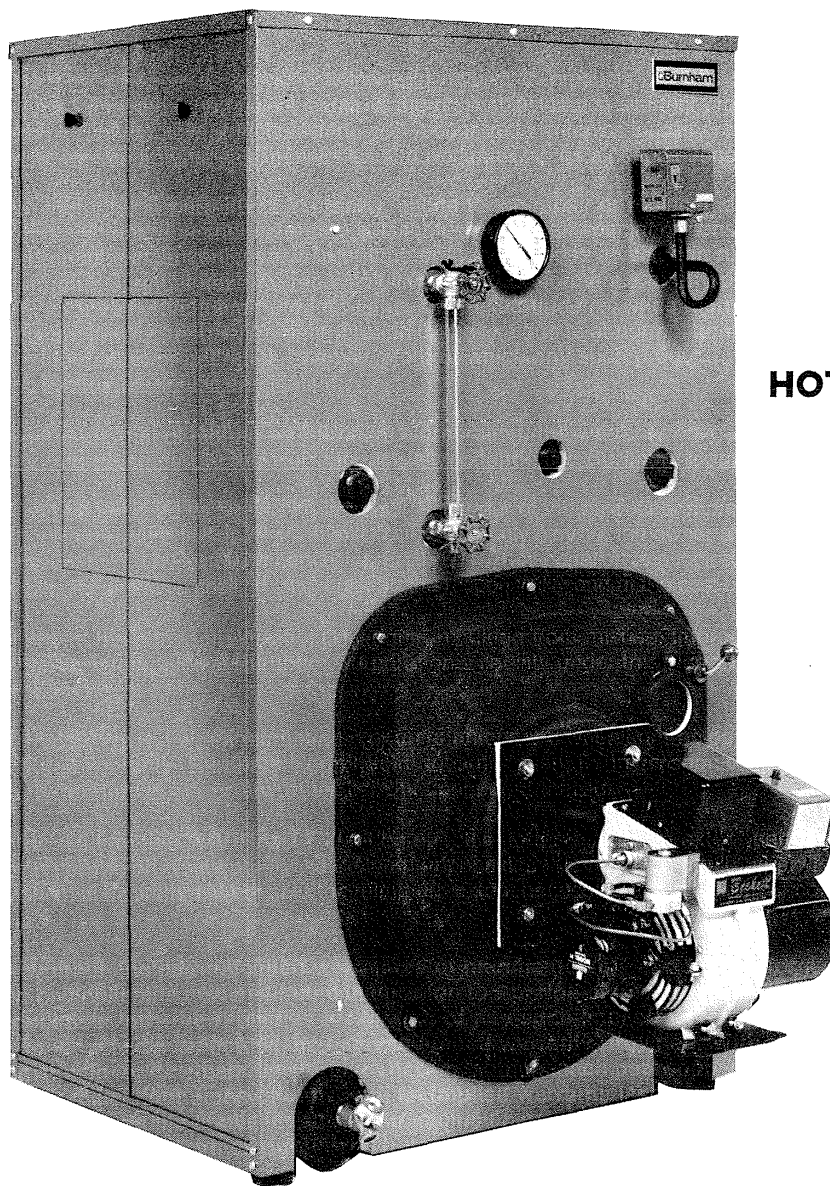


INSTALLATION AND OPERATING INSTRUCTIONS FOR **V-9 SERIES** **CAST IRON HYDRONIC HEATING UNIT**

Price - \$3.00



**FORCED DRAFT
FOR
LIGHT OIL,
GAS/LIGHT OIL,
OR GAS**



HOT WATER OR STEAM

**10 SIZES:
GROSS OUTPUT
311,000 to
1,445,000 BTU/HR**



These Instructions have been reviewed by ULC and found suitable for use in the Installation of ULC labeled V-9 Series Boilers.



The ULC label or listed marking on a product is the only evidence provided by Underwriters' Laboratories of Canada to identify products which have been produced under the listing and follow-up service.

For service and repairs to the heating plant, call your Heating Contractor. When seeking information on the boiler, provide series and size designation shown on rating plate.

Boiler Number _____ Type Firing _____ Type System _____

Heating Contractor _____

Address _____ Phone No _____

Burnham[®]

AMERICA'S BOILER COMPANY
Burnham Corporation
Lancaster, PA 17604-3079

SORT OUT ALL CARTONS, BUNDLES, AND SECTIONS and check against Shipping List chart below to be certain that you have all the material required to assemble the Boiler you ordered.

V-9 SHIPPING LIST		FRONT SECTION				"C" CENTER SECT.	"CX" CENTER SECT.	"CT" CENTER SECT.	REAR SECTION		BOILER ASSEMBLY *					JACKET CARTON		CANOPY CARTON		TIE-ROD BUNDLE *								PRESSURE RELIEF DOOR CARTON		BURNER MOUNTING PLATE ASSEMBLY		50 PSI WATER TRIM CARTON		STEAM TRIM CARTON			FLUE OUTLET CARTON			BURNER CARTON																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		

IMPORTANT INFORMATION

PLEASE READ THIS PAGE CAREFULLY

1. READ THIS MANUAL AND BURNER INSTALLATION MANUAL CAREFULLY BEFORE INSTALLING, OPERATING, OR SERVICING THIS UNIT. THE BURNER MANUAL FOR THIS UNIT IS PROVIDED AND PACKED IN THE BURNER CARTON. IF YOU DO NOT HAVE A BURNER MANUAL, WRITE TO **BURNHAM** AND ASK FOR APPROPRIATE BURNER MANUAL. KEEP INSTRUCTIONS IN LEGIBLE CONDITION AND POSTED NEAR HEATING UNIT FOR REFERENCE BY OWNER AND SERVICEMAN.
2. ALL BOILERS MUST BE INSTALLED IN ACCORDANCE **WITH** NATIONAL, STATE AND LOCAL PLUMBING, HEATING AND ELECTRICAL CODES AND THE REGULATIONS OF THE SERVING UTILITIES. AUTHORITIES HAVING JURISDICTION SHOULD BE CONSULTED BEFORE INSTALLATIONS ARE MADE.

IN ALL CASES, REFERENCE SHOULD BE MADE TO THE FOLLOWING STANDARDS:

USA BOILERS

- A. Current edition of American National Standard **ANSI/NFPA 31**, "Installation of Oil Burning Equipment", for clearances between boiler, vent connector and combustible material.
- B. Current Edition of American National Standard **ANSI/NFPA 211**, "Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances", For Chimney requirements, type of venting material and clearances between vent connector pipe and combustible materials.
- C. Current Edition of American Society of Mechanical Engineers **ASME CSD-1**, "Controls and Safety Devices for Automatically Fired Boilers", for assembly and operations of controls and safety devices.

CANADA BOILERS

- A. Current Edition of Canadian Standards Association **CSA B139**, "Installation Code for Oil Burning Equipment", for recommended Installation Practices.
 - B. The equipment shall be installed in accordance with the current installation code for gas burning appliances and equipment, **CGA B149**, and applicable provincial regulations for the class; which should be carefully followed in all cases. Authorities having jurisdiction should be consulted before **installations** are made.
3. ALL HEATING SYSTEMS SHOULD BE DESIGNED BY COMPETENT CONTRACTORS AND ONLY PERSONS KNOWLEDGEABLE IN THE LAYOUT AND INSTALLATION OF HYDRONIC HEATING SYSTEMS SHOULD **ATTEMPT** INSTALLATION OF ANY BOILER.
 4. THE BOILER MUST BE PROPERLY VENTED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES. SERIOUS PROPERTY DAMAGE COULD RESULT IF THE BOILER IS NOT PROPERLY VENTED.
 5. READ THE LITERATURE ENCLOSED BY THE MANUFACTURER WITH THE VARIOUS ACCESSORY DEVICES. THESE ACCESSORY DEVICES MUST BE INSTALLED AND USED ACCORDING TO THE RECOMMENDATIONS OF THE MANUFACTURER.
 6. IT IS THE **RESPONSIBILITY** OF THE INSTALLING CONTRACTOR TO SEE THAT ALL CONTROLS ARE CORRECTLY INSTALLED AND ARE OPERATING PROPERLY WHEN THE INSTALLATION IS COMPLETED.
 7. DO NOT TAMPER WITH THE UNIT OR CONTROLS. RETAIN A COMPETENT SERVICEMAN TO ASSURE THAT THE UNIT IS PROPERLY ADJUSTED AND MAINTAINED.
 8. FOR OPTIMUM PERFORMANCE FROM **THIS** UNIT FOLLOW SERVICE INSTRUCTIONS AS SPECIFIED IN SECTION V OF THIS MANUAL.
 9. PROBE AND FLOAT TYPE LOW WATER CUTOFF DEVICES REQUIRE ANNUAL INSPECTION AND MAINTENANCE. REFER TO INSTRUCTIONS ON PAGE 29, ITEM 4 FOR STEP BY STEP INSPECTION AND CLEANING INSTRUCTIONS.
 10. ALL FLAMMABLE DEBRIS, RAGS, PAPER, WOOD SCRAPS, ETC., SHOULD BE KEPT CLEAR OF THE BOILER AT ALL TIMES. KEEP THE BOILER AREA CLEAN AND FREE OF FIRE HAZARDS.

WARNING

HIGH WATER TEMPERATURES INCREASE THE RISK OF BURNS OR SCALDING INJURY. INSTALL AN AUTOMATIC MIXING VALVE AT THE **TANKLESS** HEATER OUTLET TO AVOID EXCESSIVELY **HOT** WATER AT THE FIXTURES.

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SECTION I GENERAL INFORMATION

BOILER MODEL	NUMBER OF SECTIONS	'A'	'B'	'C'	FLUE OUTLET DIAMETER 'D'	BURNER DIMENSION 'E'								APPROX. ASSEMBLED SECTION WEIGHT LBS.	APPROX. SHIPPING WEIGHT LBS. *
						BECKETT	CARLIN	G-P	POWERFLAME				WEBSTER		
									C OIL	JR	C GAS/OIL				
V-903	3	18	—	—	8	12	10	24	—	20	—	—	848	950	
V-904	4	24	—	—	8	12	16	24	24	20	30	34	1,113	1,233	
V-905	5	30	—	—	8	12	16	24	24	20	30	34	1,378	1,516	
V-906	6	36	—	—	10	12	16	28	24	20	30	34	1,648	1,803	
V-907	7	42	—	—	10	21	20	28	24	20	30	34	1,912	2,085	
V-908	8	48	24	—	10	21	20	28	24	20	30	34	2,177	2,368	
V-909	9	54	18	—	12	21	20	28	24	23	30	34	2,448	2,655	
V-910	10	60	24	—	12	21	20	28	24	23	30	34	2,713	2,938	
V-911	11	66	24	18	12	22	20	30	29	23	35	34	2,978	3,220	
V-912	12	72	18	30	12	22	21	30	29	23	35	34	3,248	3,518	

* DOES NOT INCLUDE BURNER MOUNTING PLATE.
ADD 45 LBS. FOR MOUNTING PLATE (SHIPPED SEPARATELY).

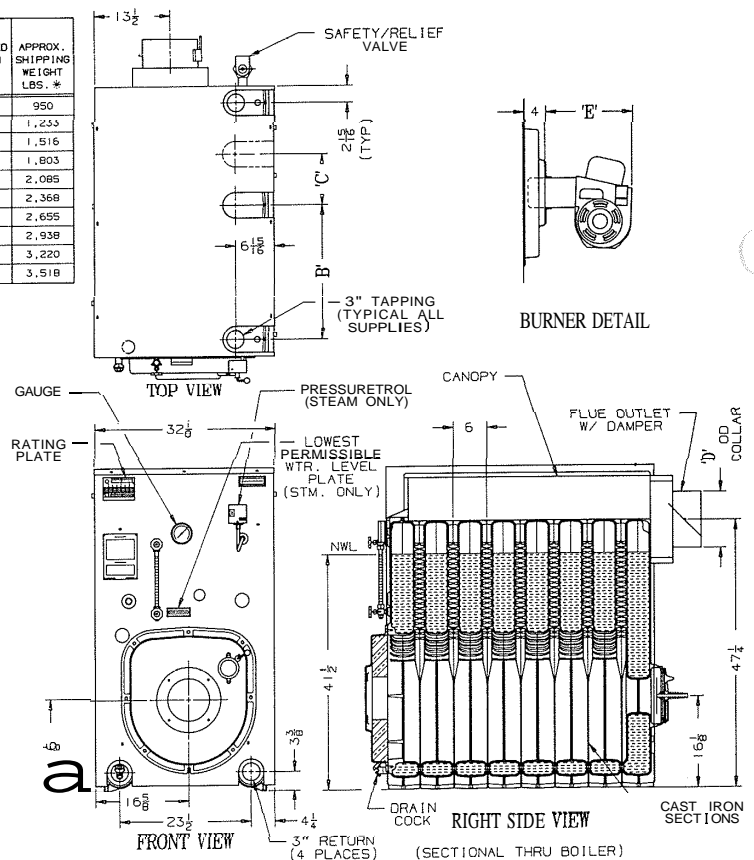
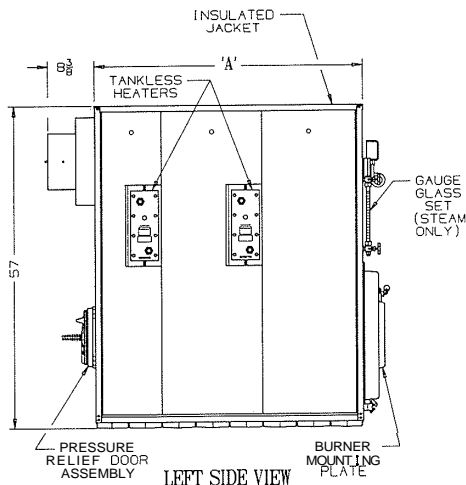


Fig. 1

TABLE I -- RATINGS DATA

(1)

(2)

(3)

BOILER MODEL	BOILER HORSEPOWER	GROSS OUTPUT MBH	NET I=B=R RATING			BURNER INPUT		HEATING SURFACE		NET FIREBOX VOLUME (CU. FT.)	PRESSURE IN FIREBOX (INCHES WTR. COLUMN)	WATER CONTENT FULL (GALLONS)		BOILER WEIGHT W/ WATER (LBS.)		I=B=R VENT DIA. (INCHES)
			SO. FT.	MBH STEAM	MBH WATER	OIL (GPH)	GAS (MBH)	STEAM	WATER			STEAM	WATER	STEAM	WATER	
V-903	9.3	311	971	233	270	2.75	397	34	37	3.2	.28	44.5	66.0	1219	1398	8
V-904	12.1	404	1263	303	351	3.5	505	48	54	4.8	.29	53.0	75.0	1554	1737	8
V-905	16.0	534	1671	401	464	4.65	668	62	71	6.4	.20	61.5	84.0	1890	2077	8
V-906	19.8	664	2075	498	577	5.8	830	77	88	7.9	.29	70.0	93.0	2231	2422	10
V-907	23.7	794	2483	596	690	6.9	992	91	105	9.5	.26	78.5	102.0	2566	2762	10
V-908	27.6	924	2888	693	803	8.0	1155	105	122	11.0	.29	87.0	111.0	2902	3102	10
V-909	31.5	1054	3296	791	917	9.1	1317	119	139	12.6	.28	95.5	120.0	3243	3447	12
V-910	35.4	1184	3700	888	1030	10.2	1479	134	156	14.2	.28	104.0	129.0	3579	3787	12
V-911	39.3	1314	4125	990	1143	11.4	1642	148	173	15.7	.28	112.5	138.0	3915	4127	12
V-912	43.2	1445	4579	1099	1257	12.6	1804	162	190	17.3	.30	121.0	147.0	4256	4472	12

(1) Suffix "S" indicates steam boiler, "W" indicates water boiler. Suffix "G" indicates gas-fired, "O" indicates oil-fired, "GO" indicates combination gas-oil fired.

(2) I=B=R net ratings shown are based on piping and pickup allowances which vary from 1.333 to 1.315 for steam and 1.15 for water.

Consult manufacturer for installations having unusual piping and pickup requirements, such as intermittent system operation, extensive piping systems, etc.

The I=B=R burner capacity in GPH is based on oil having a heat value of 140,000 BTU per gallon.

(3) Boiler ratings are based on 12.5% CO₂, + .10" water column pressure at boiler flue outlet.

MAXIMUM ALLOWABLE WORKING PRESSURE:

(USA) STEAM - 15 PSI
WATER - 50 PSI
OPTIONAL SPECIAL ORDER - 70 PSI

(CANADA) STEAM - 15 PSI
WATER - 45 PSI

Ratings shown above apply at altitudes up to 1000 feet on oil and 2000 feet on gas. For altitudes above those indicated, the ratings should be reduced at the rate of 4% for each 1000 feet above sea level.

SECTION I GENERAL INFORMATION (CONTINUED)

1 INSPECT SHIPMENT carefully for any signs of damage.

- A. ALL EQUIPMENT is carefully manufactured, inspected and packed. Our responsibility ceases upon delivery of crated Boiler to the carrier in good condition.
- B. ANY CLAIMS for damage or shortage in shipment must be filed immediately against the carrier by the consignee. No claims for variances from, or shortage in orders, will be allowed by the manufacturer unless presented within sixty (60) days after receipt of goods.

2 LOCATE THE UNIT

- A. PROVIDE CLEARANCE — Locate the unit in the boiler room so as to provide ease of venting and adequate clearance for maintenance, serviceability, and installation of piping.

FRONT — Provide 48" service clearance for removal, maintenance, and servicing of burner and controls.

REAR — Provide a minimum clearance from the boiler jacket of 36" for access to pressure relief door, flame observation, port and flue damper.

LEFT SIDE — Provide a minimum clearance from the boiler jacket of 35" for installation and removal of the tankless heaters and for cleaning of flueways.

RIGHT SIDE — Provide a minimum clearance from the boiler jacket of 9 .

TOP — Provide a minimum clearance from the boiler jacket of 21".

Refer to Figure 1 for boiler dimensional data.

- B. For minimum clearances to combustibles materials, See Figure 1A.

- C. PROVIDE ADEQUATE FOUNDATION for the unit.

1. CAUTION — DO NOT INSTALL BOILER ON CARPETING. Boiler is suitable for installation on combustible floors.
2. Floor construction should have adequate load bearing characteristics to bear the weight of the boiler filled with water (see Table 1). A boiler foundation similar to the one shown in Figure 2 is recommended if the boiler room floor is weak or uneven or if a water condition exists.

3 PROVIDE AIR SUPPLY AND VENTILATION to accommodate proper combustion.

For commercial and industrial equipment, permanent facilities for supplying an ample amount of outside air shall be provided in accordance with the following.

