

Smith

CAST IRON BOILERS

SERIES 450 MILLS WATER-TUBE BOILER COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

FOR AUTOMATIC FIRING WITH OIL OR GAS

TO STEAMFITTER

NOTE: READ THESE INSTRUCTIONS CAREFULLY. THEY WILL SAVE YOU TIME IN ASSEMBLING BOILER PROPERLY.

IMPORTANT: BE SURE AND SEAL ALL JOINTS TO PREVENT AIR LEAKAGE INTO COMBUSTION CHAMBER.

THESE INSTRUCTIONS TO BE LEFT WITH THE BOILER FOR REFERENCE PURPOSES

MEA #421-93-E

Smith
CAST IRON BOILERS

WESTCAST, INC.
260 NORTH ELM STREET WESTFIELD, MA 01085
TEL. (413) 562-9631 FAX (413) 562-3799

SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

GENERAL INFORMATION

The boiler sections should be completely erected with header nipples made up tight into the sections and locknut nipples correctly sealed before installation of combustion chamber is begun. Also, insure that both the upper and lower section straps are in place and secure.

The last two pages of this booklet consist of tables for this combustion chamber. They should be studied along with figure No. 1 thru 19, prior to installation of chamber.

IMPORTANT

The blocks and bricks must be properly located in order to fit correctly in this boiler. Use of the drawings and tables is crucial to the correct construction of this chamber.

1. HOLLOW FLOOR TILE

Remove the erecting bars and work through the front of the boiler. Place the hollow floor tiles in position starting at the rear of the boiler according to table 1 and figure No. 1.

2. BACKWALL AND SIDEWALL INSULATION

Refer to figure No. 2 before placing parts in position. Starting with the right or left side rearward insulation (see table 1) place against foundation sidewall back as far as possible. Repeat same for opposite side foundation.

Locate forward sidewall insulation along foundation sidewall on both the right and left hand sides.

Select the 2" X 4" X 20-1/2" back wall insulation block and place in vertical position in corner against side insulation. Place (3) 2" X 12" X 20-1/2" blocks in the vertical position against the back wall.

NOTE: Trim blocks with a sharp knife to fit snugly under ledge and with notch against back end.

Repeat this same procedure for the (3) remaining 2" X 12" X 20-1/2" back wall insulating blocks.

3. FOOT BRICKS

IMPORTANT

Foot bricks are supplied in different sizes; therefore, correct location of each foot brick is a must. Figure No. 2 and table 2 illustrate the correct location

Place a 12" X 6" X 4" foot brick in each corner along the sidewall and against the rear insulation.

NOTE: The notched corner of the foot bricks should be facing up against the insulation.

(2) 12" X 6" X 4" foot bricks with (1) 6" X 6" X 4" foot brick in the middle should be placed along the rearwall. Locate and center the (6) 9" X 3-1/2" X 2-1/2" fire bricks in position as shown in figure No. 3.

The remaining 12" X 6" X 4" foot bricks are to be positioned along both the right and left sidewalls.

NOTE: Certain size chambers require (1) 6" X 6" X 4" foot brick on each side to complete chamber. See table 2.

A combination of (2) 5-1/2" X 5 - 1/2" X 14-1/2" foot bricks and (1) 9" X 4 - 1/2" X 1" split half bricks are used to span the front opening of the chamber. The 9" X 4-1/2" X 1" split half-brick should be placed in the center of the other two bricks and the excess portion of the split brick broken off. (See figure No. 3).

NOTE: These bricks should be recessed back from the front of the hollow floor tile 1".

4. SIDE BRICK

Two rear 15" side bricks are provided and must be installed as shown in figure No. 4.

There are two sizes of forward side bricks required to makeup the combustion chamber lengths. Use table 2 to determine the correct combination of bricks for **your** chamber.

5. BACK BRICK

The back brick consist of (4) bricks, (2) of which are the same (3360A). Place (1) 3360A back support brick in the right hand corner of the chamber. (See figure No. 5).

Before placing the right hand back center brick with the hole in it (3362A) in position, insert the 3/8" X 4 - 1/2" bolt thru the hole and secure with washers and nut. Seal hole with "Kaowool" plug. (See figure No. 18). Interlock this brick with the corner brick.

Now lock the left and center support brick in position. To complete the backwall support brick assembly, position the remaining support brick in the left hand corner as illustrated.

The lintel brick (3359A) has to be bolted to the back section as illustrated in figure No. 18. Refer to figure No. 6 for correct installation instructions.

SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

6. INSULATING CEMENT

A cap of insulating cement should be applied to the top of all the side and rear combustion chamber bricks at an angle of 45° as illustrated in figure No. 6.

7. FLOOR INSULATION

Refer to figure No. 8 and table 1 before installing floor insulation. The 6" wide blocks are for the center section and the 12" wide blocks are for both side sections. Trim the length with a sharp knife to insure a snug fit against foot bricks.

8. FACTORY PELLETS

Refractory pellets should be distributed throughout the combustion chamber to a depth about level with the top of foot bricks. It is recommended to place all but one bag of pellets in the chamber before the front brick is installed. Then finish the job with the two lower front bricks in place. See figure No. 7.

9. FRONT BRICK AND INSULATION

Place the two upper front bricks in position on top of both lower bricks. With all four front bricks in position, tape the four pieces of front insulation board together and rest against front brick. See figures No. 9-11.

10. FRONT PLATE

Taking care not to topple the front bricks, assemble the (4) 5/16" brass studs to the screw seats in the front section.

Trowel a thin, smooth layer of furnace cement on the front ends of the foundation sidewalls.

Place the front plate in position over the brass studs and assemble plate to sidewalls using the bolts and nuts from the erecting bars. Assemble washers and nuts to brass studs and drape (1) length of 3/8" insulating rope over studs. Tighten all hardware.

By reaching through the burner hole, insert the (1) 1/2" X 5" bolt and washer through the upper right hand front brick, insulating board and burner mounting plate. Tighten in place with hex nut and seal bolt hole in front brick with insulating cement.

Repeat same procedure for the three remaining front bricks. It is recommended that the upper bricks be secured first to avoid the possibility of them toppling over.

11. OBSERVATION DOORS AND COVERS

After the front plate is in position, take one observation cover frame and install it over the left hand opening as shown in figure No. 14.

Assemble the cover and catch to the plate in such a manner as to insure the cover swings open toward the center of the boiler.

NOTE: The cover should pivot on the 7/16" O.D. brass bushing and 5/16" X 3/4" hex head bolt.

Repeat the same procedure for the right hand observation cover, but with the latch on the opposite side.

12. REFRACTORY OVEN (I.C. BURNERS ONLY)

Industrial combustion burners are supplied with a refractory oven that mounts to the burner mounting plate. This oven does not seal completely with the burner front brick and must be packed with a high temperature material and capped as illustrated in figure No. 15. This can be accomplished by reaching through the refractory oven and packing back against the burner front brick and burner mounting plate.

