

FEBRUARY 1979

CATALOG NO. 2628-A
SUPERSEDES NO. 2598

ERECTING DIRECTIONS

SERIES 450 MILLS WATER-TUBE BOILER

FOR AUTOMATIC FIRING

STEAM, VAPOR OR WATER HEATING

WITH OR WITHOUT SMITH MANIFOLDS FOR YEAR-ROUND DOMESTIC HOT WATER.
MAXIMUM ALLOWABLE WORKING PRESSURE - STEAM 15 LBS., WATER 40 LBS.
HYDROSTATICALLY TESTED - A.S.M.E. STANDARD

THE SECTIONS IN
THIS BOILER **MUST**
BE ASSEMBLED IN
THE PROPER ORDER.
READ INSTRUCTIONS.

CAUTION

WHEN DOMESTIC HOT WATER HEAT MANIFOLDS ARE USED
WITH THIS BOILER BE SURE TO INSTALL JACKET SIDE
PANELS BEFORE ASSEMBLING MANIFOLDS ON THE BOILER.

TO STEAMFITTER

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

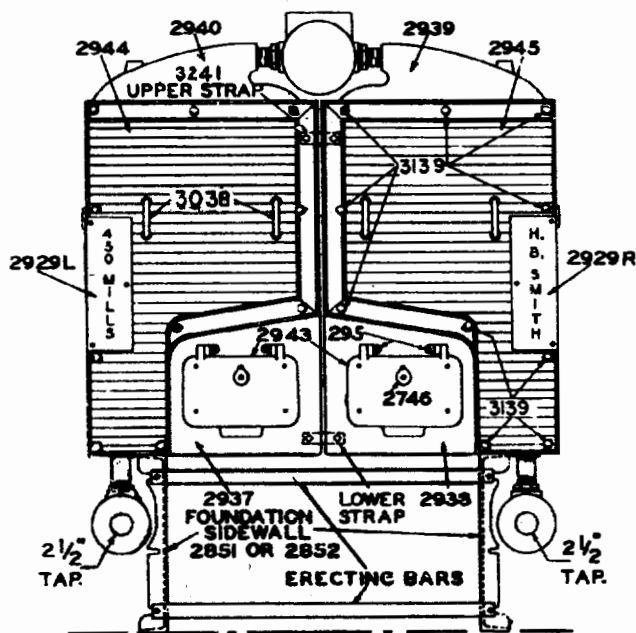
IMPORTANT: BE SURE AND SEAL ALL JOINTS
TO PREVENT AIR LEAKAGE INTO COMBUSTION
CHAMBER.

THE **HB Smith**
COMPANY, INC.
WESTFIELD, MASSACHUSETTS
Established 1853

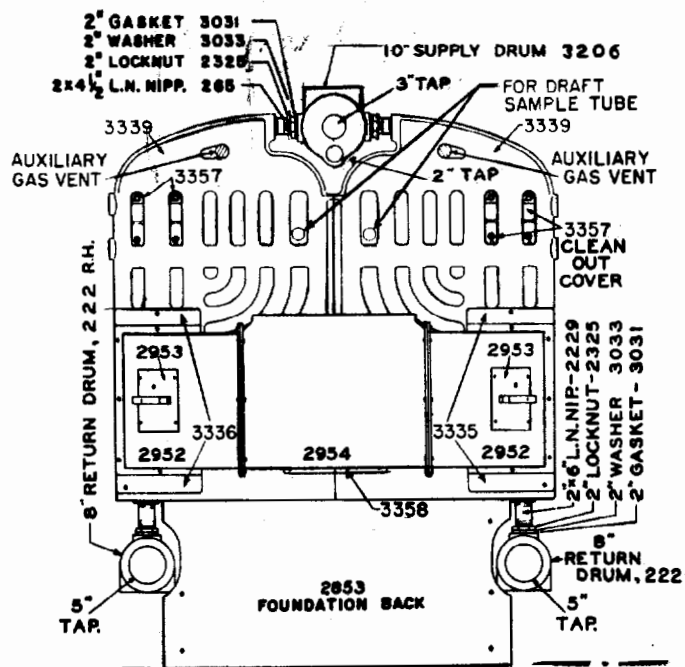


THESE INSTRUCTIONS TO BE LEFT WITH THE BOILER FOR REFERENCE PURPOSES

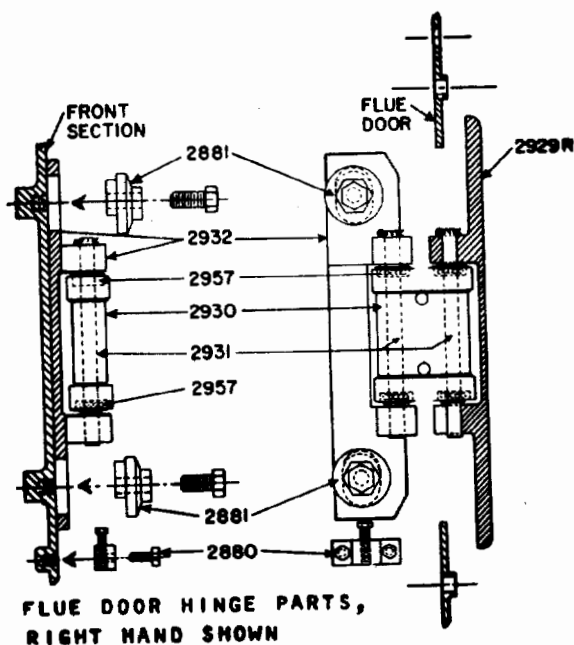
SERIES 450 MILLS WATER TUBE BOILER



FRONT VIEW

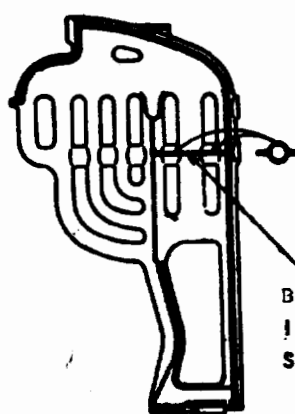


REAR VIEW

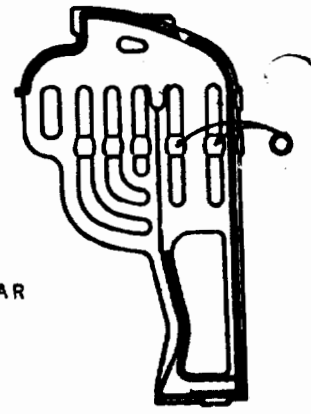


FLUE DOOR HINGE PARTS,
RIGHT HAND SHOWN

FIGURE NO.1



REAR
INTERMEDIATE
SECTION 3338



FORWARD
INTERMEDIATE
SECTION 3337

SUPPLY DRUM EQUALIZER AND DRIP PIPING

THE SUPPLY DRUM OF ALL STEAM BOILERS HAS A 2" LOW TAPPING ON THE REAR END TO BE USED FOR EQUALIZING AND DRIP PIPING. FIELD FABRICATED YOKES MUST PROVIDE A 2" DRIP. THE YOKE MUST ALSO PROVIDE FOR EXPANSION TO PREVENT STRAINING OF THE BACK SECTION. SEE PAGE 9 FOR DETAIL OF WATER RETURN YOKE.