For boiler rooms adjacent to outside walls, and where combustion air is provided by natural ventilation from the outside, there shall be a permanent air supply inlet having a total free area of not less than 1 sq. in. per 4,000 Btu per hr. (35 sq. in. per gal. per hr.) (5.5 cm² per kw.) of total input rating of the burner or burners and in no case less than 35 sq. in. (0.425 m²).

For boiler rooms not adjacent to outside walls, the combustion air shall be supplied in a manner acceptable to the authority having jurisdiction.

- A. In the absence of local requirements, the confined space shall be provided with two permanent openings, one in or near the top of the room and one near the bottom. The openings shall communicate by means of ducts, with the outdoors or to such spaces (crawl or attic) that communicate with the outdoors.

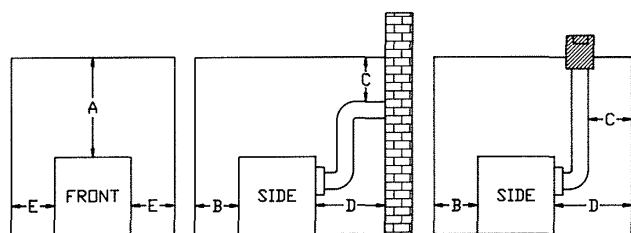
1. Where communicating by means of vertical ducts, each opening shall have a free area of not less than 1 sq in. per 4,000 Btuh (35 sq in. per gph) (5.5 cm² per kw) of total input rating of all appliances in the enclosure.

2. If horizontal ducts are used, each opening shall have a free area of not less than 1 sq in per 2,000 Btuh (70 sq. in per gph.) (11 cm² per kw) of total input of all appliances in the enclosure.

4 CHIMNEY OR VENT

The V-9 Series boiler is designed for forced draft firing and may be used with a conventional natural draft stack or a stub vent, sometimes called a diesel stack (see Figure 3). See Table 1 for the proper vent size. Draft controls are not normally required, although they may be used on installations where a natural draft stack is used or on multiple boiler installations with a common stack. The boiler is provided with a breeching damper which should be adjusted to maintain a positive 0.1" W.C. pressure in the vent connector box during burner operation.

Figure 1A



Boiler	A Above	B Front	C Chimney Con- nector	D Rear	E Sides
V-9	6	24	18	32	6

NOTE 1: Listed clearances comply with American National Standard ANSI/NFPA 31, Installation of oil burning equipment.

NOTE 2: V-9 Series boilers can be installed in rooms with clearances from combustible material as listed above. Listed clearances can not be reduced for alcove or closet installations.

NOTE 3: For reduced clearances to combustible material, protection must be provided as described in the above ANSI/NFPA 31 standard.

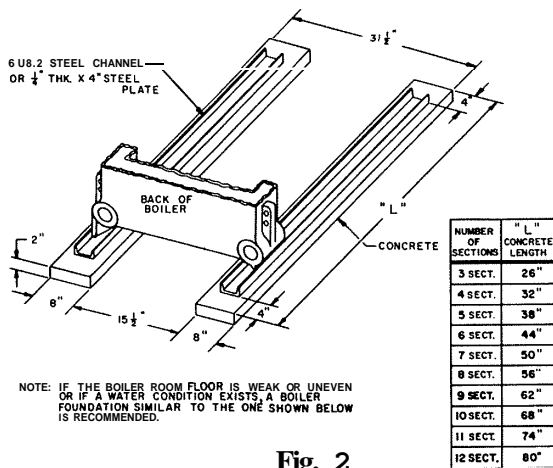


Fig. 2

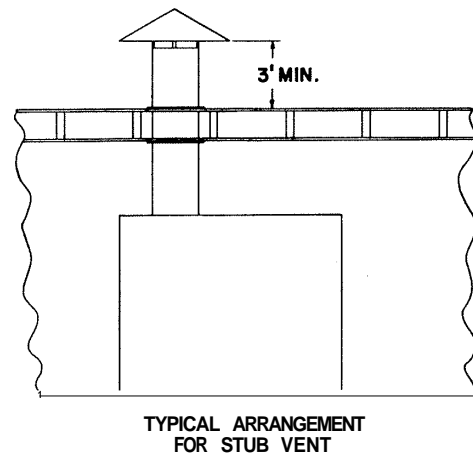


Fig. 3

SECTION II CAST IRON BLOCK ASSEMBLY

① **FACTORY ASSEMBLED SECTIONS** — If the boiler was ordered with factory assembled sections, the assembly should be set in the proper location as outlined in 'Section 1. Lifting arrangement and weights are given in Figure 4.

The tie-rod nuts should then be loosened until finger tight. Now proceed to part 3 of this section on page 12, "HYDROSTATIC TEST."

② **FIELD ASSEMBLED SECTIONS** — If the boiler was ordered to be field assembled, follow the assembly procedure outlined on the following pages.

A. Assembly of Sections (Manual Draw-Up)

WHEN ASSEMBLING SECTIONS WITHOUT HYDRAULIC DRAW-UP EQUIPMENT, NEVER ASSEMBLE MORE THAN ONE 'SECTION AT A TIME.

A "Manual Draw-Up Kit" is available through Burnham by ordering part number 6082901.

1. Place the rear section in its approximate final position, as outlined in 'Section 1, and support it with a suitable prop. 'See Figure 5.

903 ONLY — Open target wall carton, apply silastic to back of target wall and secure target wall to rear section.

2. Open the Boiler Assembly Carton(s).

3. Clean nipples and nipple ports thoroughly with a degreasing solvent and apply nipple lubricant provided.

4. Drive nipples squarely into section using block of wood and hammer, or preferably an aluminum headed hammer, if available.

5. A special nipple setting gauge is provided for the nipples. Gauge nipple in both directions to insure that it is driven to the proper depth into the nipple opening. Cut-out in gauge must rest on nipple, with legs of gauge touching finished face of section, when nipple is properly driven. See Figure 6.

IMPORTANT — NIPPLES MUST BE DRIVEN AS DIRECTED TO INSURE TIGHT JOINTS. MOST NIPPLE LEAKS ARE CAUSED BY TILTED OR COCKED NIPPLES.

6. IMPORTANT — THIS IS A FORCED DRAFT FIRED BOILER AND SEALANT MUST BE APPLIED WHERE SPECIFIED FOR PROPER AND SAFE PERFORMANCE. THE BURNHAM CORPORATION HAS APPROVED A SECTION JOINT SEALANT (SILASTIC) MANUFACTURED BY DOW-CORNING UNDER THE PRODUCT NUMBERS OF 732-RTV, 732-BLII AND 781. ALL THREE NUMBERS ARE THE SAME MATERIAL.

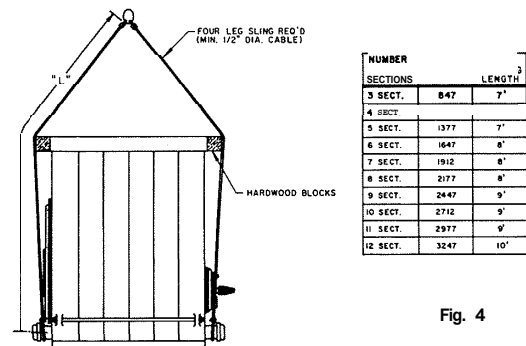


Fig. 4

LIFTING INSTRUCTIONS

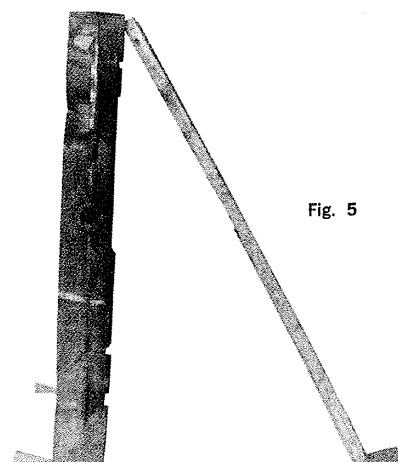


Fig. 5

POSITIONING OF BACK SECTION

The grooves in the gound joint along the edge of the section should be cleaned with a wire brush. Then using a cartridge of sealant in a caulking gun, apply $\frac{1}{4}$ " bead of Silastic to one side of each joint to be mated. Touch up any missed spots before draw-up. Touch-up after draw-up has no value. See Figure 7.

All sections must be drawn-up iron-to-iron at all three nipple ports.

SECTION'S MUST BE DRAWN-UP TIGHT WITHIN FOUR HOURS OF THE TIME WHEN SILASTIC IS FIRST APPLIED. SILASTIC CURES IN FOUR HOURS AND WILL NOT FLOW INTO SEAL GROOVES AFTER FOUR HOURS FROM APPLICATION, REGARDLESS OF THE PRESSURE APPLIED.

Tie bolts must be applied immediately after draw-up. If any joint springs apart it must be re-drawn tight within four hours of the time of application of the 'Silastic to that joint.

On long boiler assemblies, it may be necessary to draw-up a partial block if the entire boiler is not ready to be drawn-up tight within four hours of the first application of Silastic. If the block assembly time extends overnight, the partial block completed must be drawn-up tight before leaving the boiler overnight. If a joint springs out, it must be re-drawn tight within four hours of first application of Silastic to the joint.

7. From arrangement of sections chart (see Figure 8) select next section according to code letters on section.

IMPORTANT — SECTIONS MUST BE ASSEMBLED IN PROPER ORDER.

Clean nipple ports and place section on nipples in rear section. To facilitate assembly, it is advisable to enter the upper nipple first in its port, then enter the lower nipples in their respective ports.

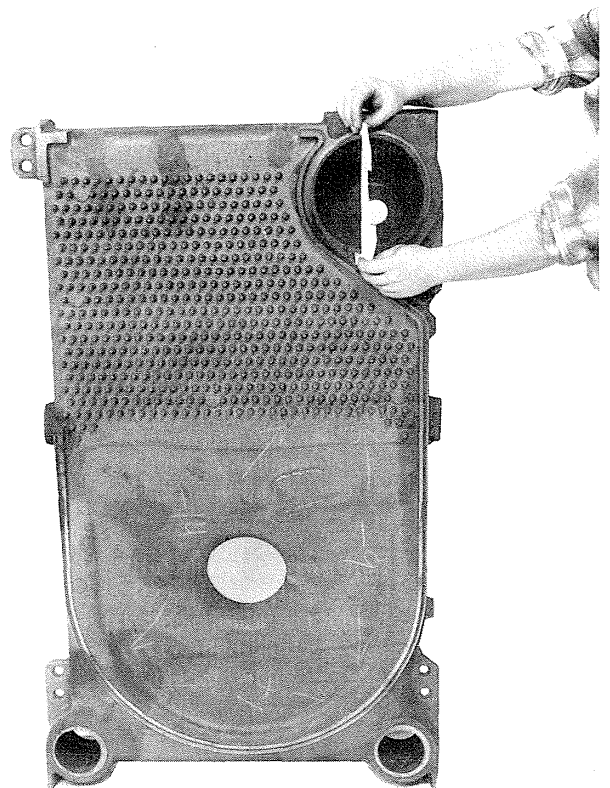
8. Insert the three $\frac{3}{4}$ " draw-up rods through the nipple ports in the intermediate section extending them through the tapped holes in the rear section.

CAUTION: Care must be exercised to avoid applying pressure directly on threaded tappings on front and rear sections with Draw-up channels during assembly procedures.

Refer to figs. 9 and 10 for proper placement of channel block during assembly procedures.

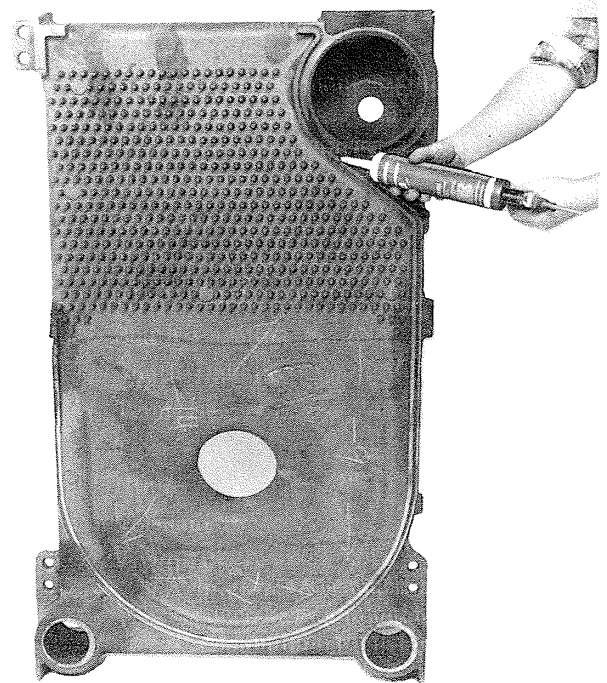
Place a 3" x 12" lg. steel channel on each end of the upper draw-up rod and an 3" x 8½" lg. steel channel on each end of the lower draw-up rods along with nuts and washers. These items are all located in the Draw-Up Kit. See Figures 9 and 10.

9. Drive section in place with a heavy block of wood, striking blows as squarely as possible over nipples.



SETTING OF NIPPLES

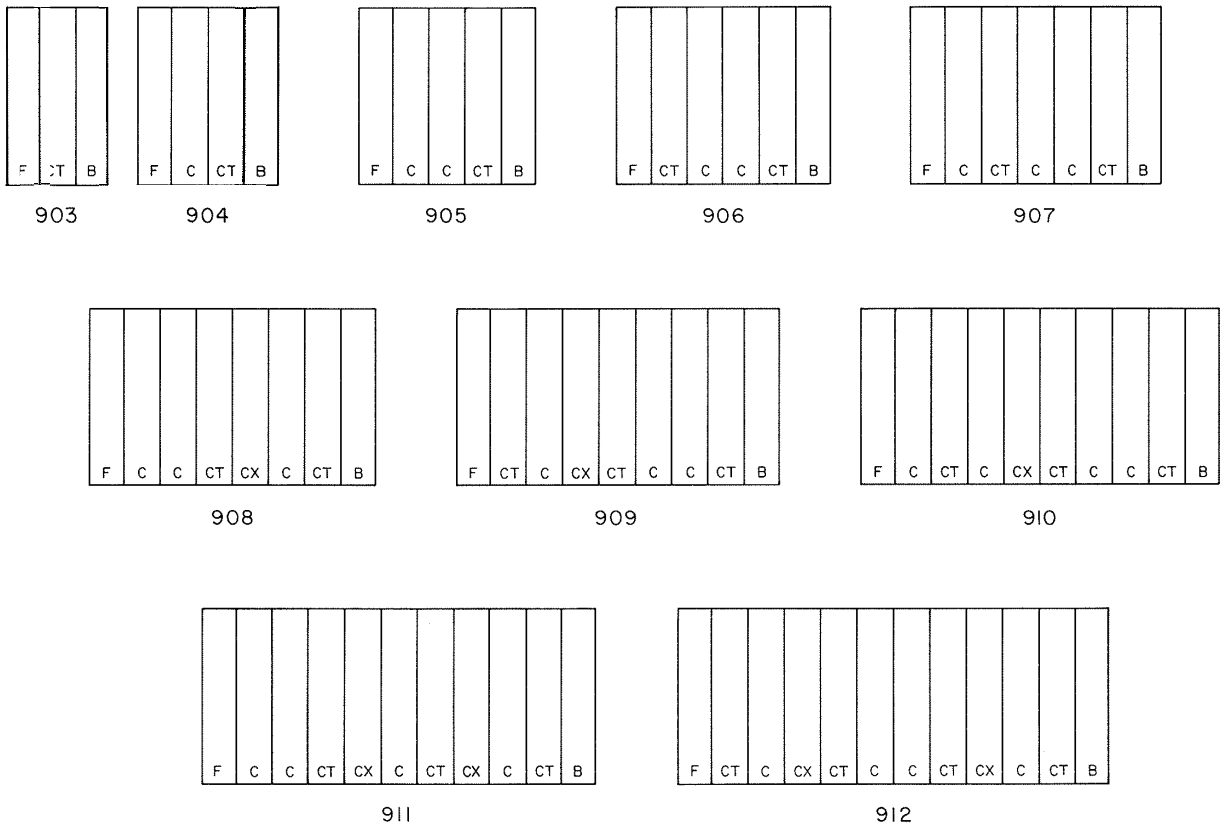
Fig. 6



APPLICATION OF SEALANT

Fig. 7

V9 SECTION ARRANGEMENT



F - FRONT SECTION w/ 3" TOP SUPPLY TAPPING
 C - CENTER SECTION
 CT - CENTER SECTION w/ HEATER OPENING
 CX - CENTER SECTION w/ 3" TOP SUPPLY TAPPING
 B - BACK SECTION w/ 3" TOP SUPPLY TAPPING

NOTES: 1. FOR BOILERS LESS TANKLESS HEATER, REPLACE THE "CT" SECTIONS WITH "C" SECTIONS.
 2. THE SECTIONS MUST BE ASSEMBLED ACCORDING TO THE ARRANGEMENT SHOWN TO INSURE PROPER OPERATION AND ALIGNMENT OF PIPING WITH JACKET KNOCKOUTS.
 3. WATER BOILER ONLY. REPLACE "CX" SECTION WITH "C" SECTION

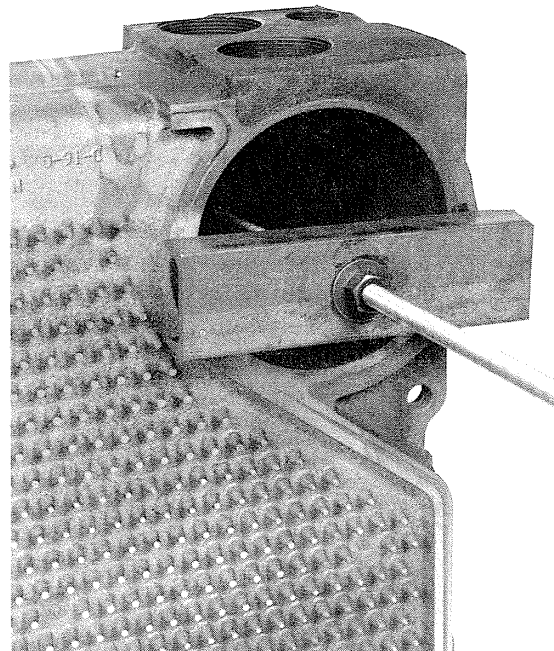
Fig. 8

10. DRAW UP SECTION SLOWLY AND EVENLY, tightening each draw-up rod a little at a time so that sections are equally spaced, starting with low-draw-up rods.

KEEP NIPPLES ALIGNED WITH NIPPLE PORTS. If necessary, tap nipples lightly with a blunt tool or rod to keep nipples from cocking while section are being drawn-up. DO NOT DRAW UP SECTION WHEN NIPPLES ARE COCKED. Continue tightening draw-up rods equally, periodically bumping the section with the heavy block of wood to relieve tension on the draw-up rods, until sections meet iron-to-iron on the ground surfaces.