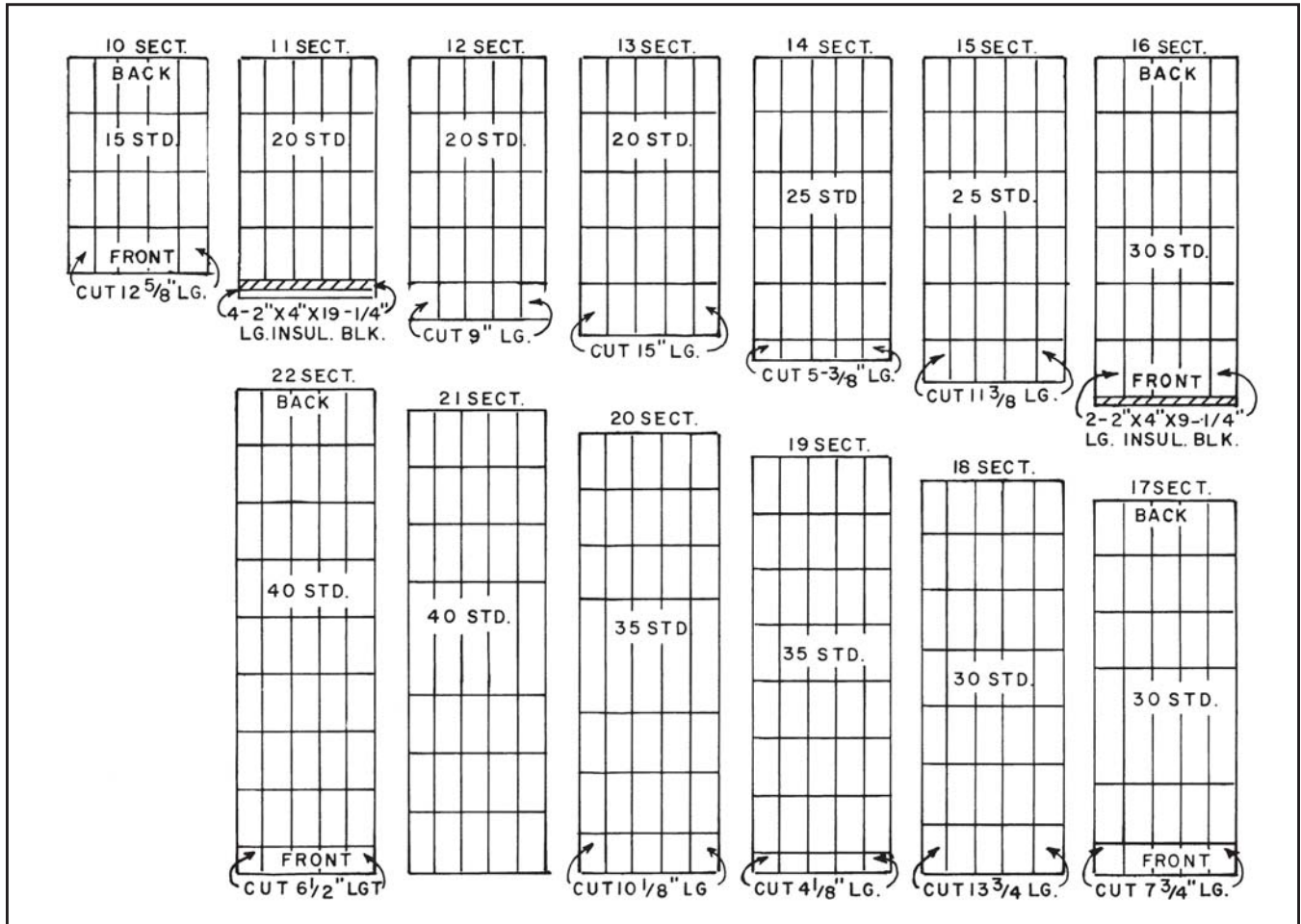
13. REFRACTORY PLATE (WEBSTER BURNERS)

Webster burners are supplied with refractory plates (parts No.s 730095, 730096, and FP4-W012717-2) which mount to the burner mounting plate. (see figures No. 17, 18, and 19 respectively). See figure No. 17 for use with 10 section boiler. Figure No. 18 for 11 thru 15 section and figure No. 19 for 16 thru 22 section boiler. Use mounting lugs and hardware for mounting to front plate.

SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

SERIES 450 MILLS COMBUSTION CHAMBER TILE SCHEDULE

FIGURE NO. 1



NOTE: REFER TO SCHEDULE ON PAGE 11

FIGURE NO. 2

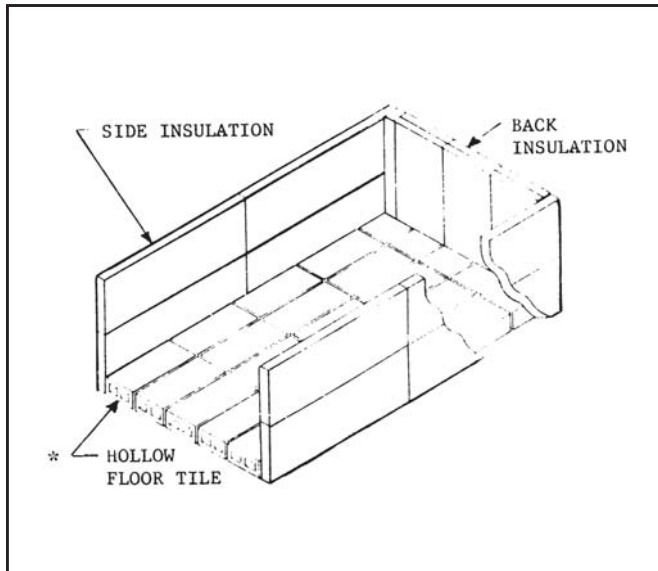
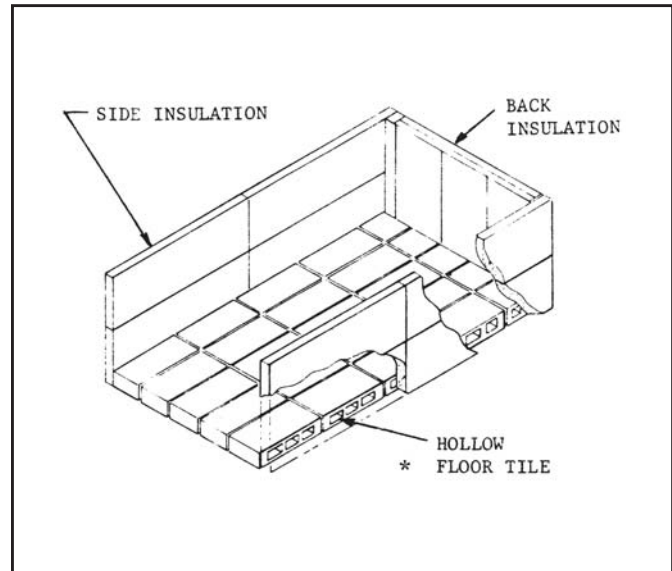


FIGURE NO. 2A



* Figure No. 2 shows hollow floor tile with openings thru the length of the tile. Figure No. 2A shows hollow floor tile with openings thru the width of the tile. Either type of tile is usable for installation.

SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

FIGURE NO. 3

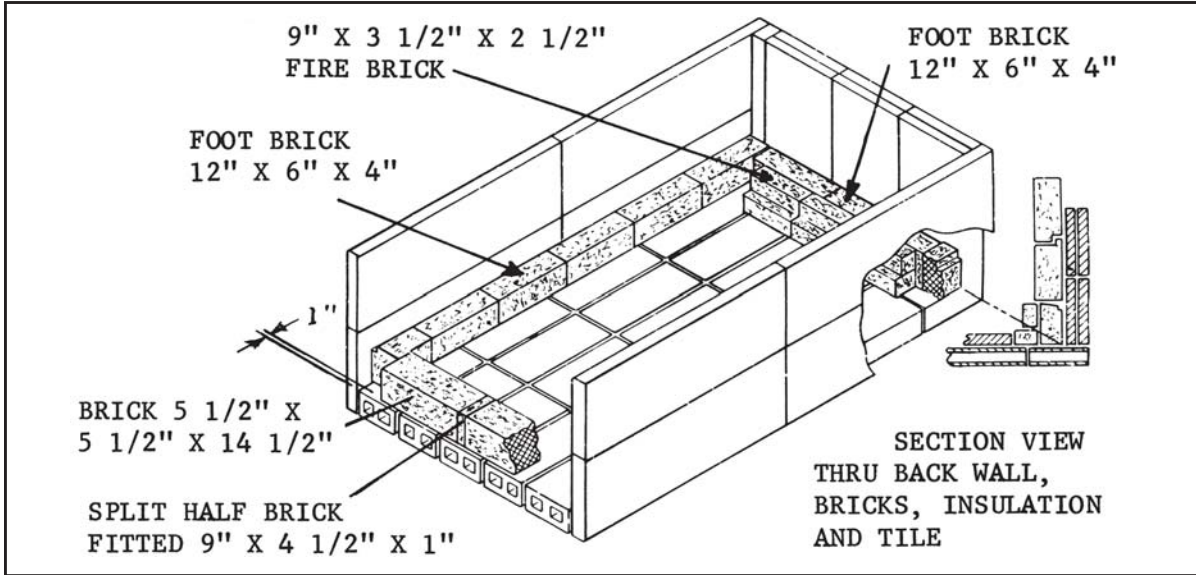


FIGURE NO. 4

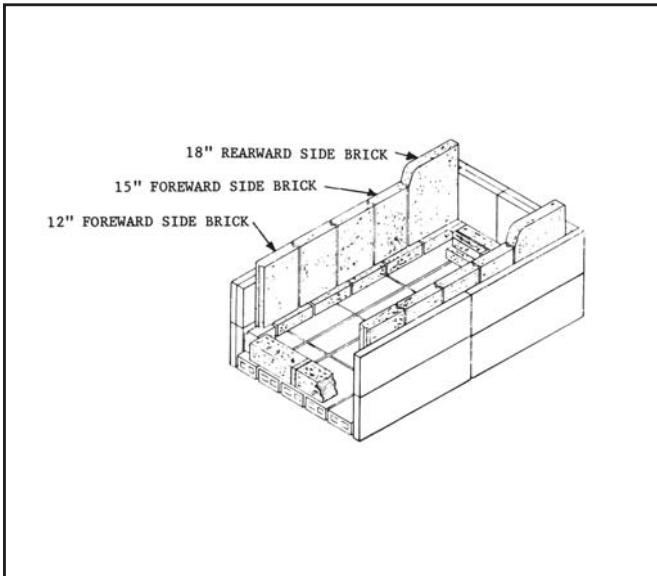


FIGURE NO. 5

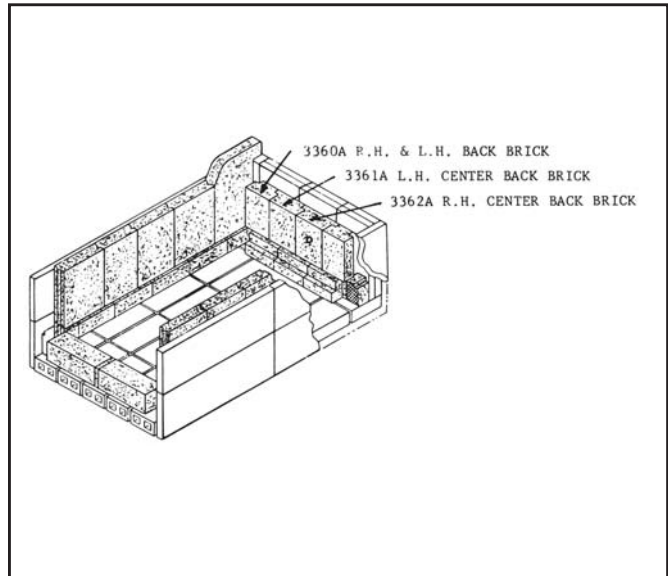
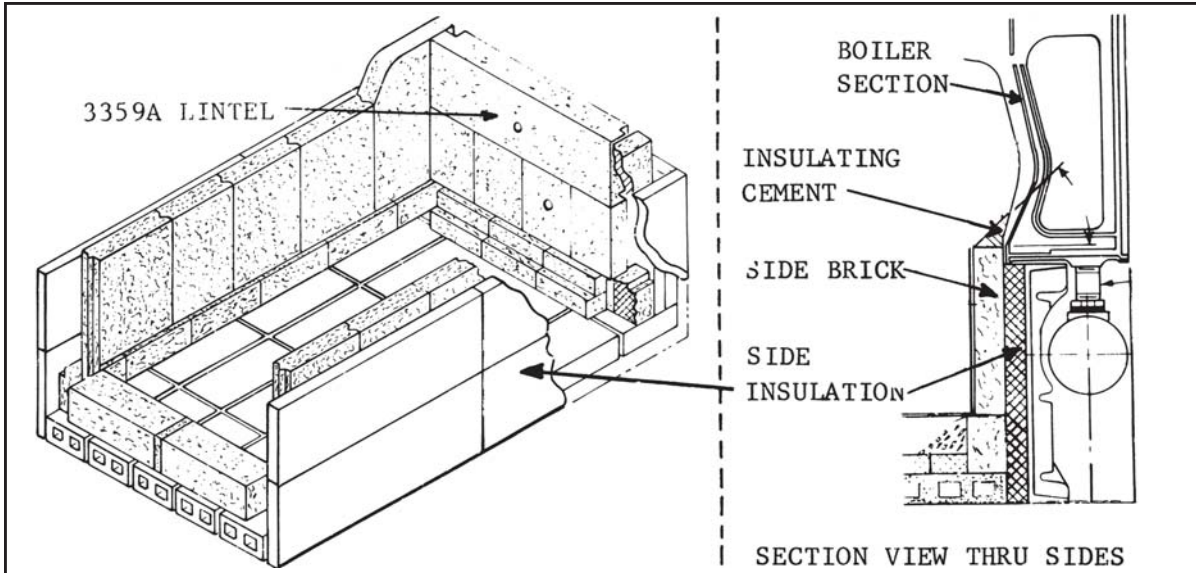