SERIES 450 MILLS WATER TUBE BOILER

PAGE 3

List of Parts

NOTE: R.H. RIGHT HAND OR L.H. LEFT HAND AS SEEN FROM THE FRONT OF BOILER.

CAT. NO.	DESCRIPTION		INTERMEDIATE	
			3337	FORWARD INTERMEDIATE SECTION
	FOUNDATION		3338	REAR INTERMEDIATE SECTION
	ERECTING BARS			BACK -- NEW PARTS
2851	C.I. SIDEWALL - 3 SECTION - 18" LONG			
2852	C.I. SIDEWALL - 4 SECTION - 24" LONG		3335	R.H. SMOKEHOOD ADAPTER
2853	FOUNDATION BACK WALL		3336	L.H. SMOKEHOOD ADAPTER
	FRONT		3339	BACK SECTION 2 REQUIRED
295	FIRE DOOR HINGE LUG (1 DOT)		3357	CLEANOUT COVER
2746	SIGHT OPENING COVER		3358	BACK STRAP
2880	HINGE SUPPORT			
2881	HINGE ECCENTRIC			
2929R	FLUE DOOR HINGE (H.B. SMITH) R.H.	2952		SMOKEHOOD ELBOW
2929L	FLUE DOOR HINGE (450 MILLS) L.H.	2953		SMOKEHOOD CLEANOUT COVERS
2930	HINGE ARM	2954		SMOKEHOOD CENTER SECTION
2931	HINGE PIN	3255		L.H. ELBOW WITH DAMPERS, SPINOLES, CRANK ARMS, 9-1/8" & 6-15/16" CONN.
2932	BOILER HINGE			R.H. ELBOW WITH DAMPERS, SPINOLES, CRANK ARMS, 9-1/8" & 6-15/16" CONN. AND PIVOT PLATE.
2937	L.H. FIRE DOOR FRAME	3256		
2938	R.H. FIRE DOOR FRAME			
2939	R.H. FRONT SECTION			
2940	L.H. FRONT SECTION			
2943	FIRE DOOR			
2944	L.H. FLUE DOOR	265		2" x 4-1/2" NIPPLE (SUPPLY)
2945	R.H. FLUE DOOR	2229		2" x 6" NIPPLES (RETURN)
2957	BALL BEARING	2325		2" LOCKNUT
3038	FLUE DOOR HANDLE	3031		2" GASKET
3102	FLUE DOOR LINING, 2 PC. PER DOOR	3033		2" STEEL WASHER
3139	FLUE DOOR FASTENING BOLT, 10 PER DOOR			
3240	LOWER STRAP			
3241	UPPER STRAP			
	7/16" x 1" HEX CAP SCREWS FOR STRAPS			
	5/8" x 2-1/4" CAP SCREWS FOR HINGE ECCENTRIC			
	3/8" x 1" JACK SCREW			
	1/2" x 1-1/2" F.H. MACH. SCR. FOR HINGES			

SEE PAGE 9 FOR WATER RETURN YOKE PARTS.

DRUMS & CLEANING TOOLS

3206 SUPPLY DRUM - 10"

NO. OF HOLES	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
NO. OF SECTIONS	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

222 RETURN DRUMS - 8"

NO. OF HOLES	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
NO. OF SECTIONS	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

542 FLUE BRUSH HANDLE

SUFFIX	B	C		D		E		F		G		H		I	
LENGTH	4 ft.	5 ft.		6 ft.		7 ft.		8 ft.		9 ft.		10 ft.		11 ft.	
NO. OF SECTIONS	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

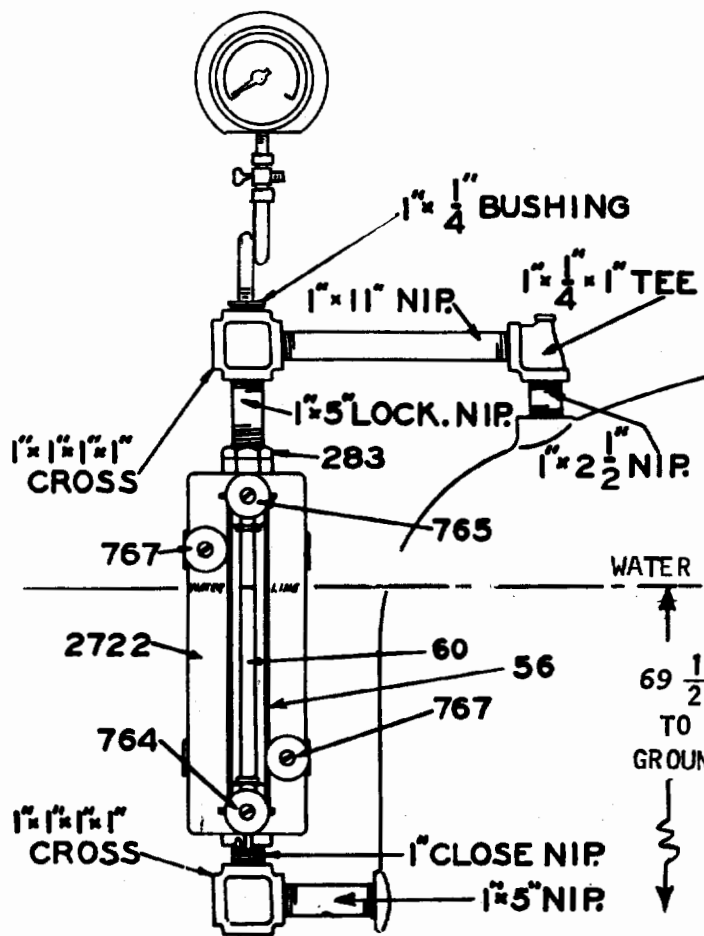
1805 FLUE BRUSH

TABLE SHOWING NUMBER AND LOCATION OF SECTIONS

CASTING NUMBER	DESCRIPTION	NO. OF SECTIONS IN BOILER														
		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
RH-2939 LH-2940	FRONT SECT.	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3337	FORWARD INTER. SECT.	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10
3338	REAR INTER. SECT.	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10
3339	BACK	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Where one section is indicated in the table, two half sections are required since this is a split section boiler. If no distinction is made between "Right Hand" and "Left Hand" in the column listing "Casting Number," the half sections are suitable for use either right hand or left hand.