11. KEEP DRAW-UP ROD THREADS, NUTS AND WASHERS LUBRICATED with grease or heavy oil to prevent damage to rods and threads and to make assembling easier.
12. CONTINUE ASSEMBLING SECTIONS IN THEIR RESPECTIVE ORDER.

Be sure to apply the sealant to the groove joints between adjacent sections as the boiler operates with a positive pressure in the firebox and products of combustion will escape between sections unless the sections are properly sealed. The sealant should be applied before each section is placed on the assem'blage.



CHANNEL BLOCK IN POSITION

Fig. 9

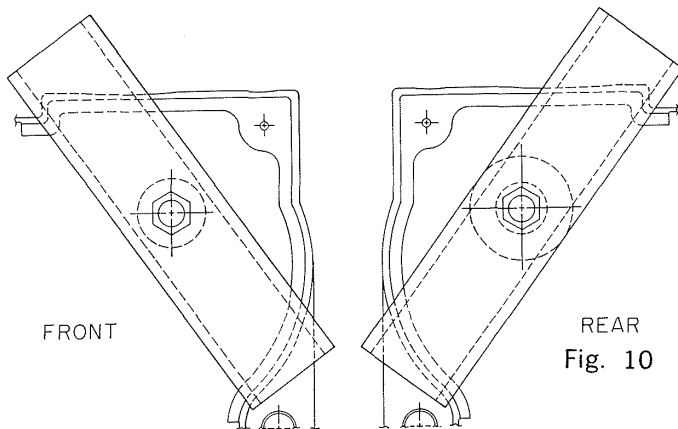


Fig. 10

13. After all sections have been drawn up, but before removing draw-up rods, the tie-rods must be installed.

- a. Locate (8) $\frac{5}{8}$ "-11 hex nuts and washers in the Boiler Assembly Carton(s).
- b. Locate the Tie-Rod Bundle.
- c. Insert tie-rods through lugs on sections. On the V-911 and the V-912, (2) different length tie-rods must be assembled with tie-rod couplings to achieve the proper length tie-rod assembly. Since the coupling is too large to fit through the lugs on the sections, insert the (2) tie-rods through the lugs before joining with the coupling.

d. Place a $\frac{5}{8}$ "-11 hex nut and washer on each end of the tie-rods and turn until finger tight.

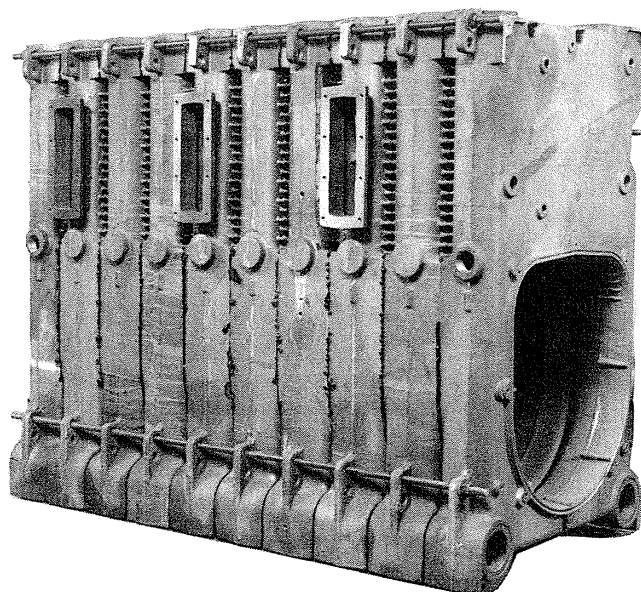
e. Remove draw-up rods from the section assemblage.

f. Excess length of tie-rods must be sawed off so they will not extend beyond front and rear sections. Rods should project equally at each end to insure proper fit of the jacket.

See Figure 11 for complete boiler section assemblage. Illustration shows boiler equipped with sections for built-in water heaters.

14. If any joint springs apart it must be redrawn within four hours of the time of application of the Silastic to that joint.

15. Now proceed to part 3 of this section on page 12, "HYDROSTATIC TEST."



SECTION ASSEMBLAGE

Fig. 11

B. Assembly of Sections (Hydraulic Draw-Up)

The entire assemblage may be drawn up at one time using hydraulic draw-up equipment providing the operation is completed within four hours after application of the sealant.

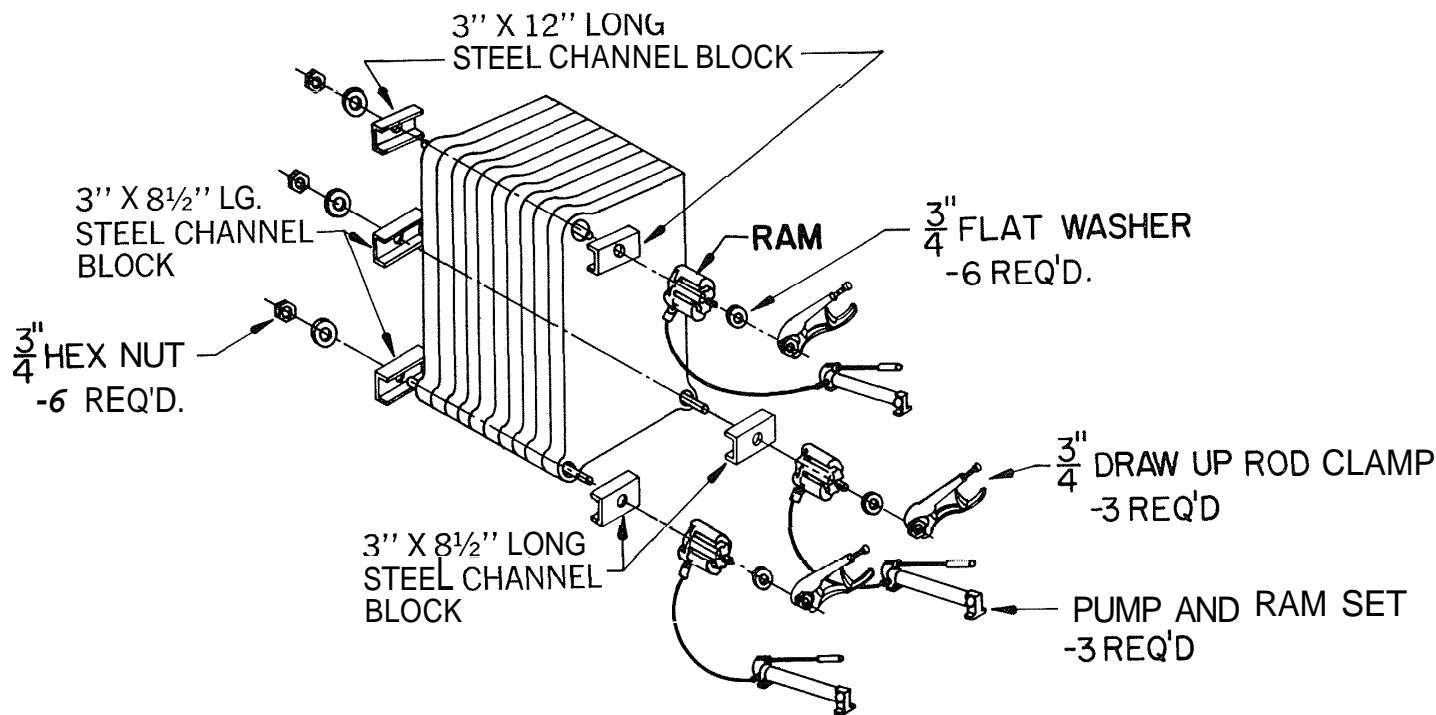
"Hydraulic Draw-Up Equipment" is available through Burnham by ordering part number 6196008.

1. Repeat steps 1 through 7 under "Assembly of Sections (Manual Draw-Up)."
2. Continue assembling sections in their respective order until all sections are in the assemblage. Be sure to apply the sealant to the groove in the ground joints 'between adjacent sections as the boiler operates with a positive pressure in the firebox and products of combustion will escape between sections unless the sections are properly sealed. The sealant should be applied before each section is placed on the assemblage.
3. Use $\frac{3}{4}$ " diameter rod(s) and coupling(s) to draw-up the sections (extra rods and couplings are provided with hydraulic draw-up equipment).

CAUTION: Care must be exercised to avoid applying pressure directly on threaded tappings on front and rear sections with Draw-up channels during assembly procedures.

Refer to figs. 9 and 10 for proper placement of channel block during assembly procedures.

4. Use two 12" lg. steel channel blocks for the upper rod, which is inserted through the upper tappings and nipple ports. See Figure 12.
5. Use four 8½" lg. steel channel blocks for the lower rods, which are inserted through the lower tappings and nipple ports.
6. Use hydraulic rams to draw up sections by applying pressure alternately on the draw-up rods. Continue to draw-up until all sections make contact at the ground joints.
7. Repeat steps 13 through 15 under "Assembly of Sections (Manual Draw-Up)."



HYDRAULIC DRAW-UP OF SECTIONS

Fig. 12

③ **HYDROSTATIC TEST** — After the boiler sections have been assembled, it is essential that the boiler be hydrostatically tested before platework, jacket, or piping is installed.

A. Tankless Heater Installation

If boiler is ordered with tankless heaters, install heaters with the gaskets provided. Table II on page 13 gives the maximum number of heaters permissible per assemblage and the heater ratings.

B. Plug all boiler tappings and fill entirely with cold water. To protect and safeguard the accuracy of steam or water gauge supplied, **DO NOT INSTALL GAUGE UNTIL AFTER TESTING OF BOILER.**

C. All completed boilers shall satisfactorily pass the prescribed hydrostatic test.

1. **STEAM BOILERS:** The assembled boiler shall be subjected to a hydrostatic test of not less than 45 psig.

2. **Hot Water Boiler:** The assembled boiler shall be subjected to a hydrostatic test of not less than 1½ times the maximum allowable working pressure.

a. 45 psi mawp - minimum test pressure is 68 psig.

b. 50 psi mawp - minimum test pressure is 75 psig.

c. 70 psi mawp - minimum test pressure is 105 psig.

D. **EXAMINE BOILER CAREFULLY, INSIDE AND OUTSIDE,** to insure against leaks from cocked nipples or through concealed breakage caused in shipping and handling. This precaution is for your protection and will simplify handling of necessary replacements and adjustment claims.

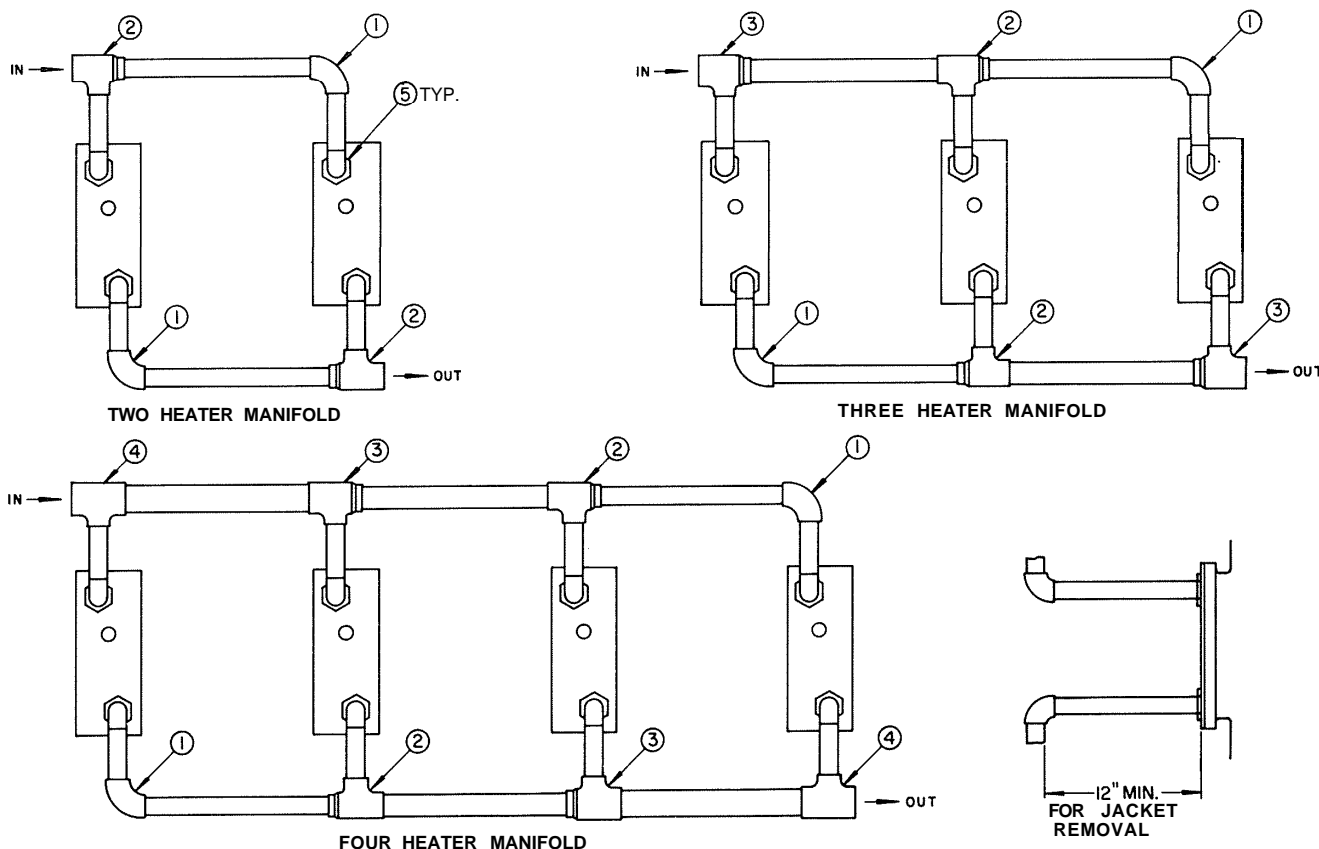
E. After making certain that there are no leaks, drain boiler and remove plugs for boiler trim and other connections.

SECTION III INSTALLATION INSTRUCTIONS

① For boilers with no tankless heaters, proceed to Step 4, Boiler Piping.

② Install the tankless heater manifolds according to Figure 13.

**MINIMUM PIPING RECOMMENDATION FOR V9
TANKLESS WATER HEATER MANIFOLDS**



ITEM	DESCRIPTION
①	1/2" COPPER ELBOW
②	1/2" x 1/4" x 1/4" COPPER TEE
③	2" x 1 1/2" x 1/4" COPPER TEE
④	2" x 2" x 1/4" COPPER TEE
⑤	1 1/4" COPPER X MIP ADAPTER

Fig. 13

NOTES:

1. IT IS IMPORTANT THAT WATER HEATERS BE CENTRALLY LOCATED IN BOILER. REFER TO PROPER SECTION ARRANGEMENT PER FIG. (8).
2. PRESSURE DROP ACROSS EACH V9-2 TANKLESS HEATER = 5.25 PSI AT 7.5 GPM FLOW RATE.

③ CONNECT TANKLESS HEATER PIPING AS SHOWN IN Fig. 14. See Table II for Tankless Heater Ratings.

THE FOLLOWING GUIDELINES SHOULD BE FOLLOWED WHEN PIPING THE TANKLESS HEATER:

A. Flow Regulation

If flow through the heater is greater than its rating, the supply of adequate hot water may not be able to keep up with the demand. For this reason a FLOW REGULATOR matching the heater rating should be installed in the cold water line to the heater. Refer to Figure 14 for piping recommendations. The flow regulator should preferably be located below the inlet to the heater and a minimum of 12" away from the inlet so that the regulator is not subjected to excess temperatures that may occur during "off" periods when it is possible for heat to be conducted back through the supply line. The flow regulator also limits the flow of supply water regardless of inlet pressure variations in the range of 20 to 125 psi.

B. Tempering of Hot Water

WARNING

Install a mixing valve at the tankless heater outlet to avoid risk of burns or scalding due to excessively hot water at the fixtures. Refer to Figure 14 for piping recommendations. Adjust and maintain the mixing valve in accordance with manufacturers instructions.

Installation of a tempering or mixing valve will also lengthen the delivery of the available hot water by mixing some cold water with the hot. In addition, savings of hot water will be achieved since the user will not waste as much hot water while seeking water temperatures to his liking. Higher temperature hot water

required by dishwashers and automatic washers is possible by piping the hot water from the heater prior to entering the mixing valve. The mixing valve should be "trapped" by installing it below the cold water inlet to heater to prevent lime formation in the valve.

C. Flushing of Heater

All water contains some sediment which settles on the inside of the coil. Consequently, the heater should be periodically backwashed. This is accomplished by installing hose bibs as illustrated in Figure 14 and allowing water at city pressure to run into hose bib A, through the heater, and out hose bib B until the discharge is clear. The tees in which the hose bibs are located should be the same size as heater connections to minimize pressure drop.

D. Hard Water

This is applicable to some city water and particularly to well water. This should not be a deterrent but precautions are necessary. A water analysis is necessary and an appropriate water softener installed. This is not only beneficial to the heater but to piping and fixtures plus the many other benefits derived from soft water.

TANKLESS HEATER RATINGS*

BOILER MODEL	NUMBER OF V9-2 TANKLESS HEATERS INSTALLED			
	1	2	3	4
V-903	6.0	--	--	--
V-904	7.5	--	--	--
V-905	7.5	--	--	--
V-906	7.5	13	--	--
V-907	7.5	15	--	--
V-908	7.5	15	--	--
V-909	7.5	15	21.0	--
V-910	7.5	15	22.5	--
V-911	7.5	15	22.5	--
V-912	7.5	15	22.5	28.5

* Ratings are given in gallons per minute continuous flow of water heated from 40°F to 140°F with 200°F boiler water.