FIGURE NO. 6



SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

FIGURE NO. 7

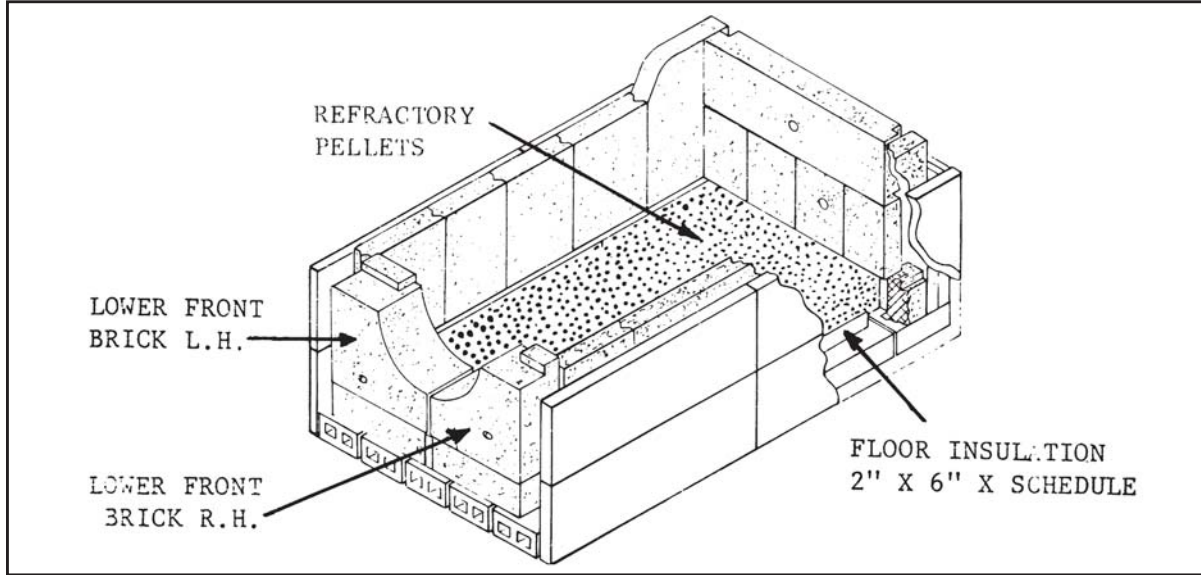
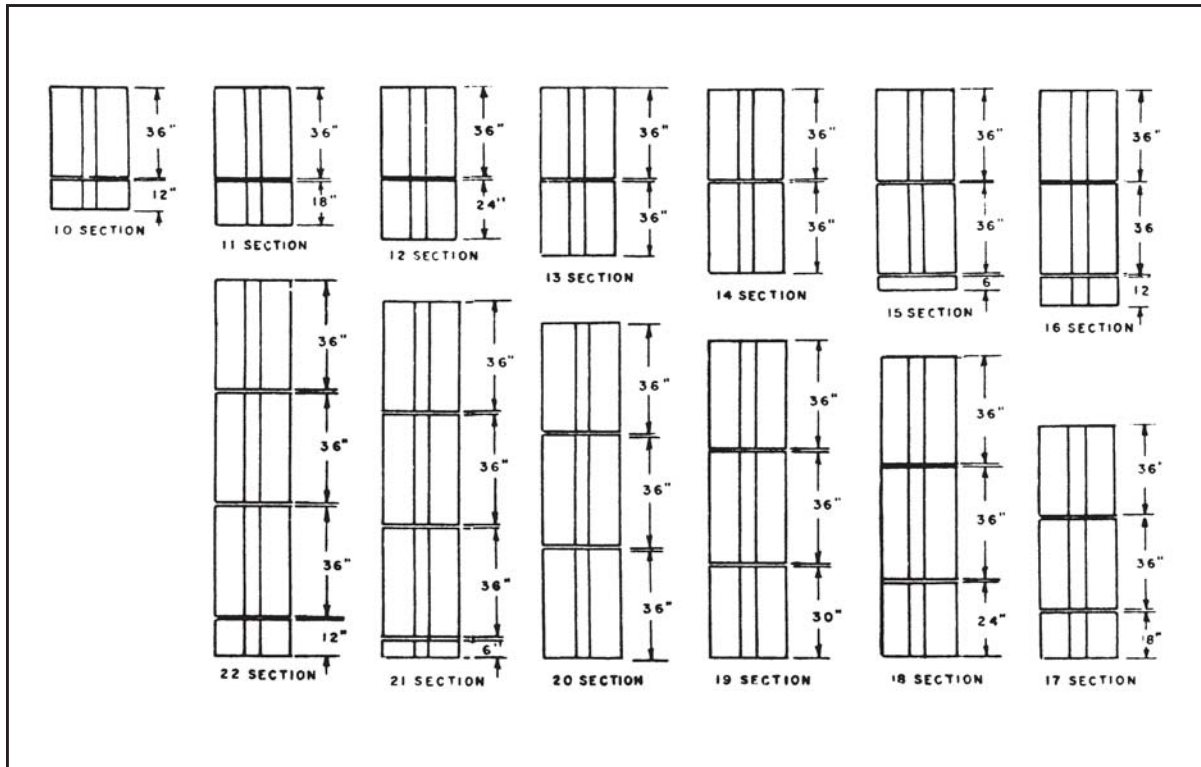


FIGURE NO. 8

SERIES 450 MILLS COMBUSTION CHAMBER FLOOR INSULATION DIAGRAM



SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

FIGURE NO. 9

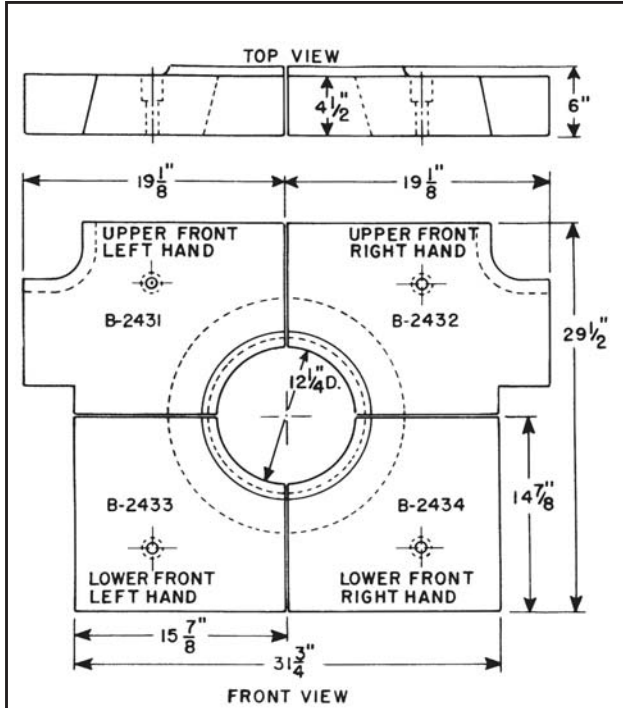
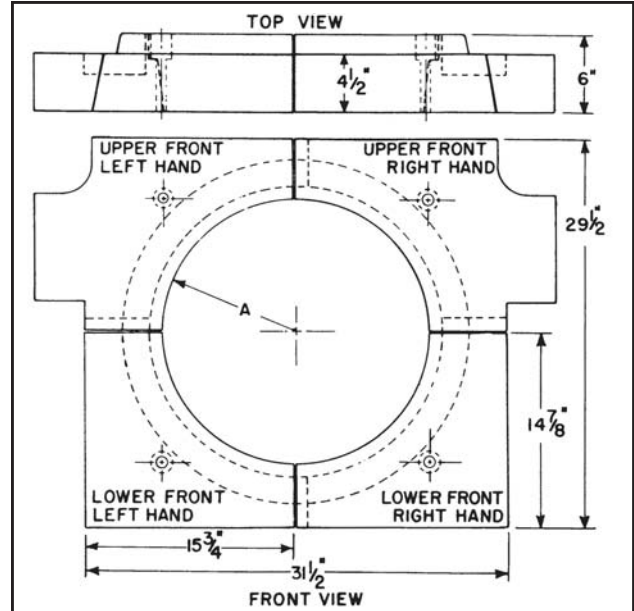


ILLUSTRATION OF BURNER BRICKS USED WITH POWERFLAME C3, C4, AND C5 BURNERS USING LIGHT OIL, GAS OR COMBINATION GAS-OIL.