SERIES 450 MILLS WATER TUBE BOILER



CATALOG NUMBER

56
60
283
764
765
767
2722

STANDARD STEAM TRIM

NAME OF PART

GAUGE GLASS RODS
GAUGE GLASS (5/8" x 12")
LOCKNUT (1")
GAUGE COCK (LOWER)
GAUGE COCK (UPPER)
TRY COCKS
STEAM GAUGE
WATER COLUMN

NOTE:

THIS INSTALLATION IS NOT COMPLETE WITHOUT THE RED INSTRUCTION TAG FOR PUTTING COLD BOILERS INTO SERVICE OR FOR CHANGING WATER LEVEL UNDER STEAM PRESSURE.

ACCESSORIES

1. #10-344, 3/8" DIA. ROPE WICKING, 15-1/4" BETWEEN EACH PAIR OF SECTIONS.
2. #10-668, 1/2" DIA. BRAIDED ROPE 126" CEMENTED TO EACH FLUE DOOR BY H.B. SMITH CO.
3. #10-659, 3/8" DIA. BRAIDED ROPE, 64" CEMENTED TO EACH SMOKEHOOD ADAPTOR BY H.B. SMITH CO.
4. #10-658, 5/16" DIA. BRAIDED ROPE, 56" FOR FIRE DOOR AGAINST SECTION. (2)
5. INSULATING CEMENT. SEE FIGURES NO. 9 & 10.
6. FURNACE CEMENT.

NOTES

GENERAL:

1. NIPPLE CONNECTIONS FROM SUPPLY AND RETURN DRUMS TO SECTIONS SHOULD BE MADE UP USING PIPE JOINT COMPOUND ON TAPERED THREADS.

OIL BURNING INSTALLATIONS:

1. THE ARRANGEMENT OF OIL BURNING EQUIPMENT SHOULD BE AS RECOMMENDED BY THE OIL BURNER MANUFACTURER.
2. THE FOLLOWING RECOMMENDATIONS SHOULD BE FOLLOWED TO OBTAIN PERFORMANCE OF THE BOILER IN ACCORDANCE WITH CATALOG RATINGS AND TO INSURE LONG LIFE AND LOW MAINTENANCE.
 - a) ADJUST OIL DELIVERY RATE TO AGREE WITH CATALOG FIRING RATE.
 - b) ADJUST DRAFT REGULATOR TO MAINTAIN THE FURNACE DRAFT REQUIRED BY THE OIL BURNER MANUFACTURER.
 - c) ADJUST BURNER TO OBTAIN A MINIMUM OF 10% CO₂ FLUE GAS ANALYSIS.

DOMESTIC HOT WATER:

1. IF MANIFOLDS AND DOMESTIC HOT WATER HEATERS ARE TO BE INSTALLED, READ SEPARATE INSTRUCTION FOLDER BEFORE ERECTING BOILER.

SERIES 450 MILLS WATER TUBE BOILER

PAGE 5

GENERAL

PREPARE A SMOOTH LEVEL FLOOR AREA OR SETTING TO RECEIVE THE BOILER FOUNDATION. ALLOW SUFFICIENT TIME FOR CEMENT IN FLOOR OR SETTING TO CURE BEFORE COMMENCING TO ERECT THE BOILER.

NOTES

IF THE SUPPLY AND RETURN DRUMS AND THE BOILER SECTIONS HAVE BEEN STORED ON THE JOB SO AS TO HAVE BEEN SUBJECTED TO WEATHER EXPOSURE, CARE SHOULD BE EXERCISED TO REMOVE ANY DIRT, MUD, SAND OR OTHER FOREIGN MATERIALS FROM THE INTERIOR OF THE CASTINGS AND TO THOROUGHLY CLEAN THE THREADS OF ALL TAPPINGS.

NOTE 1 TAPERED THREAD ON NIPPLES ENGAGE SECTIONS AND RUNNING THREADS ENGAGE SUPPLY AND RETURN DRUMS.

SUPPLY DRUMS

1. THE 2" X 4-1/2" TOP DRUM NIPPLES (265) ARE SHIPPED WITH EXCLUSIVE HY-TEMP HYDRONIC GASKET (3031) AND WASHER (3033) ASSEMBLED AT THE FACTORY. TAPERED THREADS ARE PROTECTED BY A PLASTIC CAP WHICH MUST BE REMOVED BEFORE INSTALLING NIPPLES.

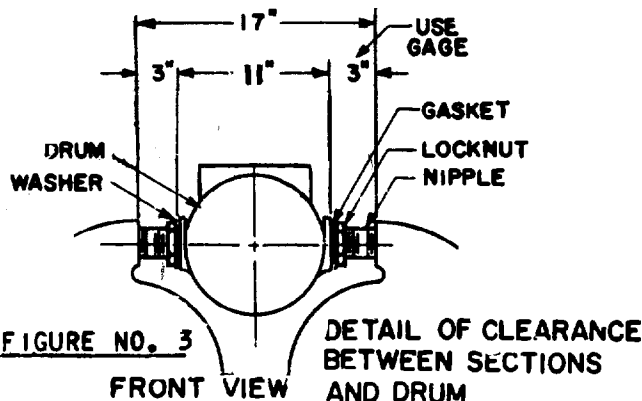


FIGURE NO. 3
FRONT VIEW
DETAIL OF CLEARANCE
BETWEEN SECTIONS
AND DRUM

2. CLEAN THE THREADS OF EACH TAPPING AND INSTALL THE NIPPLES IN THE DRUM SO THAT THE ENDS OF THE NIPPLES MEASURE 3 INCHES OUT FROM THE BOSS ON THE DRUM. USE WOOD GAGE FOR MEASURING.

3. WHEN THE SUPPLY DRUM AND NIPPLES ARE PREPARED, PLACE IT IN POSITION AND SUPPORT IT AT ITS PROPER HEIGHT WITH A CHAIN HOIST FROM A PIPE FRAME, THE BUILDING CONSTRUCTION OR BY OTHER SUITABLE MEANS.

BOILER FOUNDATION

1. BOLT THE FOUNDATION SIDEWALL SECTIONS (2851 AND 2852) TOGETHER IN THE CORRECT COMBINATION OF 18" AND 24" LENGTHS REQUIRED FOR THE BOILER (18" LENGTH IS FOR 3 SECTIONS AND 24" LENGTH IS FOR 4 SECTIONS). USE A 7/16" X 2" BOLT WITH TWO WASHERS AND A NUT AT EACH BOLT SLOT IN THE SIDEWALL SECTIONS. USE SHIMS BETWEEN THE SIDEWALL SECTIONS WHERE NECESSARY TO INSURE A STRAIGHT ASSEMBLED WALL AND BE SURE THAT THE SECTIONS ARE INSTALLED WITH THE "TOP" MARKING UP AND THE FLAT SIDE ON THE INSIDE OF THE FOUNDATION.