TABLE II

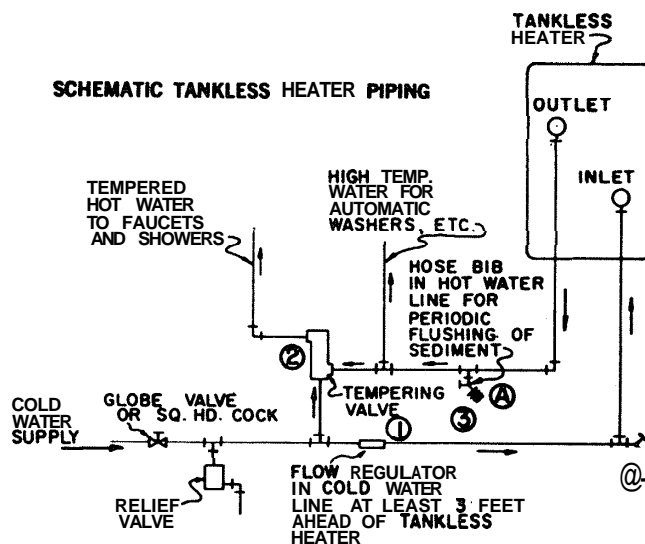


Fig. 14

4 BOILER PIPING

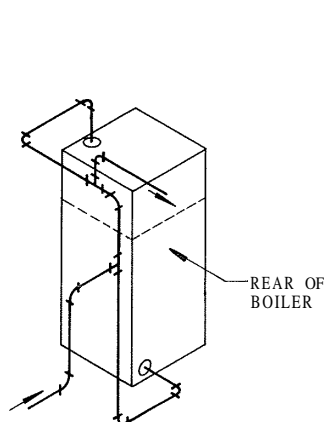
CONNECT SUPPLY AND RETURN PIPING TO HEATING SYSTEM.

CAUTION — IT IS IMPORTANT THAT THE MINIMUM PIPING REQUIREMENTS AND ARRANGEMENT'S BE COMPLIED WITH IN ORDER TO INSURE MAXIMUM RELIABILITY PERFORMANCE.

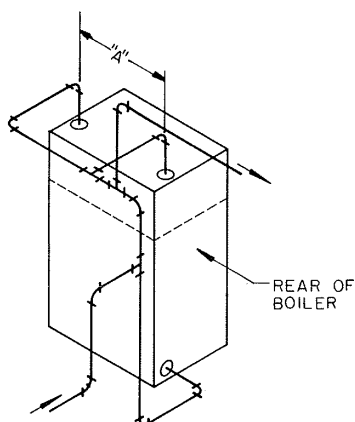
A. CLEARANCES — All steam and hot water pipes shall have clearances of at least $\frac{1}{2}$ " from all combustible construction.

B. With STEAM HEATING, see Figure 15, consult I=B=R Installation and Piping Guide No. 200.

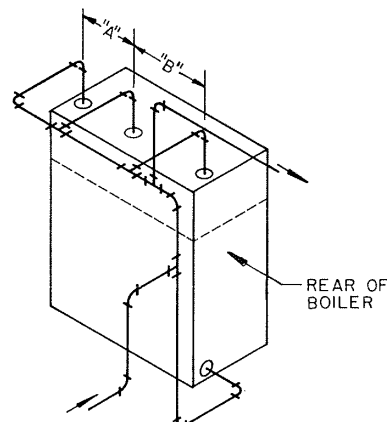
CAUTION — PARTICULAR ATTENTION SHOULD BE GIVEN TO THE CONSTRUCTION OF THE HARTFORD LOOP ON STEAM BOILERS. FIGURE 16 ILLUSTRATES THE RIGHT AND WRONG WAY TO CONSTRUCT THE STEAM HEADER.



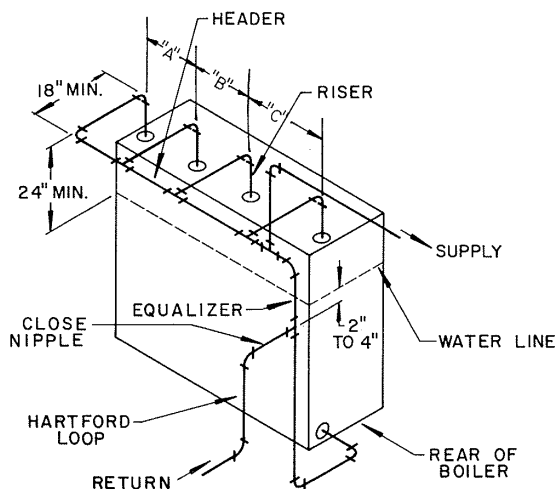
V-903 AND V-904



V-905 THRU V-907



V-908 THRU V-910

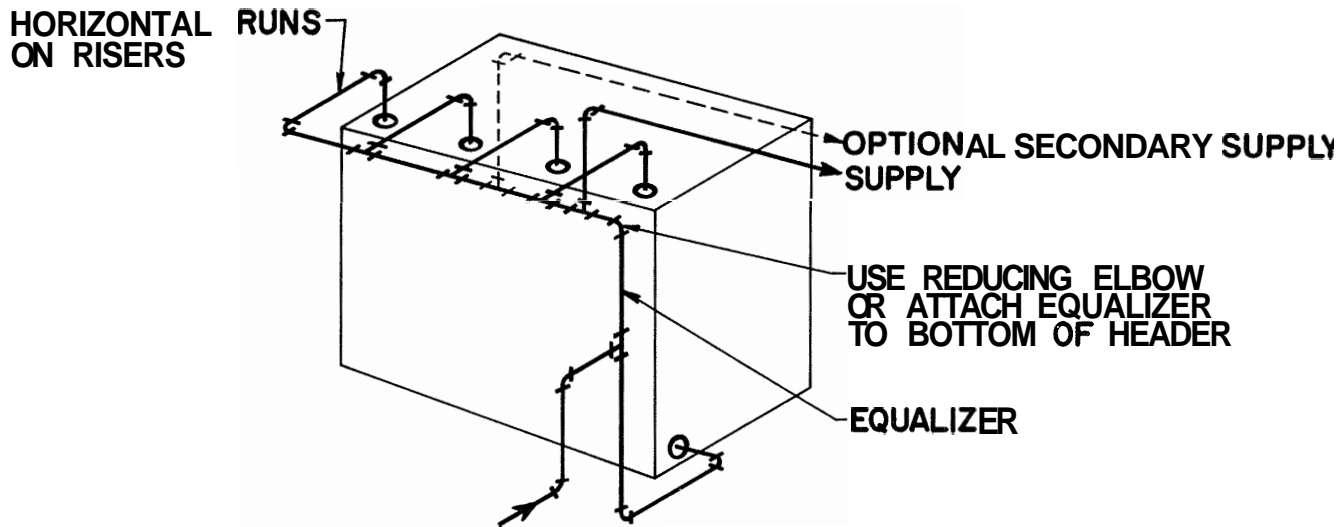


V-911 AND V-912

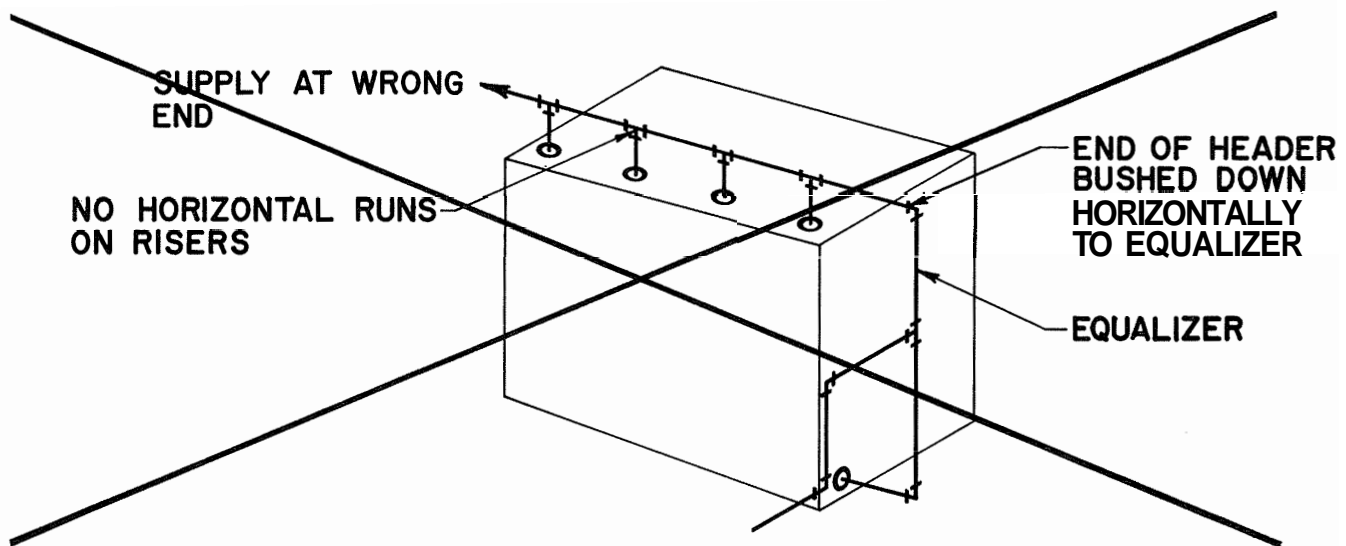
BOILER MODEL	PIPE SIZE				RISER SPACING		
	RISER	RETURN	HEADER	EQUALIZER	"A"	"B"	"C"
V-903	(1) 2 $\frac{1}{2}$ "	1"	3"	1 $\frac{1}{2}$ "	—	—	—
V-904	(1) 3"	2"	4"	2 $\frac{1}{2}$ "	—	—	—
V-905	(2) 3"	2 $\frac{1}{2}$ "	4"	2 $\frac{1}{2}$ "	24"	—	—
V-906	(2) 3"	2 $\frac{1}{2}$ "	4"	2 $\frac{1}{2}$ "	30"	—	—
V-907	(2) 3"	2 $\frac{1}{2}$ "	4"	2 $\frac{1}{2}$ "	36"	—	—
V-908	(3) 3"	2 $\frac{1}{2}$ "	6"	2 $\frac{1}{2}$ "	24"	18"	—
V-909	(3) 3"	3"	6"	3"	18"	30"	—
V-910	(3) 3"	3"	6"	3"	24"	30"	—
V-911	(4) 3"	3"	6"	3"	24"	18"	18"
V-912	(4) 3"	3"	6"	3"	18"	30"	18"

MINIMUM PIPING REQUIREMENTS STEAM BOILERS

Fig. 15



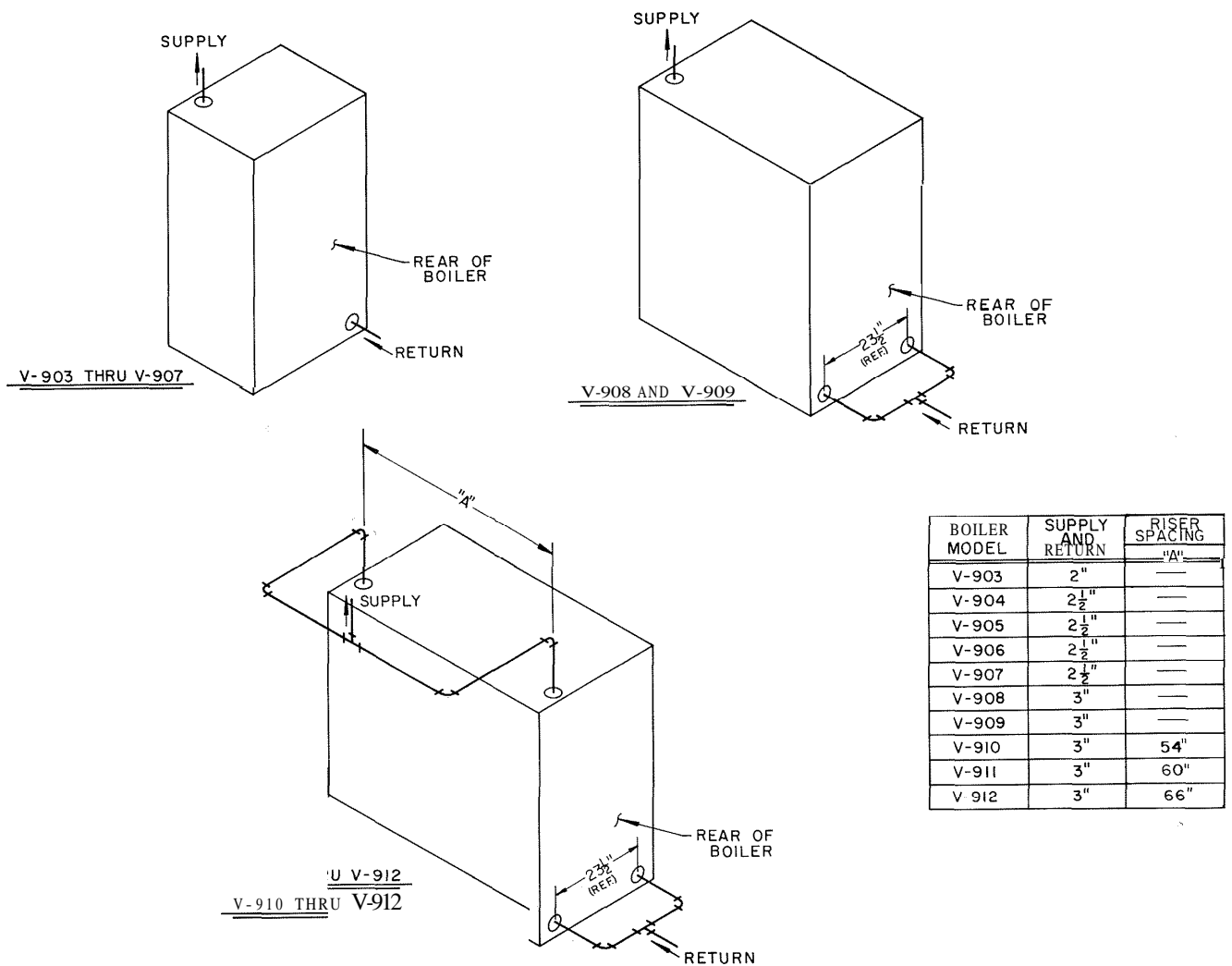
CORRECT PHYSICAL ARRANGEMENT FOR STEAM HEADERS



INCORRECT PHYSICAL ARRANGEMENT FOR STEAM HEADERS

* Optional Secondary Supply connections illustrated in dotted lines are to be used only in addition to supply connections shown in solid lines not in lieu of.

Fig. 16

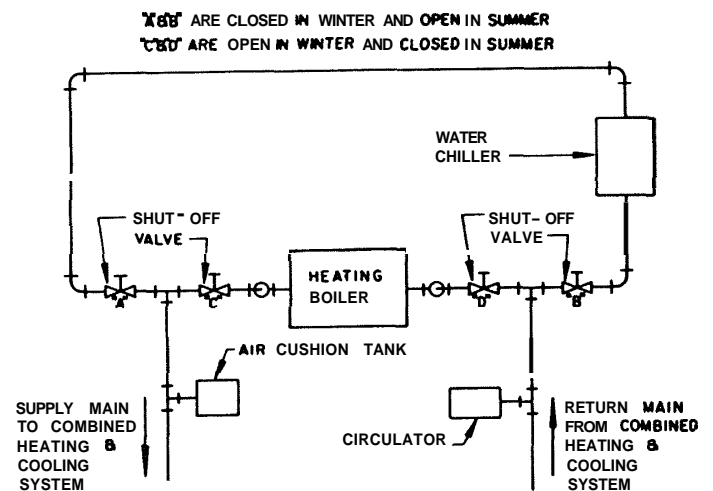


MINIMUM PIPING REQUIREMENTS WATER BOILERS

Fig. 17

C. With forced circulation HOT WATER HEATING, see Figure 17, consult I=B=R Installation and Piping Guide No. 200.

1. If this boiler is used in connection with refrigeration systems, the boiler must be installed so that the chilled medium is piped in parallel with the heating boiler using appropriate valves to prevent the chilled medium from entering the boiler, see Figure 18. Also, consult I=B=R Installation and Piping Guides.
2. If this boiler is connected to heating coils located in air handling units where they may be exposed to refrigerated air, the boiler piping must be equipped with flow control valves to prevent gravity circulation of boiler water during the operation of the cooling system.
3. If tankless heater is not used and if the boiler is to be operated in a system which has a large volume or excessive radiation where low boiler water temperatures may be encountered (i.e. converted gravity circulation system, etc.) the use of a boiler water bypass is recommended to maintain optimum operation.



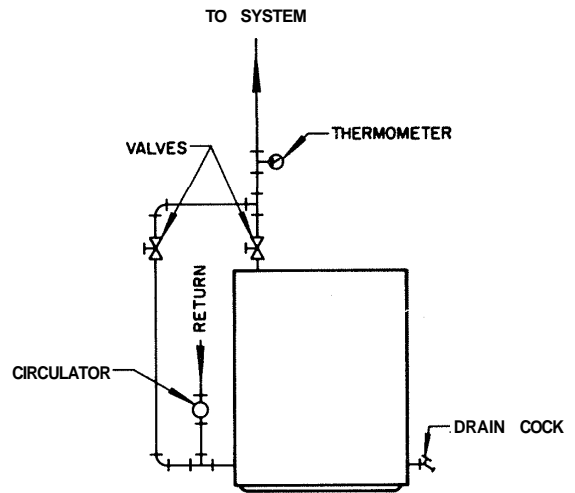
RECOMMENDED PIPING FOR COMBINATION HEATING & COOLING (REFRIGERATION) SYSTEMS WATER BOILERS

Fig. 18

Install a pipe tee between the circulator and boiler return along with a second tee in the supply piping as shown in Figure 19. The bypass should be the same size as the supply and return lines with valves located in the bypass and supply outlet as illustrated in Figure 19 in order to regulate water flow for maintenance of higher boiler water temperature.

Adjust the valves to provide 180°F to 200°F water temperature when the system water temperature is at normal operating range.

4. A hot water boiler installed above radiation level must be provided with a low water cutoff device as part of the installation.