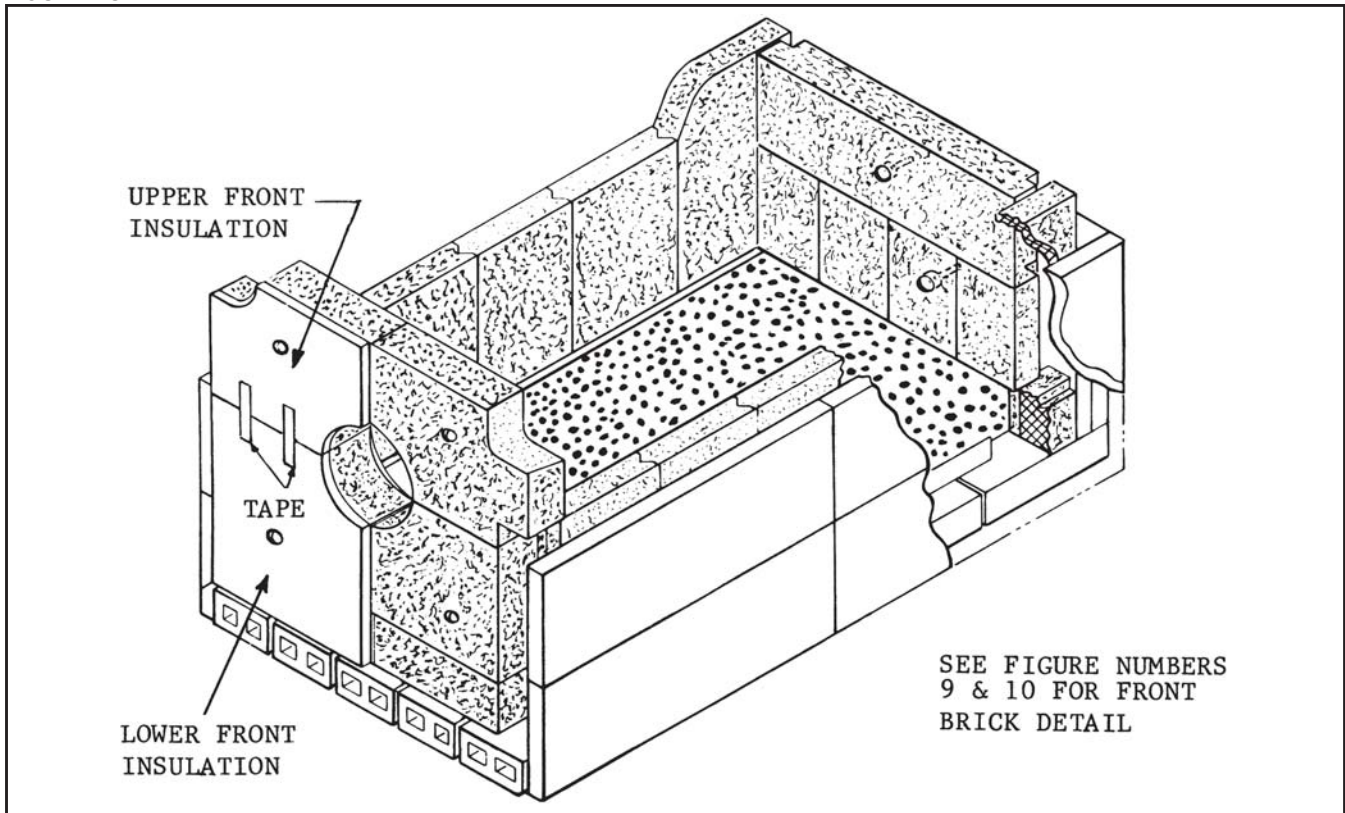
FIGURE NO. 10



BURNER	SECTIONS	DIM. A
PREF.	10-22	8-3/4"
I.C.	10-15	8-3/4"
I.C.	16-22	10"
WEBSTER	16-22	10"

ILLUSTRATION OF BURNER BRICKS USED WITH PREFERRED UTILITIES AND INDUSTRIAL COMBUSTION BURNERS.