2. BOLT THE FOUNDATION BACK END (2853) AND THE ERECTING BARS TO THE SIDEWALLS USING A 7/16" X 1-1/2" BOLT, TWO WASHERS AND A NUT AT EACH BOLT HOLE. CHECK TO BE SURE THAT THE SIDEWALLS ARE PARALLEL AND AT RIGHT ANGLES TO THE BACK END AND ERECTING BARS BY ADJUSTING TO MAKE THE DIAGONAL MEASUREMENTS OF THE FOUNDATION EXACTLY EQUAL USING A RIGID STICK OR BOARD AS A GAUGE. SEE FIGURE NO. 4.

3. POSITION THE ASSEMBLED FOUNDATION IN ITS PROPER RELATION TO THE SUPPLY HEADER SUSPENDED OVERHEAD. CHECK TO BE SURE IT IS LEVEL.

4. SEAL ALL JOINTS IN BOILER FOUNDATION AND BETWEEN FOUNDATION AND FLOOR OR SETTING WITH BLACK FURNACE CEMENT SO AS TO PREVENT AIR LEAKAGE.

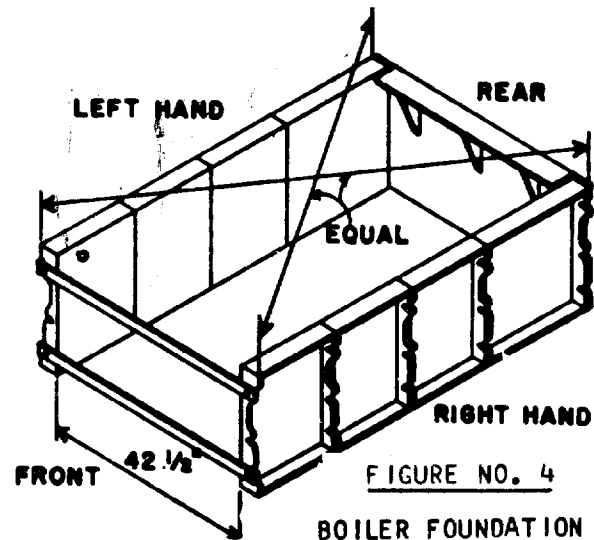


FIGURE NO. 4

BOILER FOUNDATION

RETURN DRUMS

1. THE 2" X 6" BOTTOM DRUM NIPPLES (2229) ARE ALSO SHIPPED WITH THE HY-TEMP HYDRONIC GASKET (3031) AND WASHER (3033) ASSEMBLED AT THE FACTORY. TAPERED THREADS ARE PROTECTED BY PLASTIC CAPS WHICH MUST BE REMOVED BEFORE INSTALLING NIPPLES.

2. CLEAN THE THREADS OF EACH NIPPLE TAPPING AND INSTALL NIPPLES IN THE DRUMS SO THAT THE DISTANCE FROM THE BOSS ON THE DRUM TO THE END OF THE NIPPLE IS 4-1/2" FOR THE FRONT AND REAR SECTIONS. OTHER NIPPLES SHOULD BE SCREWED INTO THE DRUMS AS FAR AS POSSIBLE.

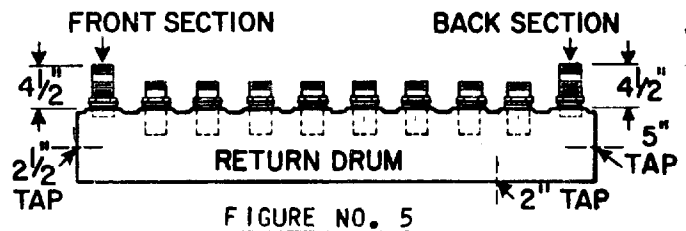


FIGURE NO. 5

3. RETURN DRUMS MAY BE USED ON EITHER THE RIGHT OR LEFT HAND SIDE OF THE BOILER. A 2" TAPPING IN THE BOTTOM OF THE DRUM IS PROVIDED FOR THE DRAIN VALVE. THE DRUM MUST BE INSTALLED WITH THE 2-1/2" TAPPING AT THE FRONT OF THE BOILER. SEE ILLUSTRATION ABOVE.

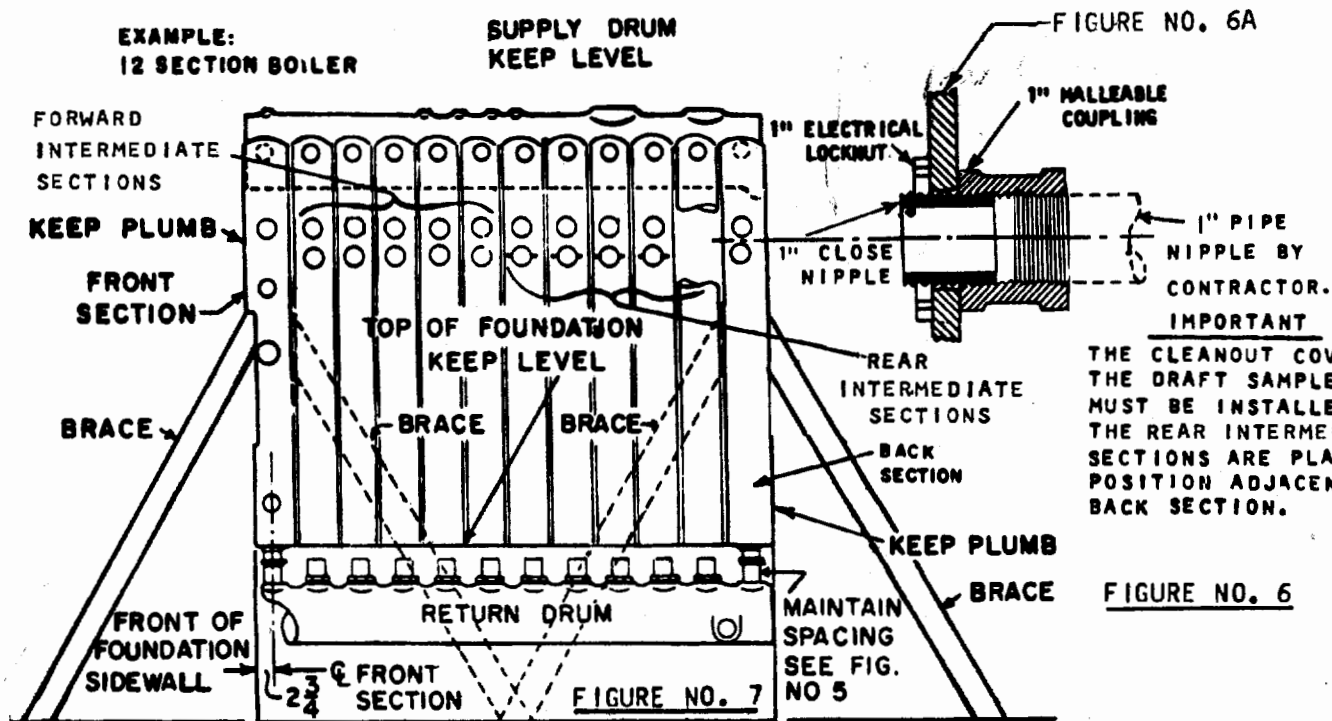
SECTIONS

(THE ASSEMBLY OF FRONT AND BACK SECTIONS CAN BE PERFORMED IN REVERSE ORDER IF DESIRED).