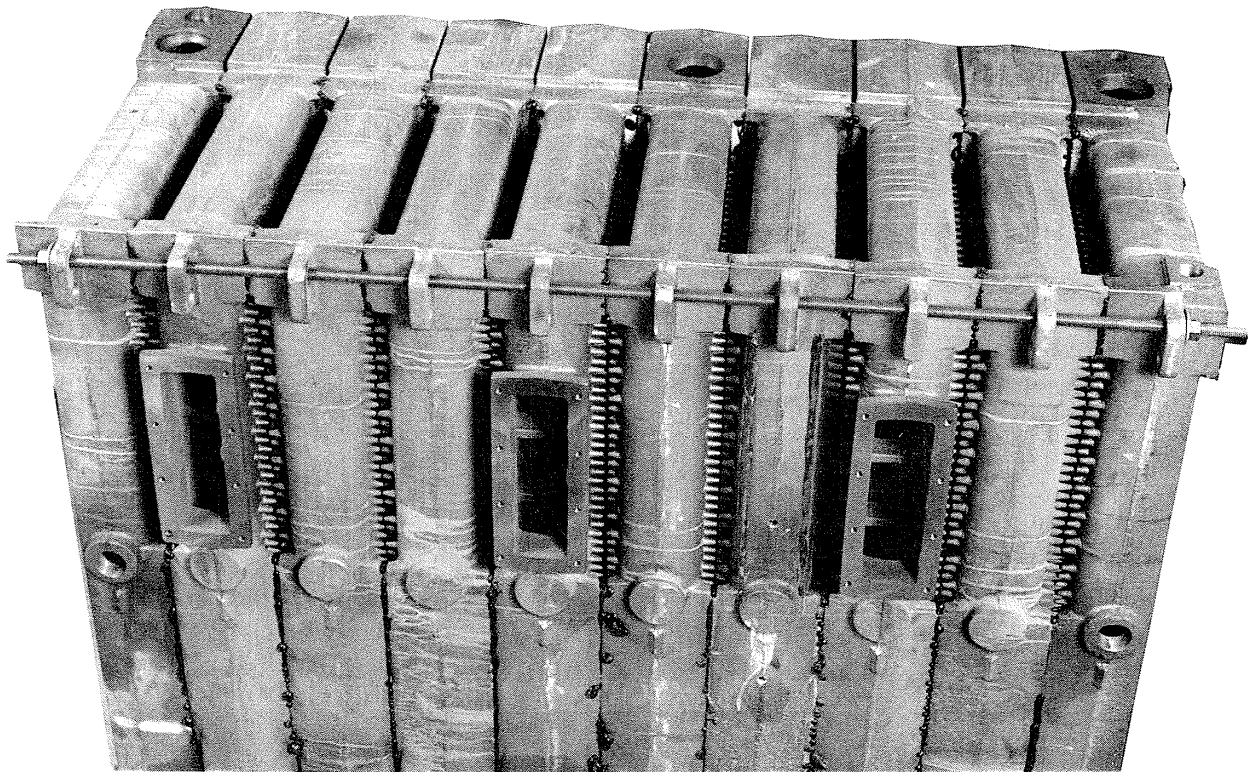
RECOMMENDED BYPASS PIPING
WATER BOILERS

Fig. 19

5 CANOPY/FLUE OUTLET ASSEMBLY

The parts necessary for items A-C are located in the canopy carton.

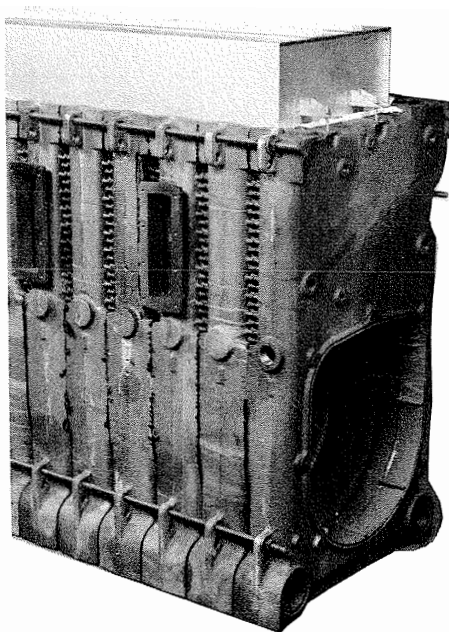
- A. Attach the (2) canopy mounting brackets to the front end of the canopy with (8) #10 x 1/2" hex washer head sheet metal screws.
- B. Along the groove provided on top of the sections and across the top of the front section, place 2" wide cera-felt strips and overlap at corners. See Figure 20.



GROOVES ON SECTION ASSEMBLAGE FOR CANOPY ATTACHMENT

Fig. 20

- C. Loosely attach the canopy to the lugs on the front of the section assembly with the $\frac{5}{8}$ " carriage bolts, lock-nuts, and washers. See Figure 21.
- D. Open the flue outlet carton.
- E. Attach the $\frac{1}{8}$ " x 1" adhesive fiber gasket to the surface of the flue outlet assembly that mounts against the back casting and canopy.
- F. Secure the flue outlet to the canopy with the (4) $\frac{5}{8}$ " brass hex nuts and flat washers. Attach the flue outlet to the section assembly with the (4) $\frac{1}{2}$ " cap screws and flat washers as shown in Figure 22.
- G. Tighten canopy carriage bolts until canopy is secure.

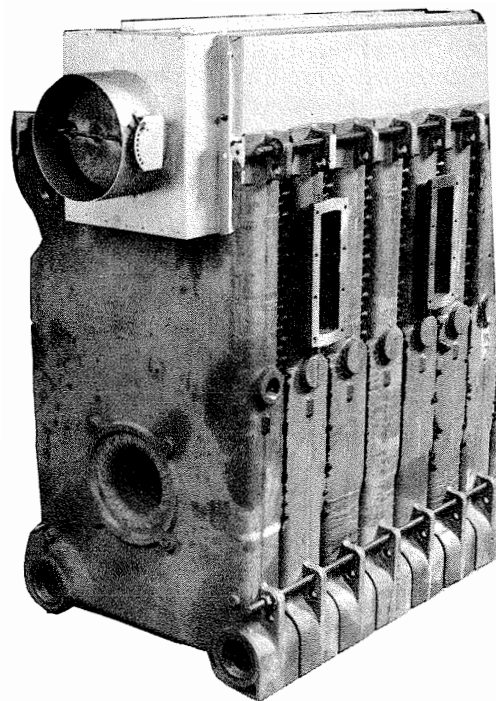


CANOPY SECURED AND SEALED TO SECTIONS

Fig. 21

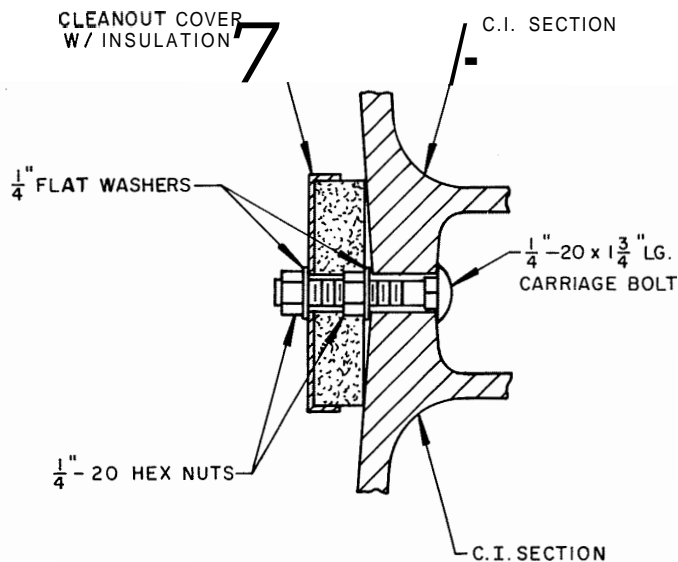
@INSTALL FLUE COVER PLATES over cleanout openings on left side of boiler as shown in Figure 23.

- A. Locate the cover plates, carriage bolts, nuts and washers in the boiler assembly carton.
- B. Attach the carriage bolts to the top and bottom of the flue openings with washers and hex nuts to provide a fixed stud.
- C. Install flue cover plates over studs with insulation against boiler and secure with washers and nuts.



FLUE OUTLET SECURED AND SEALED TO CANOPY AND REAR SECTION

Fig. 22



CLEANOUT COVER ASSEMBLY

Fig. 23

V-9 SERIES BOILER JACKET ASSEMBLY

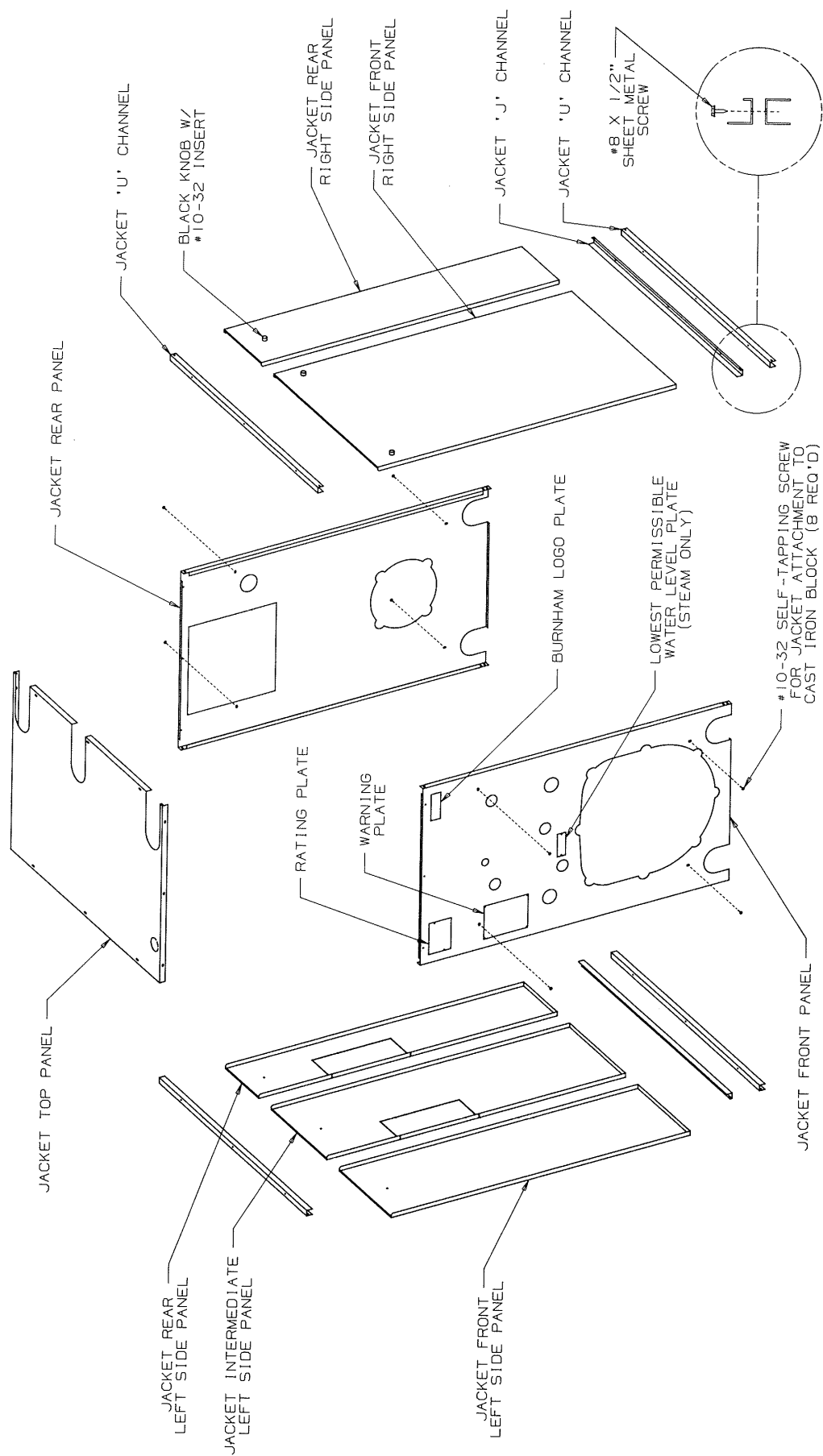
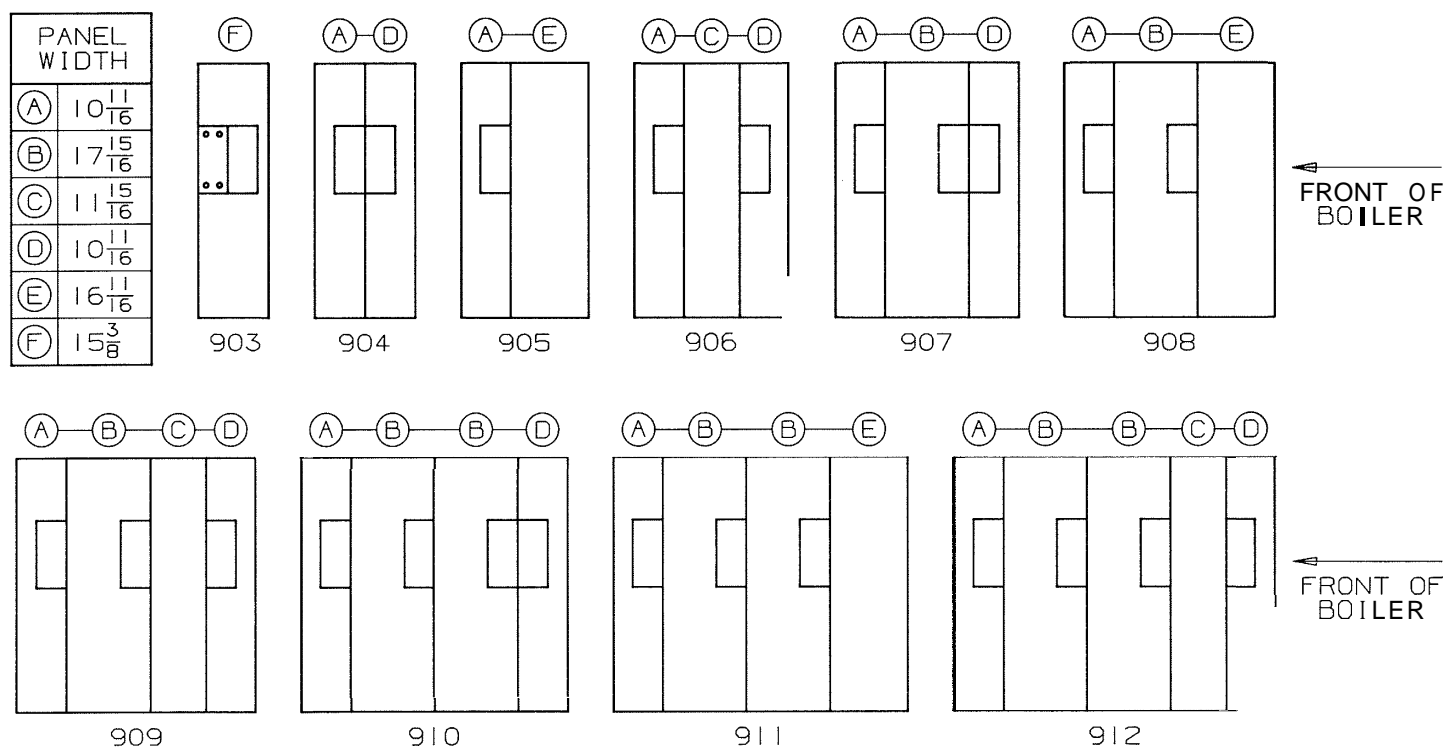


Fig. 24

7 ASSEMBLY OF JACKET

- A. Open jacket carton and jacket hardware package. Unless otherwise stated, all jacket components are fastened with #8 x .% hex head sheet metal screws. Do not drive sheet metal screws tight until jacket assembly is complete.
- B. Attach jacket front panel to front section and jacket back panel to rear section using the (8) #10 self tapping screws. See Figure 24 for jacket assembly drawing.
- C. Attach each jacket 'J' channel to one of the jacket 'U' channels as shown in the jacket detail on the jacket assembly drawing.
- D. Attach each 'U/J' channel assembly to the bottom of the front and back panels using (4) sheet metal screws.
- E. Attach each remaining 'U' channel to the top of the front and back panel ('U' side down) using (2) sheet metal screws.
- F. Attach the jacket top panel to the front panel, back panel, and upper 'U' channels.
- G. Fasten the black knobs onto the jacket side panels using the #10 machine screws.
- H. Use Figure 25 to determine the correct positions of the left side panels.
- I. Install each panel into position by inserting top of panel into upper 'U' channel, pushing bottom of panel in towards boiler, and sliding panel down into 'J' channel.
- J. Remove the knockouts necessary for tankless heater operation.
- K. Install the remaining side panels on the right side of the boiler (order is not important).
- L. Attach the 'D4A' Rating Plate and Water Treatment Caution Plate (both are in the instructions envelope) to the front panel using sheet metal screws.
- M. Tighten all sheet metal screws.

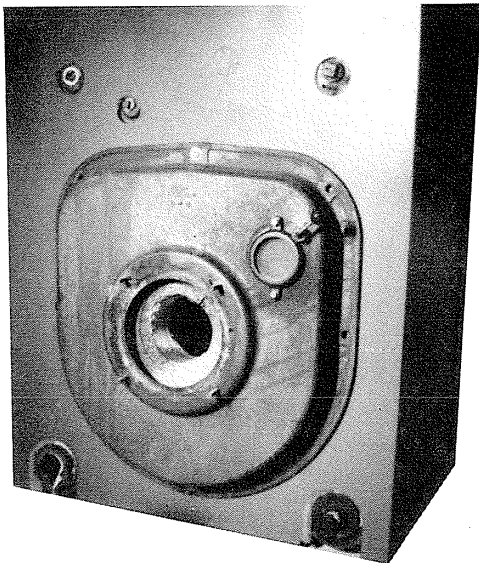


V-9 JACKET LEFT SIDE PANEL ARRANGEMENT

Fig. 25

8 INSTALL BURNER MOUNTING PLATE

- A. With the use of Silastic, secure the rope gasket to the groove along the mounting plate opening in the front section.
- B. Mount the burner mounting plate assembly to the front section with the (8) $\frac{1}{8}$ "-18 x 1" cap screws and flat washers located in the burner mounting plate carton. See Figure 26.

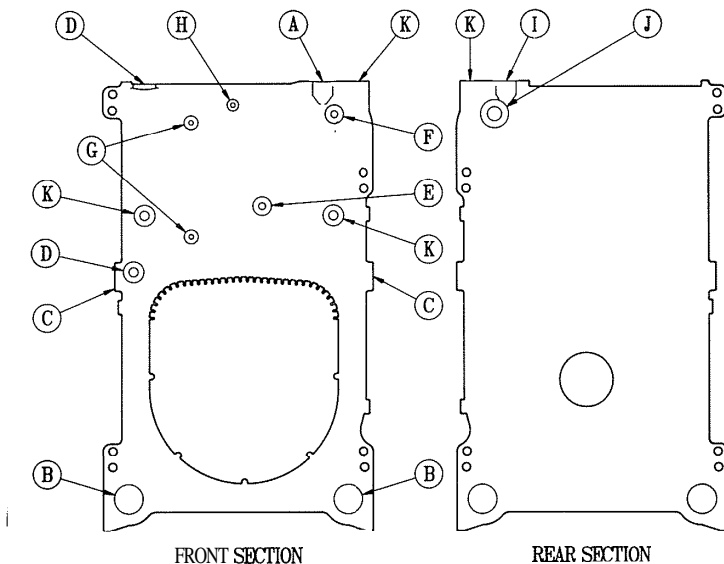


BURNER MOUNTING PLATE

Fig. 26

11 INSTALL BURNER

Refer to Oil Burner Installation Instructions and Burner Specification Manual, for proper installation, fuel piping, wiring, burner adjustment and service instructions. Using a hacksaw blade or knife, cut hole to the proper size in the burner plate insulation for receipt of burner air tube. Burner is mounted on burner mounting plate using the (4) $\frac{3}{8}$ "-16 hex nuts and flat washers located in the burner mounting plate carton.