FIGURE NO. 11



SEE FIGURE NUMBERS
9 & 10 FOR FRONT
BRICK DETAIL

SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

FIGURE NO. 12

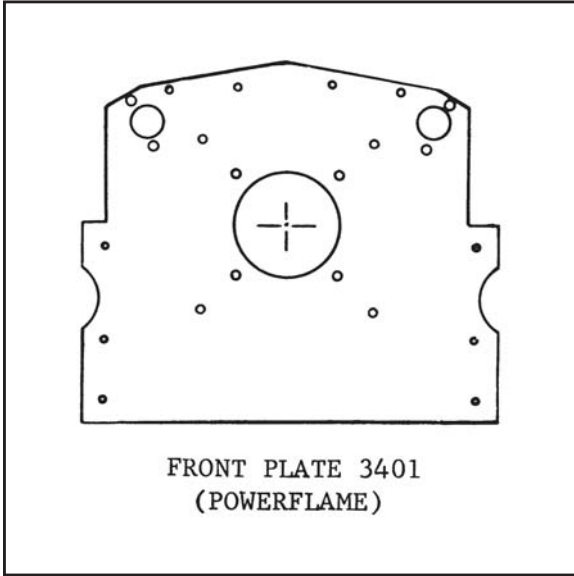


FIGURE NO. 13

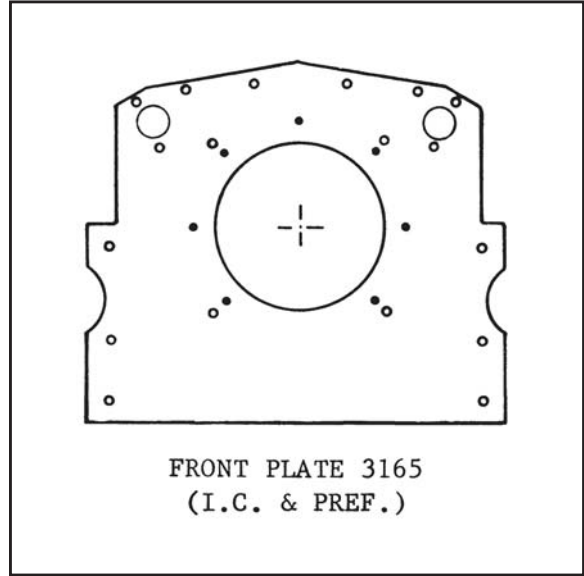


FIGURE NO. 14

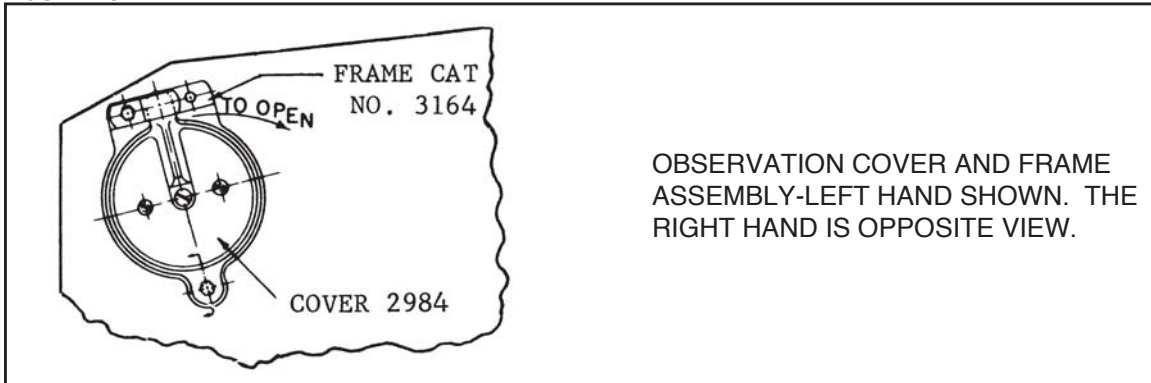


FIGURE NO. 15

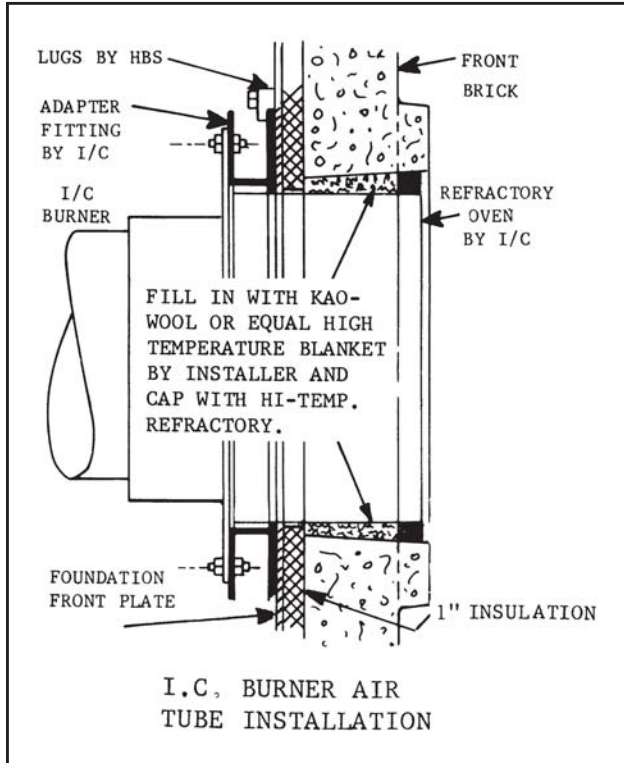
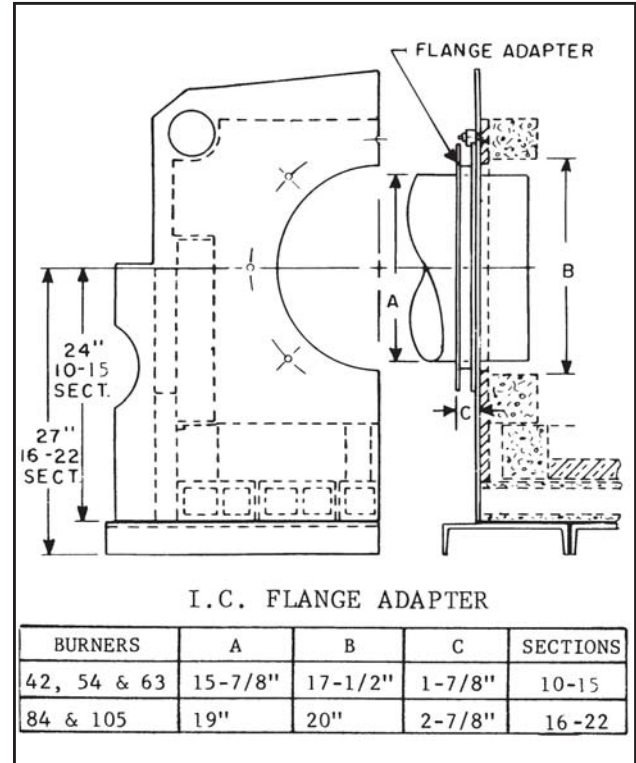


FIGURE NO. 16



SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

REFRACTORY PLATES (WEBSTER)

FIGURE NO. 17

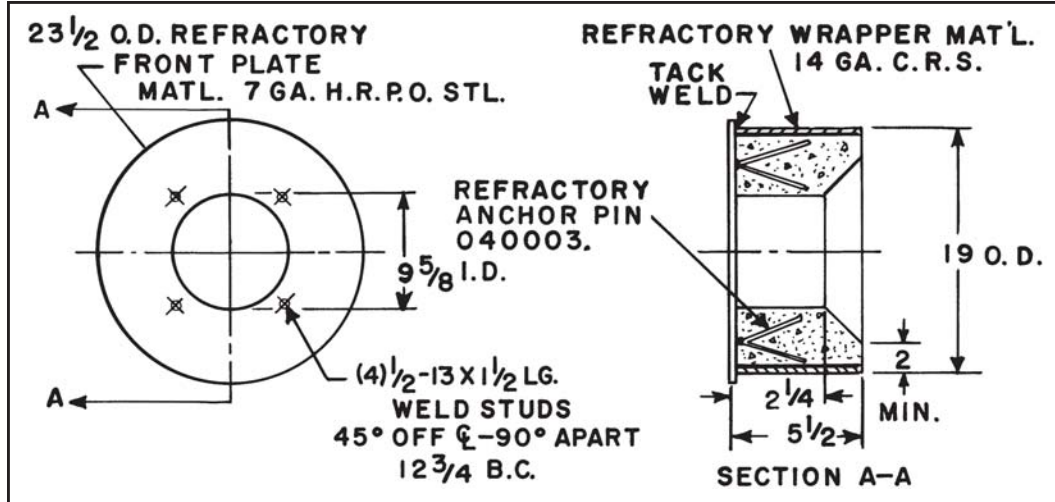


FIGURE NO. 18

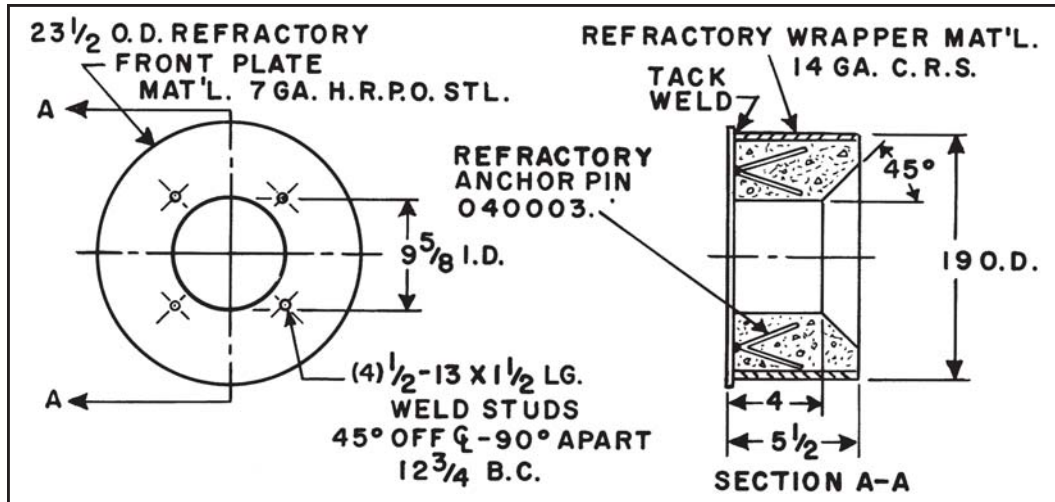
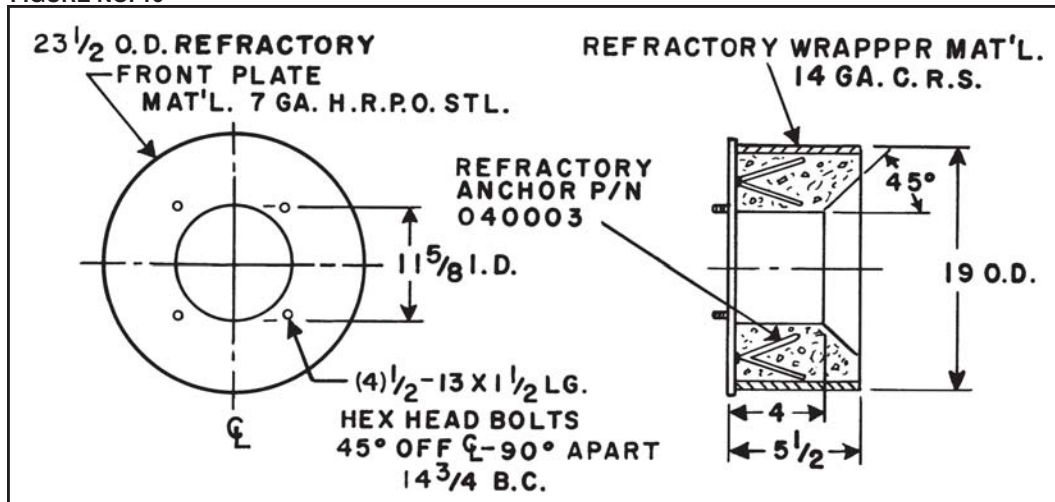