NOTE: USE PIPE JOINT COMPOUND ON TAPERED THREADS. DO NOT USE COMPOUND ON RUNNING THREADS.

1. CLEAN THE THREADS OF DRUM TAPPINGS ON BOTH HALVES OF THE FRONT SECTION. THEN, ONE AT A TIME, PLACE EACH HALF SECTION IN PLACE AT FRONT OF BOILER FOUNDATION AND MAKE EACH SUPPLY DRUM NIPPLE INTO THE SECTION, USING THE WOOD SPACING GAUGE TO MAINTAIN THE EXACT 3" DISTANCE FROM THE BOSS ON THE DRUM TO THE FACE OF THE SECTION AT THE PARTING LINE WHEN THE SECTION IS PLUMB AND THE SUPPLY DRUM LEVEL. WHEN THE TWO HALF SECTIONS ARE IN POSITION CENTERED ON THE FOUNDATION WITH THE CENTER LINE OF EACH HALF SECTION 2-3/4" FROM THE FRONT END OF THE FOUNDATION SIDEWALLS AND PLUMB, INSTALL THE TOP AND BOTTOM FRONT STRAPS USING THE 7/16" X 1" HEX. HEAD CAP SCREWS FURNISHED.

SERIES 450 MILLS WATER TUBE BOILER



SERIES 450 MILLS WATER TUBE BOILER

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DRAFT SAMPLE TUBE (WHEN REQUIRED)

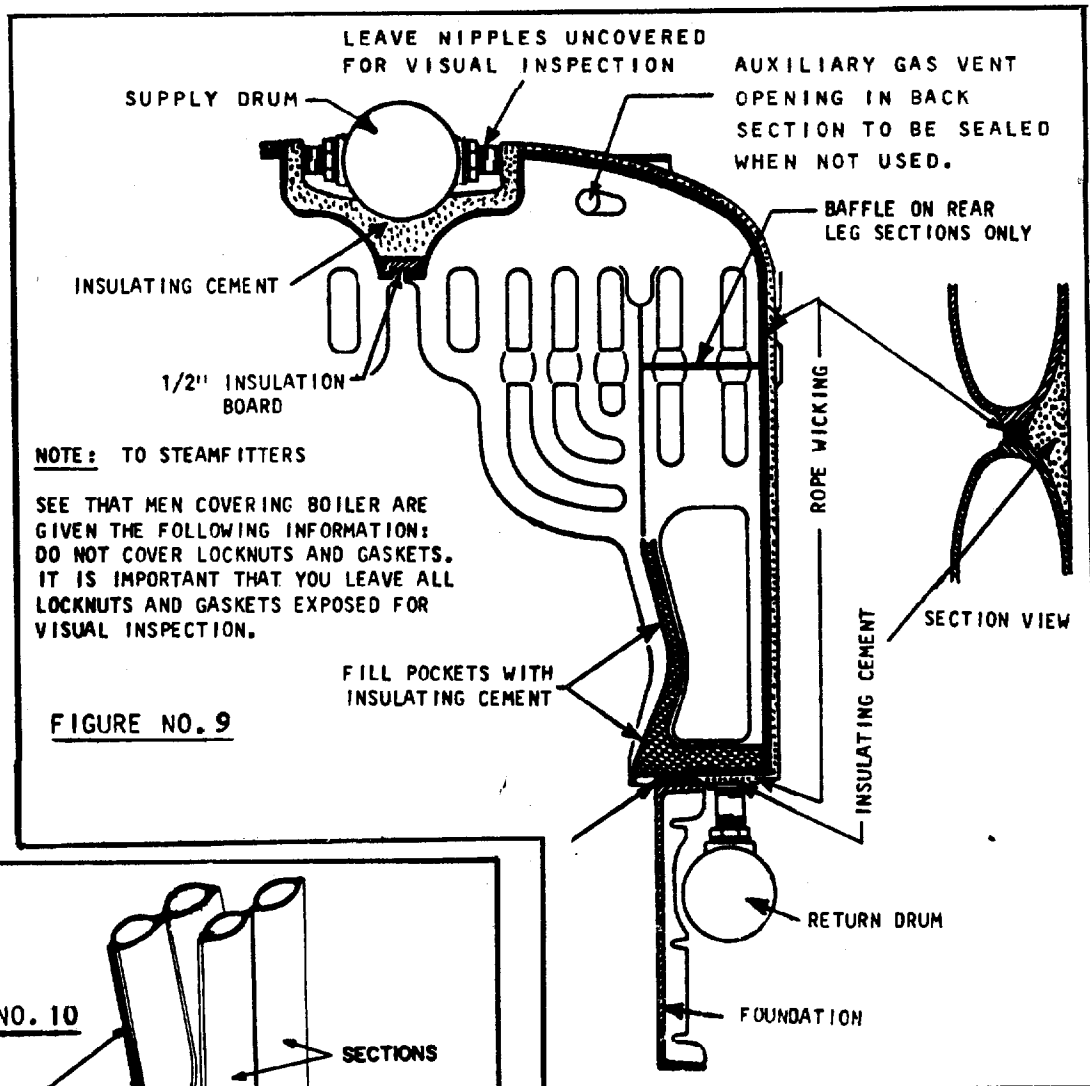
THE DRAFT SAMPLE TUBE MUST BE INSTALLED BEFORE THE LEG SECTIONS ARE PLACED IN POSITION. SEE FIG. NO. 6 A. A KNOCK-OUT IS PROVIDED IN THE WEB OF THE BACK SECTION SO THAT THE DRAFT SAMPLE TUBE MAY BE INSTALLED IN EITHER THE RIGHT OR LEFT HAND BACK SECTION, DEPENDING UPON CONTROL PANEL LOCATION. PUNCH OUT KNOCK-OUT WITH BALL PEEN HAMMER, THEN INSTALL PARTS AS SHOWN IN FIG. NO. 6A.

INSULATING CEMENT

1. INSULATING CEMENT IS TO BE USED TO FILL THE POCKETS OF SECTIONS AND SPACES BETWEEN ADJACENT SECTIONS AND BETWEEN SECTIONS AND THE FOUNDATIONS. SEE FIG. 10 FOR LOCATION OF SPACES TO BE FILLED.