FRONT SECTION

REAR SECTION

**V-9 SERIES BOILER
PURPOSE OF TAPPINGS**

TAPPING LOCATION	SIZE (INCHES)	STEAM BOILER	WATER BOILER
(A)	3	SUPPLY	SUPPLY
(B)	3	RETURN	RETURN
(C)	1 1/2	CROWN INSPECTION/WASH-OUT (SPECIAL ORDER ONLY)	CROWN INSPECTION/WASH-OUT (SPECIAL ORDER ONLY)
(D)	1	FLOAT L.W.C.O.	FLOAT L.W.C.O.
(E)	3/4	PROBE L.W.C.O.	PROBE L.W.C.O.
(F)	3/4	PRESS. LIMIT CTRL.	TEMP. LIMIT CTRL.
(G)	1/2	GAUGE GLASS	NOT USED
(H)	1/2	STEAM GAUGE (BUSHED TO 1/4")	TEMPERATURE/PRESSURE GAUGE
(I)	3	SUPPLY	SUPPLY
(J)	1 1/2	SAFETY VALVE	RELIEF VALVE
(K)	1	AUXILIARY TAPPINGS	AUXILIARY TAPPINGS

**V-9 SERIES BOILER
PURPOSE OF TAPPINGS**

Fig. 27

9 MOUNT PRESSURE RELIEF DOOR

- A. Apply a $\frac{1}{4}$ " bead of Silastic along the groove on the inside face of the pressure relief door.
- B. Mount the pressure relief door onto the rear section using the (4) $\frac{1}{8}$ "-18 x 1" cap screws and washers located in the canopy carton.

10 INSPECT SEAL

After the platework is in place, a visual inspection should be made of all sealed joints and repairs made if necessary. A darkened boiler room with a light source in the combustion space and canopy will aid this inspection.

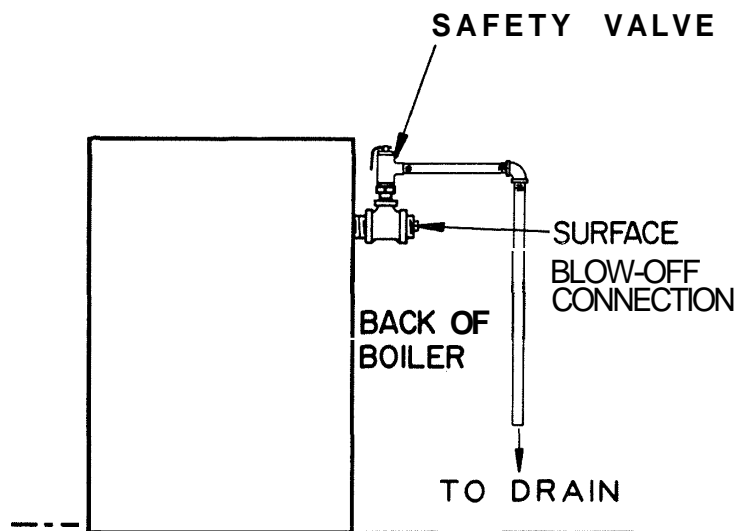
12 STEAM BOILERS — INSTALL STEAM TRIM

Items for steam trim are located in the steam trim carton (except for the separately ordered low water cutoff and tankless heater control). Figure 27 shows the proper tapings for each item. Figure 29 shows front view of an assembled steam boiler.

- A. Install the gauge glass set.
- B. Install the low water cut-off.
- C. Install the Pressuretrol to the boiler using the $\frac{1}{4}$ " x 90 (2%) syphon and the $\frac{3}{4}$ " NPT x $\frac{1}{4}$ " FPT hex bushing.
- D. Install the $\frac{3}{4}$ " drain cock using the 3" NPT x $\frac{3}{4}$ " FPT hex bushing.
- E. Install the steam gauge using the $\frac{1}{2}$ " NPT x $\frac{1}{4}$ " FPT hex bushing.
- F. Install the safety valve to the back section as shown in Figure 28. The safety valve is installed in the tee provided for blow-off piping.
- G. For boilers with tankless heaters, install the operating control in an unused tapping through one of the heater plates.

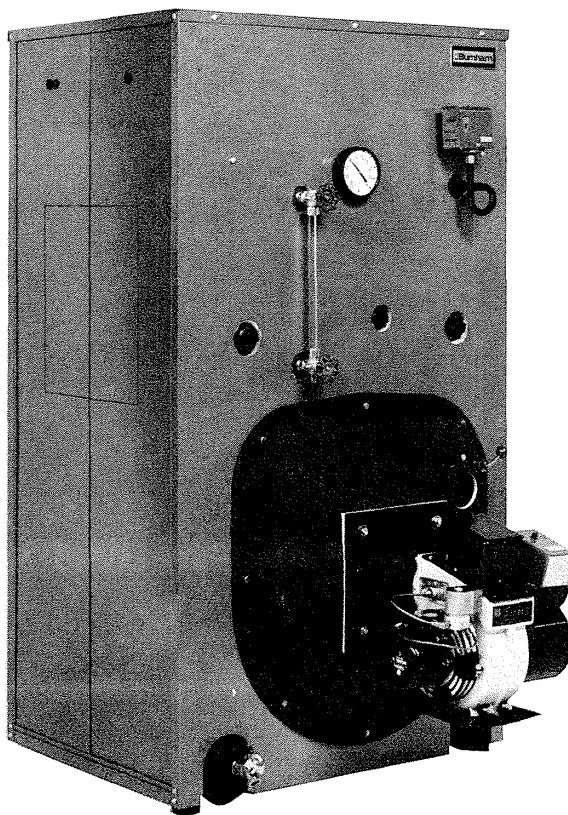
H. Plug extra tapings.

- I. Attach the Lowest Permissible Water Level Plate to the jacket front panel as shown in Figure 24 with the #8 x $\frac{1}{2}$ " sheet metal screws.



STEAM BOILER-SAFETY VALVE HOOK-UP

Fig. 28



STEAM BOILER — FRONT VIEW

Fig. 29

13 WATER BOILERS — INSTALL WATER TRIM

Items for water trim are located in the water trim carton (except for the separately ordered low water cutoff). Figure 27 shows the proper tappings for each item. Figure 31 shows front view of an assembled water boiler.

- A. Install the temperature pressure gauge.
- B. Install the low water cutoff.
- C. Install the immersion well and mount the aquastat on to the well.
- D. Install the $\frac{3}{4}$ " drain cock using the 3" NPT x $\frac{3}{4}$ " FPT hex bushing.
- E. Install the pressure relief valve as shown in Figure 30.
- F. Plug extra tappings.

CAUTION: OXYGEN CORROSION

Oxygen contamination of the boiler water will cause corrosion of the iron and steel boiler components, which can lead to failure. As such, any system must be designed to prevent oxygen absorption in the **first** place or prevent it from reaching the boiler. Problems caused by oxygen contamination of boiler water are not covered by **Burnham's** standard warranty.

There are many **possible causes** of oxygen contamination such as:

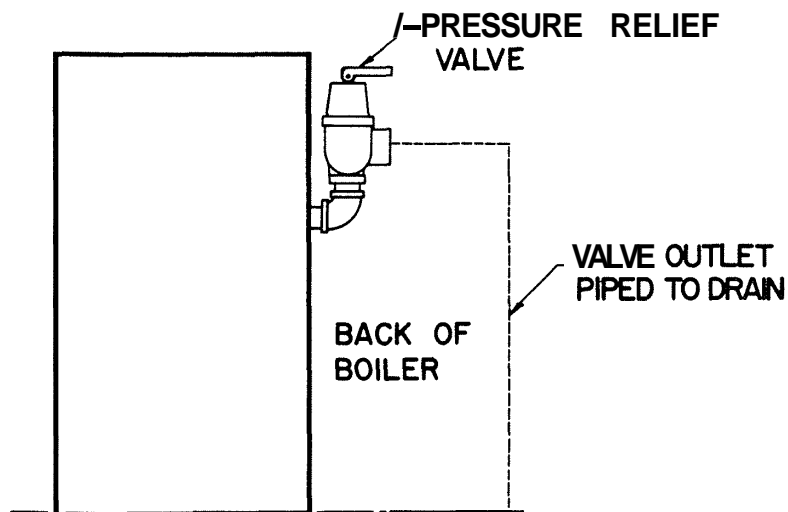
1. Addition of excessive make-up water as a result of system leaks.
2. Absorption through open tanks and fittings.
3. Oxygen permeable materials in the distribution system.

In order to insure long product life, oxygen sources should be eliminated. This **can** be accomplished by **taking** the following measures:

1. Repairing system leaks to eliminate the need for addition of make-up water.
2. Eliminating open tanks from the system.
3. Eliminating **and/or** repairing fittings which allow oxygen absorption.
4. Use of non-permeable materials in the distribution.

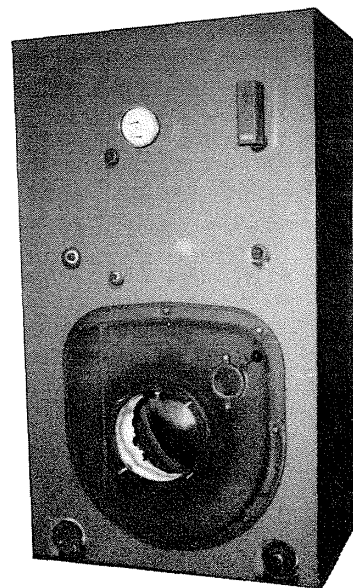
14 INSTALL ELECTRIC WIRING in accordance with National Electric Code and local regulations. A separate ELECTRICAL CIRCUIT should be run from meter with a Fused Disconnect Switch in this Circuit.

CANADA — Refer to CSA Standard **C22.2** Part 1, **1990**, Electrical features of Fuel Burning Equipment (gas and oil).



WATER BOILER
PRESSURE SAFETY RELIEF VALVE HOOK-UP

Fig. 30



WATER BOILER — FRONT VIEW

Fig. 31

SECTION IV OPERATING INSTRUCTIONS

① ALWAYS INSPECT INSTALLATION BEFORE STARTING BURNER.

② FILL HEATING SYSTEM WITH WATER

NOTE: It is important, especially in a steam system, to properly remove the oil and dirt from the system. Failure to clean the system can result in erratic water lines and surging.

CLEAN HEATING SYSTEM IF boiler water or condensate return water is dirty or if erratic water lines or surging exist after a few days of boiler operation. Refer to step 6 for proper cleaning instructions for steam and water boilers.

A. STEAM BOILERS — Fill boiler to normal water line. As shown in Figure 1, the normal water line is 41½" from the floor. At the start of each heating season and once or twice during the season try 'SAFETY VALVE' to be sure it is in working condition. To do this, fasten wire or cord to lever of valve and pull lever — standing safe distance away from valve.

B. HOT WATER BOILERS. Fill entire heating system with water and vent air from system. Use the following procedure on a Series Loop System installed as per Figure 17:

1. Close all but one zone valve.
2. Open drain valve on purge fitting.
3. Open fill valve.
4. Close purge valve.
5. Open relief valve on boiler.
6. Allow water to run out of purge fitting drain valve until zone has been purged of air and filled with water.
7. Open zone valve to the second zone to be purged, then close the first. Repeat this step until all zones have been purged but always have one zone open. At completion open all zone valves.
8. Close drain valve on purge fitting.
9. When water discharges from relief valve, release the lever on the top of the relief valve, allowing it to close.
10. Continue filling the system until the pressure gauge is at desired working pressure.
11. Open purge valve.

ON A HOT WATER SYSTEM THE PRESSURE MUST NOT EXCEED 50 POUNDS UNLESS THE BOILER IS EQUIPPED ESPECIALLY FOR 70 POUNDS MAXIMUM WORKING PRESSURE. IF BOILER PRESSURE EXCEEDS PRESSURE SETTING OF SAFETY RELIEF VALVE, IT MUST BE RELIEVED IMMEDIATELY AND THE CAUSE OF RELIEF VALVE FAILURE INVESTIGATED AND CORRECT-

ED. EXCESS PRESSURE IS DANGEROUS, IN ADDITION, COULD CAUSE DAMAGE TO HEATING SYSTEM.

DO NOT draw water from boiler while in use. When adding water while boiler is in operation, do not open supply valve fully but add water slowly.

③ SET CONTROLS with burner service switch turned "OFF."

- A. PRESS RED RESET BUTTON on R8184 Protecto-relay and release.
- B. On STEAM BOILERS set cut-in pressure on PA404 Pressuretrol for three (3) pounds and differential pressure for two (2) pounds. These pressures may be varied to suit individual requirements of installation.
- C. On STEAM BOILERS WITH TANKLESS DOMESTIC WATER HEATERS, set boiler water temperature dial on low limit operating control at 160°F (max.). Set differential at 10".
- D. ON WATER BOILERS WITHOUT TANKLESS HEATERS, set high limit dial on L4006A at 210°F. This temperature may be varied to suit requirements of installation.
- E. ON WATER BOILERS WITH TANKLESS HEATERS, set low limit operating control dial at 160°F and high limit dial 210°F. Operating control must be a minimum of 20 below high limit setting. Set differential at 25°.

④ ADJUST BURNER according to the Burner Manual.

A. FLAME FAILURE

The V-9 boiler controls operate the burner automatically. If for unknown reasons the burner ceases to fire and the reset button on the primary control is tripped, the burner has experienced ignition failure. Before pressing the reset button, call your serviceman immediately.

CAUTION: Do not attempt to start the burner when excess oil or gas has accumulated in the combustion chamber, when the unit is full of vapor, or when the combustion chamber is very hot.

⑤ TEST CONTROLS

WARNING

Before installation of the boiler is considered complete the operation of the boiler controls should be checked, particularly the low water cutoff and the high limit control.

- A. CHECK OPERATING CONTROL OPERATION. Raise and lower operating control setting as required to start and stop burner.
- B. WARNING — CHECK HIGH LIMIT CONTROL — Jumper Operating Control Terminals. Allow burner to operate until shutdown by limit. Installation is not considered complete until this check has been made. REMOVE JUMPER.

- C. **CHECK LOW WATER CUTOFF** control with water level at normal water line (see Figure 1). Raise operating control setting to allow burner to operate. Open boiler drain to allow water level to drop to bottom of sight glass until burner operation is shut down by low water cutoff.

Close boiler drain and refill to normal water line. Burner should automatically restart during fill. Reset operating control.

IMPORTANT

PROBE AND FLOAT TYPE LOW WATER CUTOFF DEVICES REQUIRE ANNUAL INSPECTION AND MAINTENANCE. Refer to step 4 of Service Instructions for proper cleaning instructions.

- D. **CHECK OPERATING CONTROL** on boiler equipped with tankless heaters. With burner off, draw hot water until burner starts, then turn off hot water and check burner shutdown.

6 BOILER AND SYSTEM CLEANING INSTRUCTIONS FOR TROUBLE FREE OPERATION.

A qualified water treatment chemical specialist should be consulted for recommendations regarding appropriate chemical compounds and concentrations which are compatible with local environmental regulations.

A. Steam Boilers

1. Oil, greases & sediments which accumulate in a new boiler and piping must be removed from the system in order to prevent an unsteady water line and carry over of the water into the supply main above boiler. Operate the boiler with steam in the entire system for a few days allowing the condensate to return to the boiler. If the condensate can temporarily be wasted, operate boiler only for the length of time it takes for condensate to run clear. If the latter cannot be achieved or if the condensate is returned to the boiler, boil out the boiler using the **SURFACE BLOWOFF** connection. See Figure 28.
 - a. Drain boiler until water is just visible in gauge glass. Run temporary 1 1/2" pipe line from the surface **blowoff** connection to an open drain or some other location where hot water may be discharged safely. Do not install valve in this line.
 - b. Add an appropriate amount of recommended boil out compound.
 - c. Start burner and operate sufficiently to boil the water without producing steam pressure. Boil for about 5 hours. Open boiler feed pipe sufficiently to permit a steady trickle of water from

the surface **blowoff** pipe. Continue this slow boiling and trickle of overflow for several hours until the water coming from the overflow is clear.

- d. Stop burner and drain boiler in a manner and to a location that hot water can be discharged with safety.
 - e. Refill boiler to normal water line. If water in gauge glass does not appear to be clear, repeat steps (a. thru c.) and boil out the boiler for a longer time.
2. Low pressure steam boilers such as the V-9 series should be maintained with appropriate water treatment compounds. Add suitable water treatment compounds as recommended by your qualified water treatment company.
 3. Remove temporary surface **blowoff** piping, plug tapping and reinstall safety valve. Boil or bring water temperature to 180°F promptly in order to drive off the dissolved gases in the fresh water.
 4. If unsteady water line, foaming or priming persist, install gate valve in Hartford Loop and drain valves in return main and at boiler and proceed as follows:
 - a. Connect hoses from drain cocks to floor drain. Close gate valve in Hartford Loop and open drain cock in return main. Fill boiler to normal water level, turn on oil burner and operate boiler at this water level for at least 30 minutes after the condensate begins to run hot, then turn off burner.
- Close all radiator valves. Remove all supply main air valves and plug the openings in supply main.
- b. Draw about 5 gallons of hot water from boiler into a container and dissolve into it the appropriate amount of a recommended boilout compound. Remove safety valve from boiler and pour this solution into boiler, then reinstall safety valve.
 - c. Turn on burner and keep operating while feeding water to boiler slowly. This will raise water level in boiler slowly into supply main and back through return main, flowing from drain hose at about 180°F. Continue until water runs clear from drain hose for at least 30 minutes.
 - d. Stop feeding water to boiler but continue operating burner until excess water in boiler flows out through supply main and water lowers (by steaming) until it reaches normal level in boiler.

Turn off burner. Drain boiler. Open all radiator valves. Reinstall all supply main air valves. Open gate valve in Hartford Loop.

- e. When boiler has cooled down sufficiently (crown-sheet of sections are not too hot to touch), close the drain cocks at boiler and in return main and feed water slowly up to normal level in boiler. Turn on burner and allow boiler to steam for 10 minutes, then turn off burner. Draw off one quart of water from bottom gauge glass fitting and discard. Draw off another quart sample and if this sample is not clear, repeat the cycle of draining the boiler and return main and refilling the boiler until sample is clear.
 - f. If the boiler water becomes dirty again at a later date due to additional sediment loosened up in the piping, close gate valve in Hartford Loop, open drain cock in return main, turn on burner and allow condensate to flow to drain until it has run clear for at least 30 minutes while feeding water to boiler so as to maintain normal water level. Turn off burner, drain boiler, open gate valve in Hartford Loop, then repeat step 1 above.
5. Make pH or Alkalinity Test.
- After boiler and system have been cleaned and refilled as previously described, test the pH of the water in the system. This can easily be done by drawing a small sample of boiler water and testing hydron paper which is used in the same manner as litmus paper, except it gives specific readings. A color chart on the side of the small hydron dispenser gives the reading in pH. Hydron paper is inexpensive and obtainable from any chemical supply house or through your local druggist. The pH should be higher than 7, but lower than 11. Add appropriate water treatment chemicals, if necessary, to bring the pH within the specified range.
6. Boiler is now ready to be put into service.

