SLEEVE. INSERT THERMOCOUPLE INTO BRASS BUSHING. MAKE SURE SLEEVE IS IN POSITION. THREAD NUT INTO BRASS BUSHING. USE WRENCH TO SNUG UP NUT. DO NOT USE FORCE OR OVERTIGHTEN!!!

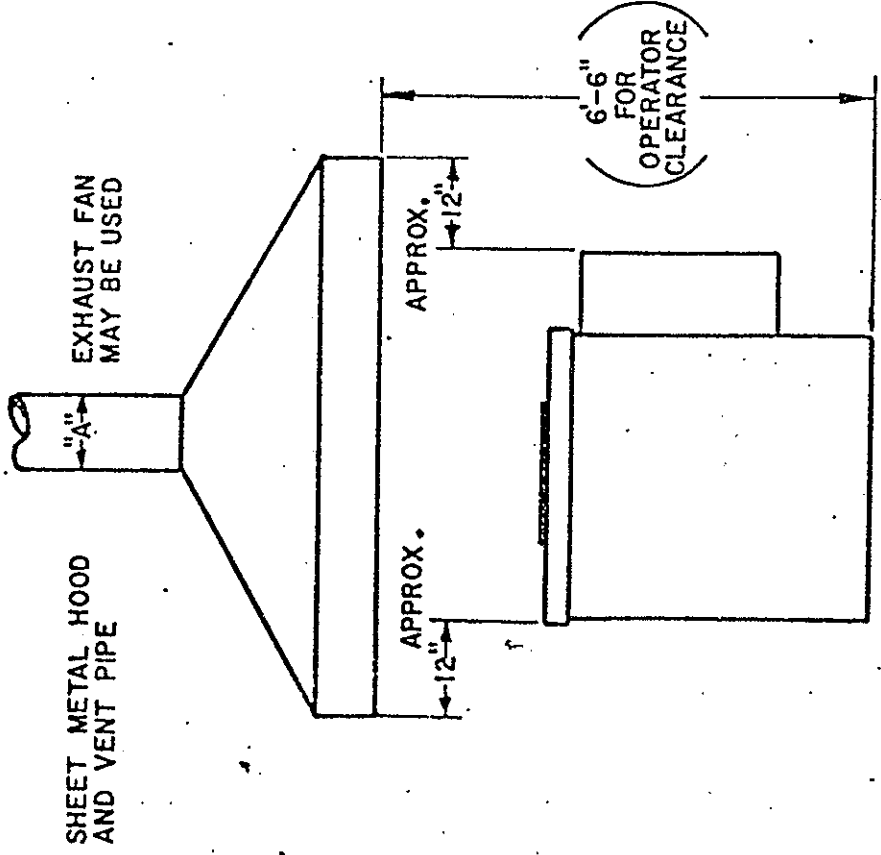
WIRING DIAGRAM FOR BLOWER TYPE FURNACE WITH
ELECTRIC IGNITION, SAFETY, & MANUAL CONTROL.



CUSTOMER CONNECT POWER
SOURCE TO BLACK & WHITE
LEADS EXTENDING OUTSIDE
OF CONTROL BOX

TWO SUGGESTED METHODS OF VENTING JOHNSON POT FURNACES

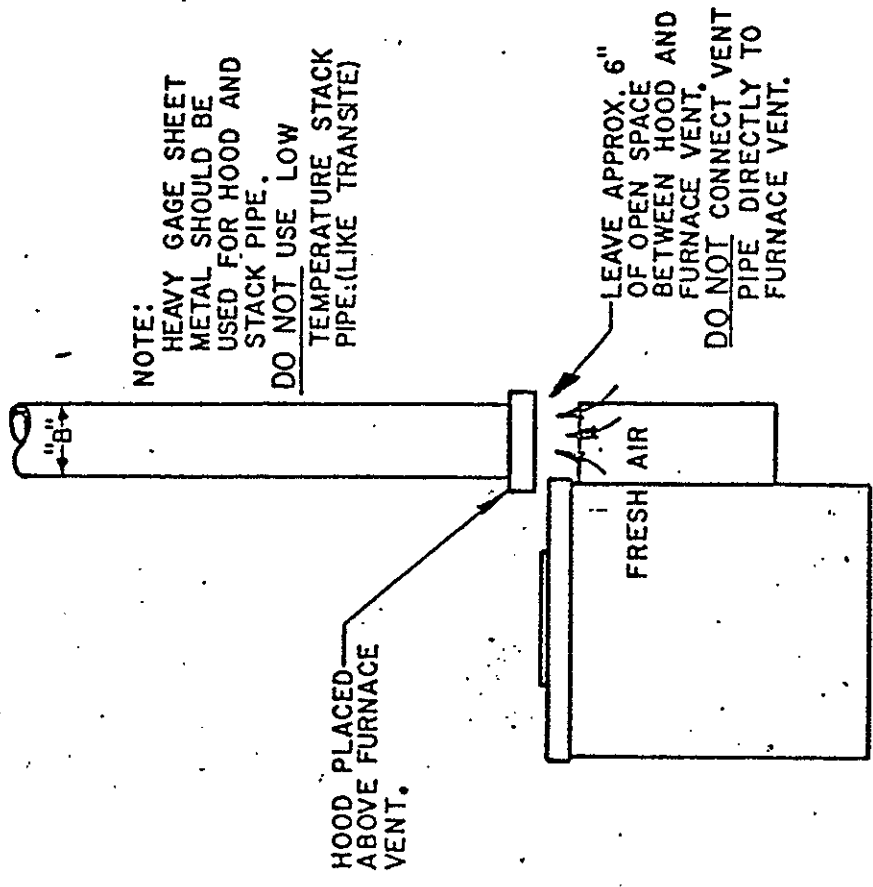
METHOD "1": FOR VENTING FURNACE EXHAUST AND FUMES FROM POT.



DIAMETER FOR VENT PIPE

FURNACE NO.	DIMENSION "A"
510, 568, 580, F-900	8"
520, 565	10"
575	12"

METHOD "2": FOR VENTING FURNACE EXHAUST ONLY.



DIAMETER FOR VENT PIPE

FURNACE NO.	DIMENSION "B"
510, 568, 580	6"
520, 565	8"
575	10"

VENTING REQUIREMENTS FOR
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 INSTALLATION 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 OPENING.)

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.