2. FOLLOW THE MANUFACTURERS INSTRUCTIONS FOR THE PREPARATION AND USE OF THE INSULATING CEMENT.

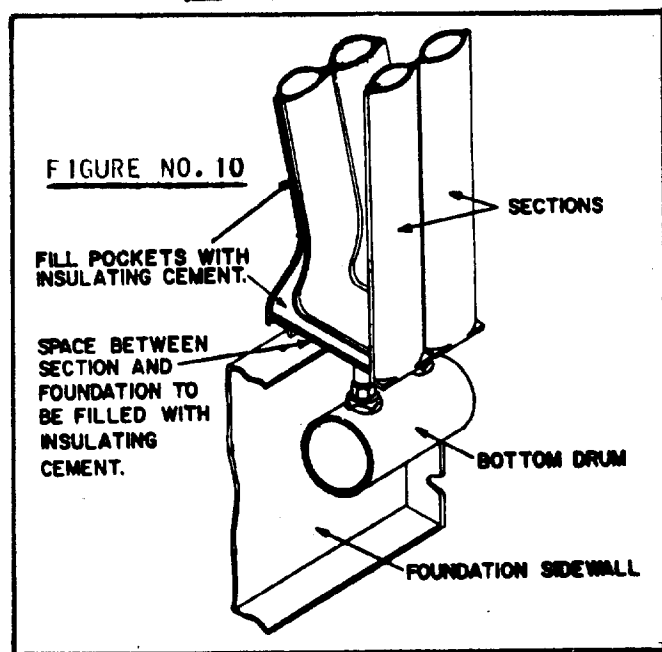
3. DO NOT PREPARE MORE INSULATING CEMENT THAN REQUIRED FOR IMMEDIATE USE IN SEALING BOILER.



NOTE: TO STEAMFITTERS

SEE THAT MEN COVERING BOILER ARE GIVEN THE FOLLOWING INFORMATION: DO NOT COVER LOCKNUTS AND GASKETS. IT IS IMPORTANT THAT YOU LEAVE ALL LOCKNUTS AND GASKETS EXPOSED FOR VISUAL INSPECTION.

FIGURE NO. 9



SERIES 450 MILLS WATER TUBE BOILER

INTERMEDIATE SECTIONS

1. TWO TYPES OF INTERMEDIATE SECTIONS ARE FURNISHED. SEE PARTS LISTS AND DRAWINGS FOR NUMBERS AND IDENTIFYING FEATURES AND REFER TO THE TABLE SHOWING THE NUMBER AND LOCATION OF THE VARIOUS TYPES OF SECTIONS. BE SURE TO INSTALL EACH TYPE OF SECTION IN ITS PROPER LOCATION.

REAR INTERMEDIATE SECTIONS ARE PLAINLY MARKED FOR POSITIVE IDENTIFICATION WITH A LARGE CAST-ON NAMEPLATE READING "REAR INTERMEDIATE SECTION." THESE SECTIONS HAVE A CAST-ON BAFFLE ON THE CROSS TUBE AND ARE SPOTTED WITH ORANGE PAINT ON THE OUTSIDE OF THE SECTION NEAR SUPPLY BOSS. REAR INTERMEDIATE SECTIONS MAY ALSO BE IDENTIFIED BY A ROUND RAISED SPOT ON EACH SIDE OF BOTH SUPPLY AND RETURN BOSSES AS WELL AS A SHORT HORIZONTAL RIB ON EACH SIDE OF THE BOSS ON THE SIDE OF SECTION.

2. FILL THE POCKETS AND THE SPACES BETWEEN THE SECTION AND THE FOUNDATION OF THE BACK SECTION WITH INSULATING CEMENT. SEE FIGURE NO. 10.

3. TAKE A REAR INTERMEDIATE SECTION 3338. CLEAN THE THREADS OF TAPPINGS, FILL POCKETS WITH INSULATING CEMENT. PLACE A QUANTITY OF INSULATING CEMENT ON THE TOP OF THE FOUNDATION SIDEWALL ADJACENT TO THE REAR SECTION SUFFICIENT TO FILL THE SPACE UNDER THE SECTION. PLACE THE SECTION ON THE FOUNDATION AND SLIDE INTO POSITION NEXT TO THE BACK SECTION. APPLY PIPE JOINT COMPOUND TO THE NIPPLE THREADS AND ENGAGE THE SUPPLY DRUM NIPPLES INTO THE SECTION. MAINTAIN THE EXACT 3" DISTANCE FROM THE BOSS ON THE DRUM TO THE FACE OF THE SECTION AT THE PARTING LINE USING THE WOOD SPACING GAGE. MAKE NIPPLE UP INTO SECTION TWO OR THREE TURNS. A SMALL PINCH BAR IS A CONVENIENT TOOL FOR POSITIONING THE SECTIONS TO LINE UP SUPPLY DRUM NIPPLE WITH THE TAPPING. DO NOT TIGHTEN LOCKNUTS.

4. APPLY PIPE JOINT COMPOUND TO THREADS OF RETURN NIPPLE, THEN ENGAGE NIPPLE IN SECTION AND MAKE UP TWO OR THREE TURNS TO HOLD SECTION IN POSITION. DO NOT TIGHTEN LOCKNUTS.

5. INSTALL AND CONNECT THE OPPOSITE HAND INTERMEDIATE SECTION IN THE SAME MANNER TAKING CARE TO FILL THE POCKETS AND SEAL THE SPACES WITH INSULATING CEMENT.

6. AS EACH FULL SECTION IS ERECTED, IT IS RECOMMENDED THAT THE JOINTS BETWEEN SECTIONS IN THE AREA UNDER THE SUPPLY DRUM BE SEALED WHILE ACCESSIBLE FROM THE INSIDE UNDER THE DRUM. THE ACCESS TO THIS AREA IS SOMEWHAT RESTRICTED WHEN ALL SECTIONS ARE IN PLACE.

7. THE JOINT BETWEEN SECTIONS UNDER THE SUPPLY DRUM SHOULD BE SEALED USING THE ROPE WICKING FURNISHED WITH THE BOILER. LAY THE ROPE OVER THE JOINT AND THEN PACK GENTLY INTO THE SPACE BETWEEN BEADS OF THE SECTIONS TAKING CARE NOT TO FORCE THE ROPE PAST THE BEADS. APPLY INSULATING CEMENT OVER THE ROPE SO AS TO FILL THE SPACE UP TO FINISH FLUSH WITH THE OUTSIDE LINE OF THE SECTIONS. SEE FIGURE NO. 9. THE EXTERIOR JOINT BETWEEN SECTIONS CAN THEN BE SEALED AFTER ALL SECTIONS ARE CONNECTED IN PLACE.

8. AS THE SECTIONS ARE ERECTED, THE LONGITUDINAL JOINT DIRECTLY UNDER THE TOP HEADER SHOULD BE SEALED BY PLACING THE NARROW INSULATING STRIPS OVER THE JOINT THEN COVER WITH A LAYER OF INSULATING CEMENT EXTENDING THE FULL WIDTH OF THE MILLBOARD AND JOINING WITH INSULATING CEMENT BETWEEN SECTIONS. SEE FIGURE NO. 9.

9. REFER TO THE TABLE SHOWING THE LOCATION AND NUMBER OF SECTIONS ON PAGE 3 AND TAKE CARE TO INSTALL REAR INTERMEDIATE SECTIONS AND FORWARD INTERMEDIATE SECTIONS IN THEIR PROPER ORDER. CONTINUE TO INSTALL INTERMEDIATE SECTIONS IN THE SAME MANNER DESCRIBED ABOVE EXCEPT FOR THE LAST THREE SECTIONS ON EACH SIDE.