B. Water Boilers

1. Filling of Boiler and System — General — In a hot water heating system, the boiler and entire system (other than the expansion tank) must be full of water for satisfactory operation. Water should be added to the system until the boiler pressure gauge registers normal system design operating pressure. To insure that the system is full, water should come out of all air vents when opened.
2. Boiling Out of Boiler and System. The oil and grease which accumulate in a new hot water boiler can be washed out in the following manner.
 - a. Remove safety relief valve using extreme care to avoid damaging it.
 - b. Add an appropriate amount of recommended boil out compound.
 - c. Reinstall safety relief valve.
 - d. Fill the entire system with water.
 - e. Start firing the boiler.
 - f. Circulate the water through the entire system.
 - g. Vent the system, including the radiation.
 - h. Allow boiler water to reach operating temperature, if possible.
 - i. Continue to circulate the water for a few hours.
 - j. Stop firing the boiler.

k. Drain the system in a manner and to a location that hot water can be discharged with safety.

1. Remove plugs from all available returns and wash the water side of the boiler as thoroughly as possible, using a high-pressure water stream.
 - m. Refill the system with fresh water.
3. Add appropriate boiler water treatment compounds as recommended by your qualified water treatment company
4. Make pH or Alkalinity Test.
- After boiler and system have been cleaned and refilled as previously described, test the pH of the water in the system. This can easily be done by drawing a small sample of boiler water and testing with hydron paper which is used in the same manner as litmus paper, except it gives specific readings. A color chart on the side of the small hydron dispenser gives the reading in pH. Hydron paper is inexpensive and obtainable from any chemical supply house or thru your local druggist. The pH should be higher than 7 but lower than 11. Add appropriate water treatment chemicals, if necessary, to bring the pH within the specified range. With this lower level of protection, care must be exercised to eliminate all of the free oxygen in the system.
5. Boiler is now ready to be put into service.

7 IMPORTANT

If, during normal operation, it is necessary to add water to this boiler more frequently than once a month consult a qualified service technician to check your system for leaks. A leaky system will increase the volume of make-up water supplied to the boiler which can significantly shorten the life of the boiler. Entrained in make-up water are dissolved minerals and oxygen. When the fresh, cool make-up water is heated in the boiler the minerals fall out as sediment and the oxygen escapes as a gas. Both can result in reduced boiler life. The accumulation of sediment can eventually isolate the water from contacting the cast iron. When this happens the cast iron in that area gets extremely hot and eventually cracks. The presence of free oxygen in the boiler creates a corrosive atmosphere which, if the concentration becomes high enough, can corrode the cast iron through from the inside. Since neither of these failure types are the result of a casting defect the warranty does not apply. Clearly it is in everyone's interest to prevent this type of failure. The maintenance of system integrity is the best method to achieve this.

SECTION V SERVICE INSTRUCTIONS

1 **IMPORTANT** — See Item 7 under Operating Instructions if it becomes necessary to add water to the boiler more frequently than once a month.

2 **GENERAL** — Inspection should be conducted annually. Service as frequently as specified in paragraphs below. While service or maintenance is being done electrical power to the boiler must be "off".

3 **CLEAN THE BOILER HEATING SURFACES & FLUE** at least once each year, preferably at the end of the heating season.

A. CLEAN THE VENT SYSTEM — Vent system should be checked annually for:

1. Obstructions.
2. Accumulations of soot.
3. Deterioration of vent pipe or vent accessories due to condensation or other reasons.
4. Proper support — no sags, particularly in horizontal runs.
5. Tightness of joints.

Remove all accumulations of soot with wire brush and vacuum. Remove all obstructions. Replace all deteriorated parts and support properly. Seal all joints.

B. CLEAN THE BOILER FLUEWAYS

1. Remove the smokepipe as necessary to gain access to the boiler flue outlet.
2. Remove the flue outlet from the canopy and rear section being careful not to damage the adhesive fiber gasket on the flue outlet.
3. Remove the jacket top and left side panels.
4. Remove the canopy being careful not to damage the cerafelt gasket.
5. Loosen nuts securing the flue cleanout plates and remove the plates. The insulation should be removed with the plates taking care not to damage the insulation.
6. Using a 1½" diameter wire or fibre bristle brush (36" handle) clean the flueways. Brush from the top and side using horizontal and diagonal strokes for best results.

C. CLEAN TOP OF BOILER SECTIONS.

Brush and vacuum the tops of the boiler sections.

D. CLEAN THE FIREBOX

1. Disconnect fuel line(s) and remove burner and burner mounting plate.

2. Using wire or fibre bristle brush clean crown of boiler and inside of water legs.

E. REASSEMBLE BOILER

CAUTION: DO NOT START THE BURNER UNLESS CANOPY, SMOKEPIPE, BURNER MOUNTING PLATE AND ALL FLUE PLATE'S ARE SECURED IN PLACE.

1. Install the canopy taking care to align the cerafelt strips. If strips are damaged replace as needed.
2. Reinstall the flue outlet onto the canopy and rear section. Replace adhesive fiber gasket if damaged.
3. Reinstall smokepipe on flue outlet and secure to collar with sheet metal screws.
4. Reinstall burner mounting plate to front section making sure Flextex rope gasket is in place and forms gas tight seal. If gasket is damaged, replace.
5. Bolt burner to burner mounting plate. Inspect gasket to assure adequate seal, replace if damaged. Connect oil line(s) and/or gas line(s).
6. Reinstall flue plates making sure gasket on each is in place and forms gas tight seal. If damaged, all edges of the cleanout plates should be sealed with Silastic sealant when reinstalled until insulation can be replaced.

4 **MAINTENANCE OF LOW WATER CUTOFF DEVICES.**

IMPORTANT

PROBE AND FLOAT TYPE LOW WATER CUTOFF DEVICES REQUIRE ANNUAL INSPECTION AND MAINTENANCE.

A. PROBE TYPE LOW WATER CUTOFF

Although these devices are solid state in their operation, the probe is exposed to possible contamination in the boiler water and subject to fouling.

It is important to physically remove the probe from the boiler tapping annually and inspect that probe for accumulation of scale or sediment.

Follow these steps to inspect, clean and/or replace the probe:

1. Turn off electric service to the boiler.
2. Drain boiler water to a level below the tapping for the probe.
3. Disconnect the low water cutoff control from the probe.
4. Dismount the low water cutoff control from the probe.
5. Unscrew the probe from the boiler tapping.
6. Inspect that portion of the probe that is exposed to the boiler water for a scale or sediment buildup.

7. Light deposits may be removed by wiping the probe with a damp cloth. Wiping the probe with a cloth soaked in vinegar will remove more tenacious lime deposits. The most stubborn deposits may be removed from the probe by using a diluted amount (3 parts of water to 1 part) of phosphoric acid (H_2PO_4).

CAUTION

Exercise caution when handling phosphoric acid and follow the instruction label on its container.

8. Wire brushing of the probe is not recommended as the soft platinum guard ring sandwiched between the ceramic insulators may be damaged. Care must be taken not to damage this ring in any way or the useful life of the probe may be shortened.
9. Clean the pipe threads of the probe to remove old, hardened pipe dope and other foreign matter.
10. Apply a moderate amount of good quality pipe dope to the pipe threads on the probe. Leaving the two end threads bare. Do not use PTFE (Teflon) tape.
11. Screw the probe into the boiler tapping.
12. Mount the low water cutoff control on the probe.
13. Reconnect the control to probe wiring.
14. Fill the boiler to its normal waterline.
15. Add boiler water treatment compound as needed.
16. Restore electric service to the boiler.
17. Fire burner to bring the water in the boiler to a boil to drive off free oxygen.
18. **WARNING: — BEFORE RETURNING BOILER TO SERVICE:** Follow the low water cutoff check out procedure on page 25.

B. FLOAT TYPE LOW WATER CUTOFF

During the heating season, if an external low water cutoff is on the boiler, the blow off valve should be opened once a month (use greater frequency where conditions warrant), to flush out the sediment chamber so the device will be free to function properly.

Low water cutoffs and water feeders should be dismantled annually by qualified personnel, to the extent necessary to insure freedom from obstructions and proper functioning of the working parts. Inspect connecting lines to boiler for accumulation of mud, scale, etc., and clean as required. Examine all visible wiring for brittle or worn insulation and make sure electrical contacts are clean and that they function properly. Give special attention to solder joints on bellows and float when this type of control is used. Check float for evidence of collapse and check mercury bulb (where applicable) for mercury separation or discoloration. **DO NOT ATTEMPT TO REPAIR MECHANISMS IN THE FIELD.** Complete replacement mechanisms, including necessary gaskets and installation instructions, are available from the manufacturer.

- 5 Check burner and control at least once a year. See Item 5 under Operating Instructions for control checks. See V-9 Burner Manual for burner tests and adjustments.

@LUBRICATE BOILER COMPONENTS according to manufacturer's instructions. Generally, this involves the oil burner and circulator. This includes the type of lubricant to use, frequency of lubrication, and points to lubricate.

7 GENERAL MAINTENANCE CONSIDERATIONS

- A. Keep radiators and convectors clean.
- B. If a hot water radiator is hot at the bottom but not at the top, it indicates that air has accumulated inside and should be vented. To vent radiator, hold small cup under air vent (located near top of radiator), open vent until water escapes and then close.
- C. If much water is added to system, it is advisable to heat system to a high temperature and vent again. This will make less venting necessary during the winter.
- D. Where an expansion tank is used, make sure that neither the tank nor its drain pipe is exposed to freezing temperatures. Never place valves in piping leading to or from expansion tank.
- E. Boiler and system cleaning will help assure trouble free operation. See Item 6 under Operating Instructions for procedure.

8 ATTENTION TO BOILER WHILE NOT IN OPERATION

A. IMPORTANT

IF BOILER IS NOT USED DURING WINTER TIME, IT MUST BE FULLY DRAINED TO PREVENT FREEZE DAMAGE.

- B. Spray inside surfaces with light lubricating or crank-case oil using gun with extended stem so as to reach all corners.
- C. With steam boilers, at end of season add sufficient water to fill boiler to top of water column and leave it that way until fall when water should be drained again to proper level. If at this time boiler water is dirty, drain water, flush out boiler, and refill with clean water to prescribed water level.
- D. Always keep the manual fuel supply valve shut off if the burner is shut down for an extended period of time.
- E. To recondition the heating system in the fall season after a prolonged shut down, follow the instructions outlined in Section IV - Operating Instructions, Items 2 through 5.

SECTION VI REPAIR PARTS

All V9 Series Repair Parts can be ordered through the nearest Burnham Regional Sales Office or Manufacturer's Representative for delivery from Lancaster.

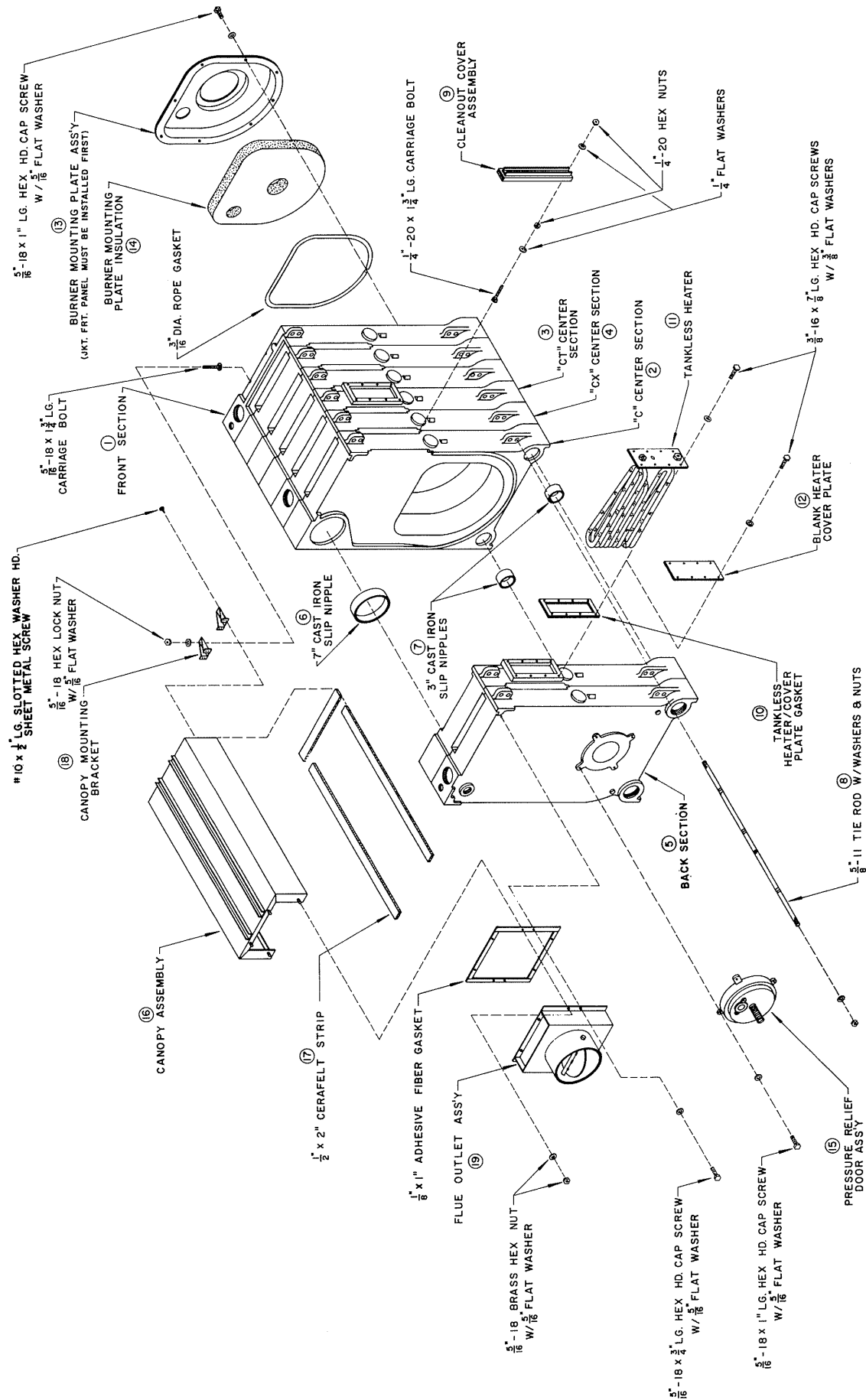
These offices can advise as to the availability of their products and repair parts from a more local source.

BURNHAM CORPORATION — REGIONAL OFFICES

- | | |
|---|--|
| <p>A. Burnham Corporation — Central and Western Region
 P.O. Box 3079
 Lancaster, PA 17604-3079
 (717) 293-5836
 Fax: 293-5832</p> | <p>C. Hurnham Corporation — Metropolitan Region
 100 Davidson Avenue
 Somerset, NJ 08873
 (908) 560-9800
 Fax: 560-9814</p> |
| <p>B. Burnham Sales Corporation — Northeast Region
 19-27 Mystic Avenue
 Somerville, MA 02145
 (617) 625-9735
 Fax: 625-9736</p> | <p>D. Burnham Corporation — Mid Atlantic Region
 P.O. Box 3079
 Lancaster, PA 17604
 (717) 293-5861
 Fax: 293-5855</p> |

Contact Regional Office Indicated for your State:

Alabama	A	New Mexico	A
Alaska	A	New York	
Arizona	A	Albany, Fulton, Montgomery, Rensselaer,	
Arkansas	A	Saratoga, Schenectady, Schoharie, Warren,	
California	A	Washington Counties	B
Colorado	A	Sullivan County	D
Connecticut	B	All other Counties	C
Delaware	D	North Carolina	A
Florida	A	North Dakota	A
Georgia	A	Ohio	
Hawaii	A	Athens, Belmont, Gallia, Jefferson, Lawrence,	
Idaho	A	Meigs, Monroe, Washington Counties	D
Illinois	A	All other Counties	A
Indiana	A	Oklahoma	A
Iowa	A	Oregon	A
Kansas	A	Pennsylvania	D
Kentucky	A	Rhode Island	B
Louisiana	A	South Carolina	A
Maine	B	South Dakota	A
Maryland	D	Tennessee	A
Massachusetts	B	Texas	A
Michigan	A	Utah	A
Minnesota	A	Vermont	B
Mississippi	A	Virginia	
Missouri	A	Arlington, Accomack, Clarke, Fairfax,	
Montana	A	Frederick, Fauquier, Loudoun,	
Nebraska	A	Northampton, Prince William Counties	D
Nevada	A	All other Counties	A
New Hampshire	B	Washington	A
New Jersey		Washington, D.C.	D
Mercer County	D	West Virginia	D
All other Counties	C	Wisconsin	A
		Wyoming	A
		Canada	A