FIGURE NO. 19



SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

REAR ACCESS DOOR INSTRUCTIONS

1. Remove clean-out door (not shown) and then cut away the insulation to reach the back center bricks.
2. Remove the 3362A R.H. back brick first. Using bolt as handle, draw out thru opening in the back foundation. **The R.H. back brick must be removed first.**
3. Remove 3361a L.H. back brick. Use care while removing back center bricks to avoid tipping the lintel brick which is supported by the R. and L. hand back support bricks.
4. When the back center bricks are replaced the 3361A L.H. center brick must be placed in position first.
5. Replace insulation and seal joints.

FIGURE NO. 20

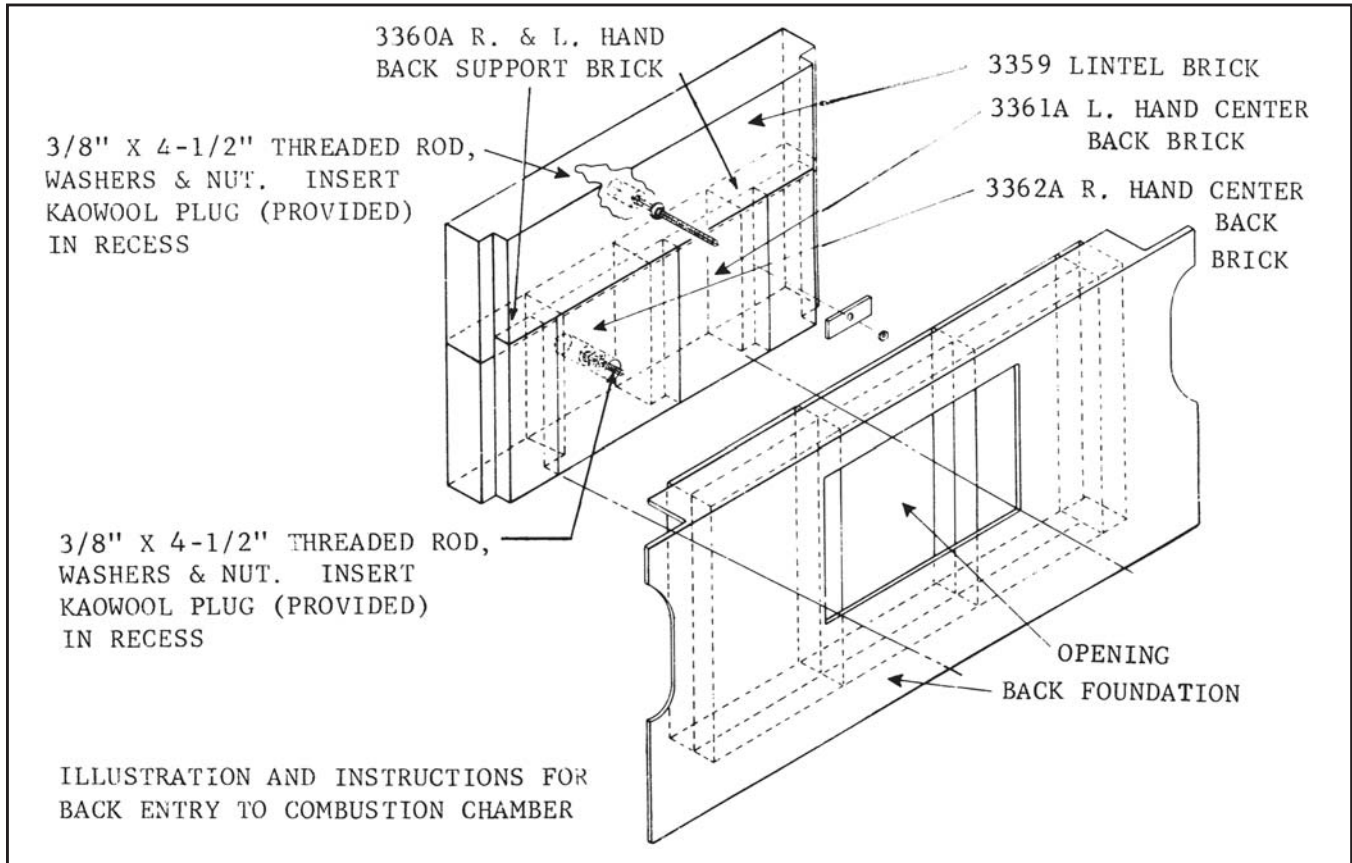


FIGURE NO. 21

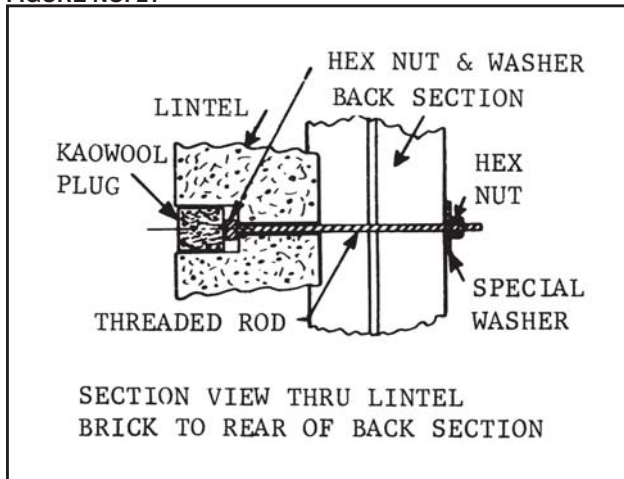
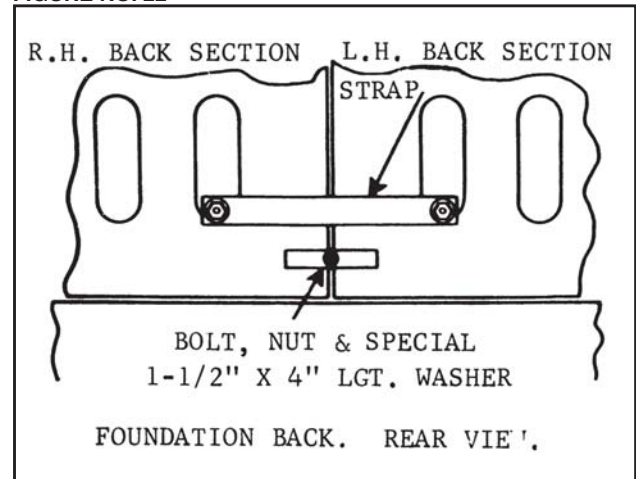