THESE SECTIONS MUST BE PLACED IN POSITION WITH THE BEAD PROPERLY SPACED BEFORE THE NIPPLES ARE ENGAGED INTO SECTIONS.

NOTE

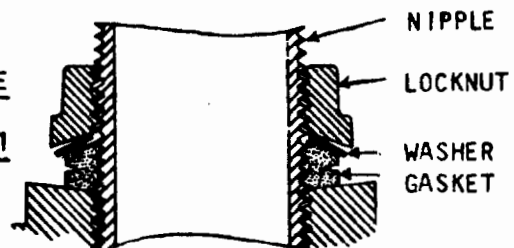
BEFORE COMMENCING TO SEAL GASKETS AND TIGHTEN LOCKNUTS READ THE ENTIRE ARTICLE ON THIS SUBJECT AND FOLLOW THE INSTRUCTIONS IN EVERY DETAIL.

SEALING GASKETS AND TIGHTENING LOCKNUTS

1. WHEN ALL SECTIONS ARE IN PLACE, GO OVER THE ENTIRE BOILER AND MAKE NIPPLES TIGHT INTO THE SECTIONS.

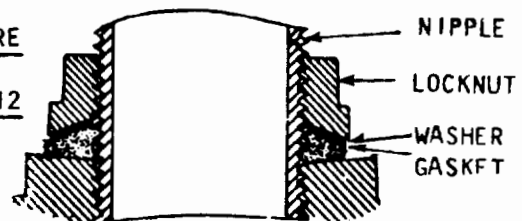
2. TIGHTENING LOCKNUTS -- WHEN ALL SECTIONS ARE IN PLACE WITH NIPPLES MADE UP TIGHT INTO SECTIONS, SCREW EACH LOCKNUT DOWN HAND TIGHT SO THAT THE GASKET IS TIGHT TO BOSS OF DRUM (SEE FIGURE NO. 11).

FIGURE
NO. 11



3. THEN, USING A LOCKNUT WRENCH, TIGHTEN EACH LOCKNUT APPROXIMATELY 1-3/4 TURNS. WHEN THE DISTANCE FROM THE BOSS TO THE WASHER IS APPROXIMATELY 3/32" AND THE OUTSIDE DIAMETER OF THE GASKET IS ROUGHLY EVEN WITH THE OUTSIDE EDGE OF THE WASHER, THE SEAL HAS BEEN MADE (SEE FIGURE NO. 12).

FIGURE
NO. 12



4. FINAL INSPECTION -- AFTER THE BOILER HAS BEEN FILLED WITH WATER AND FIRED UP, INSPECT ALL NIPPLES FOR LEAKS. LEAKS CAN BE STOPPED AT ANY TIME BY TIGHTENING THE LOCKNUT APPROX. 1/8 TURN UNTIL THE CONDITION SHOWN IN FIGURE NO. 12 IS OBTAINED.

SEALING JOINTS BETWEEN SECTIONS

1. AFTER ALL SECTIONS ARE IN PLACE AND CONNECTED TO SUPPLY AND RETURN DRUMS, GO OVER THE ENTIRE BOILER AND COMPLETE THE SEALING OF JOINTS USING ROPE WICKING AND INSULATING CEMENT ALL AS SHOWN IN FIGURE NO. 9.
2. TAKE PARTICULAR CARE TO SEAL THE JOINTS BETWEEN THE BOTTOMS OF THE SECTIONS AND THE TOP OF THE FOUNDATION ON THE REAR AS WELL AS ON THE SIDES.
3. THE VERTICAL JOINT BETWEEN THE TWO HALVES OF THE REAR SECTION SHOULD BE CAREFULLY SEALED WITH INSULATING CEMENT.

4. THE VERTICAL JOINT BETWEEN THE TWO HALVES OF THE FRONT SECTION SHOULD BE CAREFULLY SEALED WITH ROPE WICKING LAID IN THE OPENING AND COVERED WITH INSULATING CEMENT.

EXTRACT FROM A.S.M.E. BOILER CONSTRUCTION CODE

"WHEN FEED OR MAKE-UP WATER IS INTRODUCED FROM A PRESSURE LINE, IT SHALL BE CONNECTED TO THE PIPING SYSTEM AND NOT DIRECTLY TO THE BOILER"

THE DRAW-OFF COCK SHOULD BE CONNECTED TO THE OPPOSITE SIDE OF THE BOILER FROM THE FEED WATER CONNECTION TO ASSIST IN REMOVING SEDIMENT FROM THE BOILER.

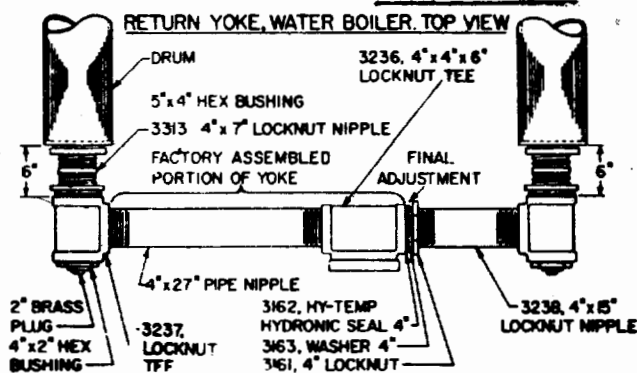
RETURN YOKE (WATER)

1. INSTALL 5" x 4" BUSHING AND 4" x 7" LOCKNUT NIPPLE USING PIPE WRENCH ON NIPPLE TO TIGHTEN BUSHING AT THE SAME TIME.
2. ADJUST THE 4" x 4" x 4" SPECIAL LOCKNUT TEES ON THE RUNNING THREAD SO THAT THE FACE OF EACH TEE MEASURES 6" FROM THE END OF THE RETURN DRUM. BOTH TEES SHOULD MEASURE AN EQUAL DISTANCE FROM THE DRUMS.
3. THREAD THE 4" x 15" LOCKNUT NIPPLE INTO THE 4" x 4" x 6" SPECIAL LOCKNUT TEE FACTORY ASSEMBLY PORTION OF YOKE.
4. INSTALL THE CROSS PIPE ASSEMBLY, 4" x 27" PIPE NIPPLE, INTO THE R.H. 4" x 4" x 4" TEE AND MAKE IT TIGHT. BE SURE 6" OPENING IN 4" x 4" x 6" TEE IS IN PROPER POSITION FOR RETURN PIPING. BACK THE 4" x 15" LOCKNUT NIPPLE OUT OF THE 4" x 4" x 6" TEE AND CHECK ALIGNMENT WITH L.H. 4" x 4" x 6" TEE. ADJUST TEE IN OR OUT ON 4" x 7" LOCKNUT NIPPLE UNTIL ALIGNMENT IS CORRECT AND THEN MAKE UP TIGHT.