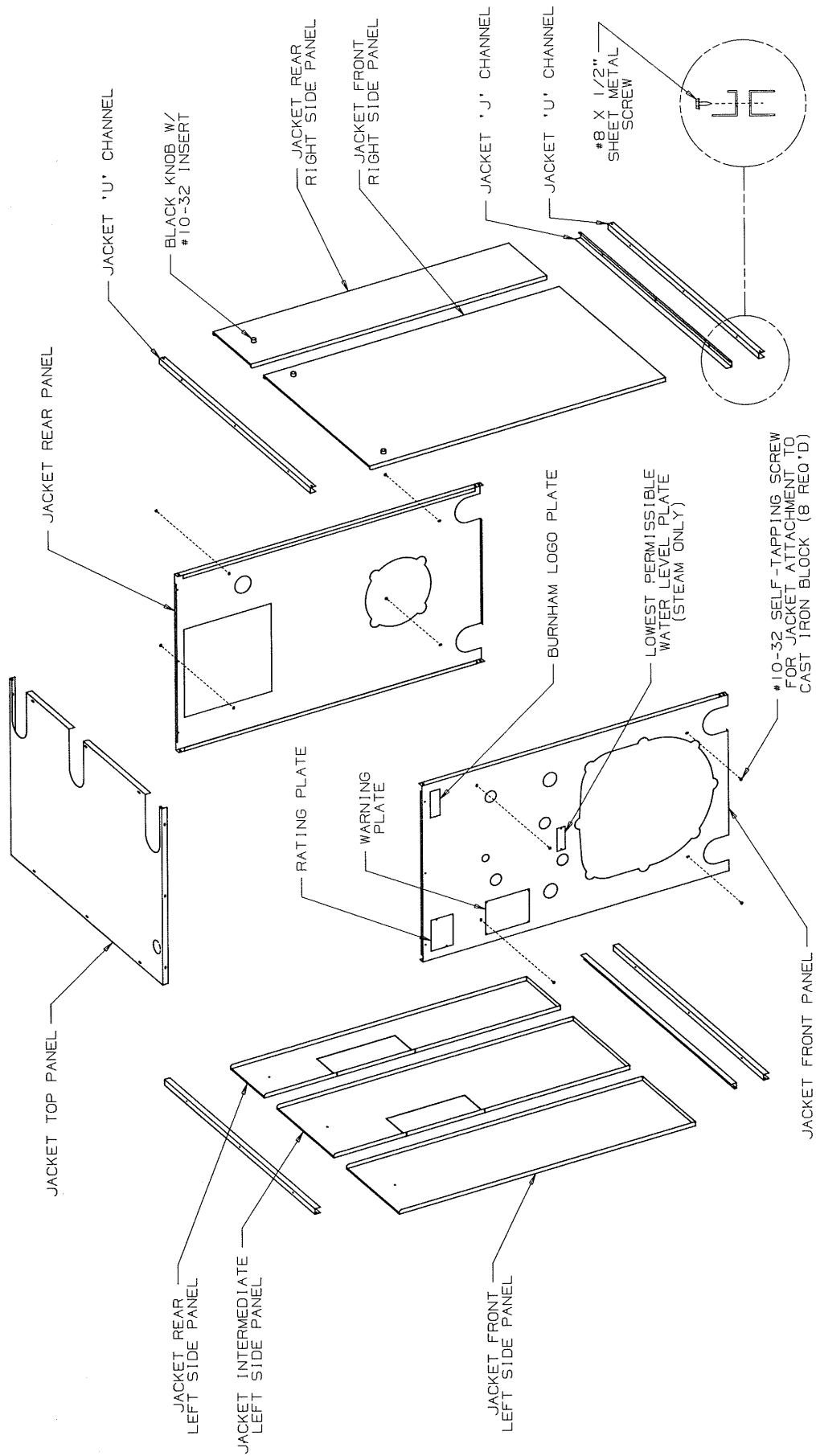
BARE BOILER ASSEMBLY

Fig. 32

V-9 BARE BOILER ASSEMBLY

		Boiler Size/Quantity										
Item No.	Description	V903	V904	V905	V906	V907	V908	V909	V910	V911	V912	Part No.
1	Front Section	1	1	1	1	1	1	1	1	1	1	7172901
2	"C" Center Section	1	2	3	4	5	5	6	7	7	8	7172903
3	Optional - 'CT' Center, I.L.O. 'C' - Max # (Center Section with Tankless Heater)	1	1	1	2	2	2	3	3	3	4	7172902
4	'CX' Center Section (with 3" Supply Tapping)						1	1	1	2	2	71729031
5	Back Section	1	1	1	1	1	1	1	1	1	1	7172904
5A	Target Wall: V903 Only (not shown)	1										8202903
6	7" Cast Iron Slip Nipple	2	3	4	5	6	7	8	9	10	11	7066004
7	3" Cast Iron Slip Nipple	4	6	8	10	12	14	16	18	20	22	7066002
8	Tie Rod Sets	1										
8A	Tie Rod Bundle, V-903											6082903
8B	Tie Rod Bundle, V-904		1									6082904
8C	Tie Rod Bundle, V-905			1								6082905
8D	Tie Rod Bundle, V-906				1							6082906
8E	Tie Rod Bundle, V-907					1						6082907
8P	Tie Rod Bundle, V-908						1					6082908
8G	Tie Rod Bundle, V-909							1				6082909
8H	Tie Rod Bundle, V-910								1			6082910
8I	Tie Rod Bundle, V-911									1		6082911
8J	Tie Rod Bundle, V-912										1	6082912
9	Cleanout Cover Assembly	2	3	4	5	6	7	8	9	10	11	6112901
10	Tankless Heater/Cover Plate Gasket (1 ea. 'CT' Section)											8036058
11	Tankless Heater (1 ea. 'CT' Section) or											8032901
12	Blank Heater Cover Plate (1 ea. 'CT' Section)											7036020
13	Burner Mtg. Plate Assy. (w/ Observation Port) NOTE Mounting Plate Size Depends on Burner Used.											
	Burner Mtg. Plate, 43/41" dia. Opening											7172905
	Burner Mtg. Plate, 6-3/8" dia. Opening											7172906
	Burner Mtg. Plate, 7-1/2" dia. Opening											7172907
	Burner Mtg. Plate, 8-3/8" dia. Opening											7172908
	Burner Mtg. Plate, 9" dia. Opening											7172909
	Burner Mtg. Plate, 6-1/2" Notched Opening											7172910
	Burner Mtg. Plate, 8-1/2" Notched Opening											7172911
	Observation Port Assy.											
	Observation Port Cover	1	1	1	1	1	1	1	1	1	1	7026004
	Observation Port Shutter	1	1	1	1	1	1	1	1	1	1	7026005
	Observation Port Glass	1	1	1	1	1	1	1	1	1	1	8026032
	Observation Port Shutter Handle	1	1	1	1	1	1	1	1	1	1	8026033
	Observation Port Shutter Spring	1	1	1	1	1	1	1	1	1	1	8026034
	Observation Port Shutter Spring Pin	1	1	1	1	1	1	1	1	1	1	8026035
	Observation Port Shutter Handle Knob	1	1	1	1	1	1	1	1	1	1	8026036
	Observation Port Outer Gasket	1	1	1	1	1	1	1	1	1	1	8206001
	Observation Port Inner Gasket	1	1	1	1	1	1	1	1	1	1	8206002
	3/8"-16 x 1-1/2" lg. Hex Head Cap Screw	4	4	4	4	4	4	4	4	4	4	80861308
	1/4"-20 x 5/8" lg. Hex Head Cap Screw	2	2	2	2	2	2	2	2	2	2	80861312
	3/8"-16 Heavy Hex Nut (Attch. Burner to Plate)	4	4	4	4	4	4	4	4	4	4	80860400
	3/8" Plain Flat Washer (Attch. Burner to Plate)	4	4	4	4	4	4	4	4	4	4	80860600
14	Burner Mtg. Plate Insulation, Ceramic Fiber	1	1	1	1	1	1	1	1	1	1	8202901
15	Pressure Relief Door Assembly	1	1	1	1	1	1	1	1	1	1	6112525
16	Canopy Assembly	1										
16A	Canopy Assembly, V-9031		1									61129031
16B	Canopy Assembly, V-904			1								61129041
16C	Canopy Assembly, V-905				1							61129051
16D	Canopy Assembly, V-906					1						61129061
16E	Canopy Assembly, V-907						1					61129071
16F	Canopy Assembly, V-908							1				61129081
16G	Canopy Assembly, V-909								1			61129091
16H	Canopy Assembly, V-910									1		61129101
16I	Canopy Assembly, V-911										1	61129111
16J	Canopy Assembly, V-912											1 61129121
17	Cerafelt Strips (1/2" x 2") (L.F.)	4	5	6	7	8	9	10	11	12	13	9206003
18	Canopy Mounting Bracket	2	2	2	2	2	2	2	2	2	2	71129002
19	Flue Outlet Assembly											
19A	Flue Assembly, 8" Outlet	1	1	1								61129044
19B	Flue Assembly, 10" Outlet				1	1	1					61129064
19C	Flue Assembly, 12" Outlet							1	1	1	1	61129094

V9 SERIES BOILER JACKET ASSEMBLY



REPAIR PARTS FOR JACKET ASSEMBLY

Fig. 33

V-9 JACKET PANELS

		Boiler Size/Quantity											
Item No.	Description	V903	V904	V905	V906	V907	V908	V909	V910	V911	V912	Part No.	
1	Jacket Front Panel Assembly	1	1	1	1	1	1	1	1	1	1	6042901	
2	Jacket Rear Panel Assembly	1	1	1	1	1	1	1	1	1	1	6042902	
3	Jacket Right Side Panel Assembly												
3A	54-1/4" x 21-3/8" Panel Assy.	1										60429032	
3B	54-1/4" x 21-3/8" Panel Assy.		1					1				60429042	
3C	54-1/4" x 27-3/8" Panel Assy.			1		1			1		1	60429052	
3D	54-1/4" x 33-3/8" Panel Assy.				1		1			1		60429062	
3E	54-1/4" x 11-15/16" Panel Assy.					1	1				1	604290031	
3E	54-1/4" x 29-15/16" Panel Assy.							1	1	1	1	60429022	
4	Jacket Left Side Panel Assy.												
4A	Left Side Panel Assembly	1										604290061	
4B	Rear Left Panel Assy. w/ Htr. K.O. (10-11/16"W)		1	1	1	1	1	1	1	1	1	60429001	
4C	Interm. Left Panel Assy. w/ Htr. K.O. (17-15/16"W)					1	1	1	2	2	2	60429002	
4D	Interm. Left Panel Assy. w/o Htr. K.O. (11-15/16"W)				1			1			1	604290032	
4E	Front Left Panel Assy. w/ Htr. K.O. (10-11/16"W)		1		1	1		1	1		1	60429004	
4F	Front Left Panel Assy. w/o Htr. K.O. (16-11/16"W)			1			1			1		60429005	
5A	Jacket Top Panel Assy., V-903	1										60429033	
5B	Jacket Top Panel Assy., V-904		1									60429043	
5C	Jacket Top Panel Assy., V-905			1								60429053	
5D	Jacket Top Panel Assy., V-906				1							60429063	
5E	Jacket Top Panel Assy., V-907					1						60429073	
5F	Jacket Top Panel Assy., V-908						1					60429083	
5G	Jacket Top Panel Assy., V-909							1				60429093	
5H	Jacket Top Panel Assy., V-910								1			60429103	
5I	Jacket Top Panel Assy., V-911									1		60429113	
5J	Jacket Top Panel Assy., V-912										1	60429123	
6A	Jacket "U" Channel, V-903	4										70429033	
6B	Jacket "U" Channel, V-904		4									70429043	
6C	Jacket "U" Channel, V-905			4								70429053	
6D	Jacket "U" Channel, V-906				4							70429063	
6E	Jacket "U" Channel, V-907					4						70429073	
6F	Jacket "U" Channel, V-908						4					70429083	
6G	Jacket "U" Channel, V-909							4				70429093	
6H	Jacket "U" Channel, V-910								4			70429103	
6I	Jacket "U" Channel, V-911									4		70429113	
6J	Jacket "U" Channel, V-912										4	70429123	
7A	Jacket "J" Channel, V-903	2										70429034	
7B	Jacket "J" Channel, V-904		2									70429044	
7C	Jacket "J" Channel, V-905			2								70429054	
7D	Jacket "J" Channel, V-906				2							70429064	
7E	Jacket "J" Channel, V-907					2						70429074	
7F	Jacket "J" Channel, V-908						2					70429084	
7G	Jacket "J" Channel, V-909							2				70429094	
7H	Jacket "J" Channel, V-910								2			70429104	
--	Jacket "J" Channel, V-911									2		70429114	
	Jacket "J" Channel, V-912										2	70429124	

STEAM TRIM / WATER TRIM

STEAM TRIM

	V903-5	V906-9	V910-12	Part Number
Pressuretrol, Honeywell PA404A1009	1	1	1	80160300
Steam Gauge, 3-1/2" Dia. Ametek 1144350	1	1	1	8056022
Gauge Glass Set, ConBraCo 120-104-10 (11")	1	1	1	8056102
Safety Valve Piping:				
Nipple, 1" NPT x 3-1/2" lg., Black	1	-	-	806600217
Nipple, 1-1/4" NPT x 3-1/2" lg., Black	-	1	-	806600218
Nipple, 1-1/2" NPT x 3-1/2" lg., Black	-	-	1	806600015
Tee, 1" NPT, Black	1	-	-	806601373
Tee, 1-1/4" NPT, Black	-	1	-	806601031
Tee, 1-1/2" NPT, Black	-	-	1	806601025
Hex Bushing, 1-1/2" x 1", Black	1	-	-	806600521
Hex Bushing, 1-1/2" x 1-1/4", Black	-	1	-	806600539
Hex Bushing, 3/4" MPT x 1/4" FPT, Black (Mount Syphon)	1	1	1	806600508
Hex Bushing, 3" MPT x 3/4" FPT, Black (Mount Drain Cock)	1	1	1	806600509
Hex Bushing, 1/2" MPT x 1/4" FPT, Black (Mount Steam Gauge)	1	1	1	806600524
Drain Cock, 3/4" ConBraCo 831-606-01	1	1	1	806603001
Safety Valve, ConBraCo #13-202-08, 1"	1	-	-	81660501
Safety Valve, ConBraCo #13-213-08, 1-1/4" x 1-1/2"	-	1	-	81660505
Safety Valve, ConBraCo 813-214-08, 1-1/2" x 2"	-	-	1	81660503
Syphon, 114" x 90°; 2-1/2" Extended Leg (Mount Pressuretrol)	1	1	1	806603006
Plug Extra Tappings:				
Pipe Plug, 1" NPT, Square Head, Black	6	5	5	806603501
Pipe Plug, 3/4" NPT, Square Head, Black	1	1	1	806603512
Pipe Plug, 1-1/4" NPT, Square Head, Black	-	1	-	806603502
Pipe Plug, 1-1/2" NPT, Square Head, Black	-	-	1	806603507
Lowest Permissible Water Level Plate, Form No. 1204	1	1	1	81460009
S.M.S., #8 x 1/2" Phil. Trs. Hd. (AB) Pltd. (Attach Plate)	2	2	2	80860000

WATER TRIM

	V903-7	V908-11	V912	Part Numbers
Aquastat Controller, Honeywell L4006A2015	1	1	1	80160400
Immersion Well, Honeywell #123871A, 3/4" NPT	1	1	1	80160452
Temperature Pressure Gauge, Ametek 1144840	1	1	1	8056028
Relief Valve Piping:				
Nipple, 3/4" NPT x 3-1/2" lg., Black	1	-	-	806600038
Nipple, 1" NPT x 3-1/2" lg., Black	-	1	1	806600217
Street Elbow, 3/4" NPT x 90°, Malleable	1	-	-	806601501
Street Elbow, 1" NPT x 90°, Malleable	-	1	1	806601514
Hex Bushing, 1-1/2" MPT x 3/4" PPT, Black	1	-	-	806600507
Hex Bushing, 1-1/2" MPT x 1" PPT, Black	-	1	1	806600521
Hex Bushing, 3" MPT x 3/4" PPT, Black (Mount Drain Cock)	1	1	1	806600509
Drain Cock, 3/4" NPT, ConBraCo 131-606-01	1	1	1	806603001
Relief Valve, ConBraCo 110-303-10, 3/4" P 501 Working Pressure	1	-	-	81660302
Relief Valve, ConBraCo #10-214-10, 1" F 501 Working Pressure	-	1	-	81660330
Relief Valve, Watts #740, 1" F x 1-1/4" P 50# Working Pressure	-	-	1	81660305
Relief Valve (Optional), Watts #740, 3/4" F x 1" F 70# Working Pressure	1	1	1	
Plug Extra Tappings:				
Pipe Plug, 1" NPT, Square Head, Black	5	5	5	806603501
Pipe Plug, 1/2" NPT, Square Head, Black	2	2	2	806603507
Pipe Plug, 3/4" NPT, Square Head, Black	1	1	1	806603512

Limited Warranty

**SERIES 5B, SERIES 8B, PF-5 SERIES, V-9 SERIES,
FD SERIES, WOODLANDER, DUO-RAD® , AND CAST IRON RADIATION**

LIMITED WARRANTY - Except as provided below with respect to products or parts not manufactured by Burnham Corporation, Burnham Corporation warrants to the original owner at the original installation site that products manufactured by Burnham, America's Boiler Company comply, at the time of manufacture, with recognized Hydronics industry regulatory agency standards and requirements then in effect and will be free from defects in materials and workmanship for a period of one year after the date of installation.

The remedy for breach of this warranty is expressly limited to the repair or replacement of any part found to be defective under conditions of normal use and does not extend to liability for incidental, special or consequential damages or losses such as loss of the use of the products, inconvenience, loss of time or labor expense involved in repairing or replacing alleged defective product. Burnham Corporation shall have no responsibility for the performance of any product sold by it under conditions varying materially from those under which such product is usually tested under existing industry standards, nor for any damage to the product from abrasion, erosion, corrosion, deterioration or the like due to abnormal temperatures or the influence of foreign matter or energy, nor for the design or operation of any system of which any such product may be made a part or for the suitability of any such product for any particular application.

For products or parts not manufactured by Burnham Corporation, the warranty obligations of Burnham Corporation shall, in all respects, conform and be limited to the warranty actually extended to Burnham Corporation by its vendors.

Warranty service can be obtained by contacting the original installer of the product and providing him with a detailed description of any apparent defect. If this procedure fails to result in satisfactory warranty service, the owner should notify Burnham Corporation, Burnham, America's Boiler Company, P.O. Box 3079, Lancaster, PA 17604. Transportation to a factory or other designated facility for repairs of any products or items alleged defective shall, in all events, be the responsibility and at the cost of the owner.

Notwithstanding any of the above provisions, (1) failures resulting from misuse, improper installation or lack of maintenance are not covered by this warranty, and (2) Burnham Corporation's liability under this warranty shall not exceed the selling price of the product found to be defective.

Equipment furnished by the Buyer, either mounted or unmounted, and when contracted for by the Buyer to be installed or handled is not covered by this warranty. Burnham Corporation does not assume any responsibility in connection with such equipment, operation, warranty, performance, or any other liability connected thereto.

The foregoing provisions of this **WARRANTY** shall be effective to the maximum extent permitted by applicable law, and, to the extent that any such provision would otherwise have an unconscionable result or would otherwise be inconsistent with applicable law, such provision shall be limited in effect to the minimum extent necessary to avoid such unconscionable result or inconsistency with applicable law.

Any implied warranties, including implied warranties of merchantability and fitness for a particular purpose shall, to the extent permitted by applicable law, be limited in duration to a period of one year after the date of installation. To the extent permitted by applicable law, the remedies for breach of any such implied warranty shall be limited to the remedies set forth above with respect to a breach of the express limited warranty provided. With respect to the limitations on implied warranties set forth above, Burnham Corporation hereby notifies each person to whom such warranty is made as follows: Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

The logo features a stylized flame icon to the left of the word "Burnham" in a bold, serif font, with a registered trademark symbol (®) to the upper right of the word.

AMERICA'S BOILER COMPANY
Burnham Corporation

Lancaster, PA 17604

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