FIGURE NO. 22



SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

SERIES 450 MILLS COMBUSTION CHAMBER SCHEDULE FOR USE WITH THE FOLLOWING BURNERS:

BURNERS: POWERFLAME C3, C4 AND C5

BURNERS: I.C. D42, 54, 63, 84, AND 105

BURNERS: PREFERRED UTILITIES XS OR XHS 26, 32, 35, 38, 41, 44, 47, 50, AND 62

BURNERS: WEBSTER JB2 AND JB3

TABLE 1

SCHEDULE OF INSULATION BLOCKS															
DESCRIPTION AND SIZE OF INSULATION BLOCKS		NO. OF BOILER SECTIONS												PART #	
		10	11	12	13	14	15	16	17	18	19	20	21		22
HOLLOW FLOOR TILE 3-3/4 X 7-5/8 X 15-5/8		15	20	20	20	25	25	30	30	30	35	35	40	40	
SPEC. HOL. TITLE OR SPECIAL INSUL. *		5	*2	5	5	5	5	*1	5	5	5	5	5	5	
INSULATION	FLOOR 2X6X6						1						1		71816
	" 2X6X12	1					2	1					2	1	71809
	" 2X12X12	2						2						2	71804
	" 2X6X18		1						1						71815
	" 2X12X18		2						2						71803
	" 2X6X24			1						1					71806
	" 2X12X24			2						2					71801
	" 2X6X30				1						1				71805
	" 2X12X30				2						2				71814
	" 2X6X36	1	1	1	1	2	2	2	2	2	2	3	3	3	60456
	" 2X12X36	2	2	2	2	4	4	4	4	4	4	6	6	6	60457
	REARWARD 2X6X24				2						2				71806
	" 2X12X18						4						4		71803
	" 2X12X24	4				2		4				2		4	71801
	FORWARD 2X12X30		4						4						71814
	" 2X12X36	4	4	8	8	8	8	8	8	12	12	12	12	12	60457
	BACK WALL 2X4X20-1/2	1	1	1	1	1	1	1	1	1	1	1	1	1	71810
	" " 2X12X20-1/2	6	6	6	6	6	6	6	6	6	6	6	6	6	71802
**FRONT WALL B-2435 TOP LH. & RH.	2	2	2	2	2	2	2	2	2	2	2	2	2		
** " " B-2436 BOT. LH. & RH.	2	2	2	2	2	2	2	2	2	2	2	2	2		

* USE INSULATION BLOCK, SEE FIGURE 1, PAGE 4.

** SAME INSULATION FOR BOTH BRICKS, CUT TO FIT

SERIES 450 COMBUSTION CHAMBER ASSEMBLY INSTRUCTIONS

SERIES 450 MILLS COMBUSTION CHAMBER SCHEDULE FOR USE WITH THE FOLLOWING BURNERS:

BURNERS: POWERFLAME C3, C4 AND C5

BURNERS: I.C. D42, 54, 63, 84, AND 105

BURNERS: PREFERRED UTILITIES XS OR XHS 26, 32, 35, 38, 41, 44, 47, 50, AND 62

BURNERS: WEBSTER JB2 AND JB3

TABLE 2

CATALOG NUMBER AND DESCRIPTION OF BRICK		NO. OF BOILER SECTIONS												SHIPPING DRUM		
		10	11	12	13	14	15	16	17	18	19	20	21		22	
INSULATION	PREF.	3364 LH. UPPER FRONT BRICK	1	1	1	1	1	1	1	1	1	1	1	1	1	SEPARATE SKID
		3365 RH. " " "	1	1	1	1	1	1	1	1	1	1	1	1	1	
		3366 LH. LOWER FRONT BRICK	1	1	1	1	1	1	1	1	1	1	1	1	1	
		3367 RH. " " "	1	1	1	1	1	1	1	1	1	1	1	1	1	
	I.C.	3364 LH. UPPER FRONT BRICK	1	1	1	1	1	1								
		3365 RH. " " "	1	1	1	1	1	1								
		3366 LH. LOWER FRONT BRICK	1	1	1	1	1	1								
		3367 RH. " " "	1	1	1	1	1	1								
		3368 LH. UPPER FRONT BRICK							1	1	1	1	1	1	1	
		3369 RH. " " "							1	1	1	1	1	1	1	
		3370 LH. LOWER FRONT BRICK							1	1	1	1	1	1	1	
	P-F	3371 RH. " " "							1	1	1	1	1	1	1	
		B-2431 LH. UPPER FRONT BRICK	1	1	1	1	1	1	1	1	1	1	1	1	1	
		B-2432 RH. " " "	1	1	1	1	1	1	1	1	1	1	1	1	1	
		B-2433 LH. LOWER FRONT BRICK	1	1	1	1	1	1	1	1	1	1	1	1	1	
	SIDE	B-2434 RH. " " "	1	1	1	1	1	1	1	1	1	1	1	1	1	
B-1818 12" FORWARD SIDE BRICK		4	-	6	2	8	4	-	6	2	8	4	10	6	K3A	
B-2247 15" " " "		2	6	2	6	2	6	10	6	10	6	10	6	10	K1A	
BACK	B-2248 15" REARWARD SIDE BRICK	2	2	2	2	2	2	2	2	2	2	2	2	2	K8B	
	3359-A LINTEL BRICK	1	1	1	1	1	1	1	1	1	1	1	1	1	K8B	
	3360-A RH. & LH. BACK SUPPORT	2	2	2	2	2	2	2	2	2	2	2	2	2	K8B	
	3361-A LH. CENTER BACK BRICK	1	1	1	1	1	1	1	1	1	1	1	1	1	K8B	
FOOT	3362-A RH. " " "	1	1	1	1	1	1	1	1	1	1	1	1	1	K8B	
	B-1823-A 6 X 6 X 4 FOOT BRICK	3	1	3	1	3	1	3	1	3	1	3	1	3	K5B	
	B-1829-A 12 X 6 X 4 FOOT BRICK	10	12	12	14	14	16	16	18	18	20	20	22	22	K3A	
	FIRE BRICK 9 X 3-1/2 X 2-1/2	6	6	6	6	6	6	6	6	6	6	6	6	6	K8	
	B-2227 FRONT FILLER BRICK 5-1/2 X 5-1/2 X 14-1/2	2	2	2	2	2	2	2	2	2	2	2	2	2	K5	
	THIN SPLIT BRICK 9 X 4-1/2 X 1	1	1	1	1	1	1	1	1	1	1	1	1	1	K5	
FILL	REFRACTORY PELLETS, 1.5 CF/BAG 1/6" - 3/4" MESH REQ'D.	3	3	4	4	4	4	4	5	5	5	5	6	6	SEP.	