5. TIGHTEN LOCKNUTS IN THE MANNER DESCRIBED FOR DRUM CONNECTIONS.

NOTE: USE PIPE JOINT COMPOUND ON TAPERED THREAD JOINTS TO BE MADE UP IN THE FIELD. DO NOT USE COMPOUND ON RUNNING THREADS.

FIGURE NO. 13



SMOKEHOOD FOR NATURAL DRAFT

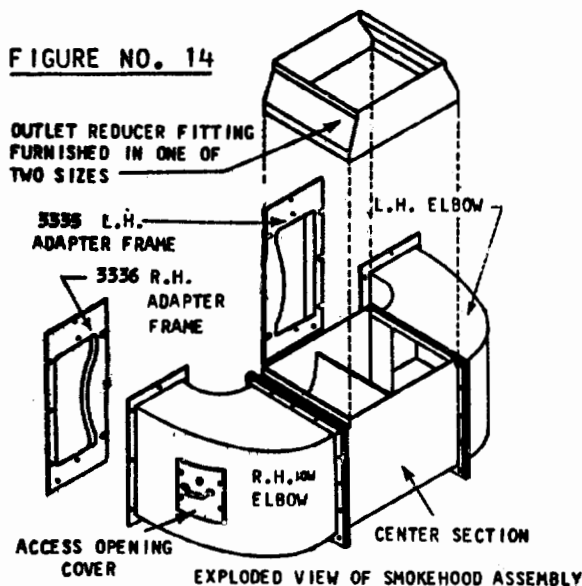
1. INSTALL THE SMOKEHOOD ADAPTER FRAMES (3335 & 3336) ON THE BACK SECTION USING 7/16" x 2-1/2" MACHINE BOLTS WITH ONE WASHER EACH. THE ROPE SEAL IS APPLIED TO THE FRAMES AT THE FACTORY, BUT CARE MUST BE TAKEN TO MAKE SURE THAT THE ROPE HAS NOT TWISTED OR KINKED DURING SHIPMENT. LINE THE FRAMES UP WITH THE OPENINGS IN THE BACK SECTIONS AND TIGHTEN ALL FASTENING BOLTS.
2. SEAL ALL OPENINGS BETWEEN THE REAR SECTION AND THE FLANGE OF THE ADAPTER FRAMES WITH BLACK FURNACE CEMENT.
3. ASSEMBLE THE 5/16" x 1" SQUARE HEAD MACHINE BOLTS AND SQUARE NUTS WITH ONE WASHER EACH LOOSELY ON THE INSIDE FLANGES OF THE SMOKEHOOD ELBOWS ON THE ENDS WHICH WILL BE SECURED TO THE ADAPTER FRAMES. ONE AT A TIME, INSTALL THE ELBOWS BY CATCHING THE INSIDE BOLTS IN THE SLOTS OF THE ADAPTER FRAMES AND THEN INSTALLING THE REMAINING 5/16" x 1" SQUARE HEAD MACHINE BOLTS AND SQUARE NUTS WITH ONE WASHER EACH. THE BOLTS FOR THE TOP AND BOTTOM HOLES SHOULD BE INSERTED WORKING THROUGH THE SMOKEHOOD ELBOW. DO NOT TIGHTEN THE NUTS, BUT ALLOW THE ELBOWS TO REST LOOSELY IN POSITION.
4. TAKE UP THE SMOKEHOOD CENTER SECTION (2954) AND PLACE IT IN POSITION BETWEEN THE ELBOWS WITH THE OUTLET EITHER LOOKING UP OR TO THE REAR AS REQUIRED. INSTALL THE 1/4" x 3/4" BOLTS, WASHERS AND NUTS, FOR FASTENING THE CENTER SECTION TO THE ELBOWS. LINE UP THE INTERIOR SURFACES OF THE CENTER SECTION AND THE ELBOWS AND TIGHTEN THE NUTS SO AS TO DRAW THE ELBOW FLANGES TIGHT TO THE CENTER SECTION FLANGES ALL AROUND.

5. ALIGN THE ELBOW OPENINGS WITH THE ADAPTER FRAME OPENINGS AND TIGHTEN NUTS SO AS TO DRAW THE FLANGES OF THE ELBOWS TIGHT TO THE ADAPTER FRAME.

6. SEAL ANY OPENINGS BETWEEN FLANGES WITH BLACK FURNACE CEMENT.

7. INSTALL SMOKEHOOD REDUCER, IF REQUIRED, OVER THE OUTLET OF THE CENTER SECTION. DRILL 9/32" DIAMETER HOLES IN THE CENTER SECTION TO MATCH THE HOLES IN THE REDUCER. ASSEMBLE 1/4" BOLTS THROUGH HOLES.

FIGURE NO. 14



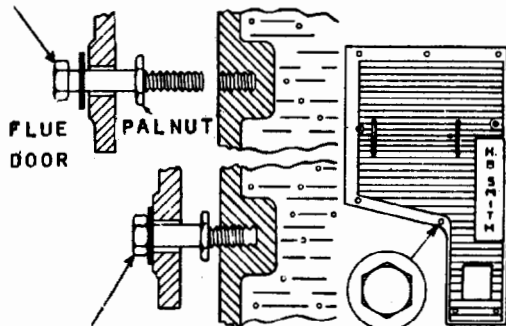
SERIES 450 MILLS WATER TUBE BOILER

For Automatic Firing with Oil or Gas

FLUE DOORS AND HINGES

1. BOLT HINGE SUPPORTS (2880) IN PLACE ON FRONT SECTIONS.
2. BOLT THE COMPLETE HINGE ASSEMBLIES WITH HINGE ECCENTRICS IN PLACE ON THE FRONT SECTION. THE HINGE WITH "450 MILLS" CAST ON FRONT IS FOR THE LEFT HAND DOOR AND THE HINGE WITH "H.B. SMITH" IS FOR THE RIGHT HAND DOOR.
3. THE BOILER HINGES SHOULD BE PLUMB WITH THE OUTSIDE EDGES APPROXIMATELY PARALLEL TO THE OUTSIDE EDGES OF THE SECTIONS.
4. SWING THE HINGE ASSEMBLIES TO THE OPEN POSITION.
5. BEFORE PLACING FLUE DOORS ON FRONT SECTION, PRE-ASSEMBLE THE 7/16" x 2-1/4" SPECIAL BOLT AND PALNUT AS SHOWN IN FIGURE NO. 15.
6. PLACE THE FLUE DOORS (2944 AND 2945) IN PLACE AGAINST THE FRONT SECTION AND HOLD LOOSELY IN PLACE WITH 2 OR 3 SPECIAL BOLTS IN THE DOOR.
7. SWING HINGE ASSEMBLIES TO THE "CLOSED" POSITION ON TOP OF FLUE DOORS. FASTEN BOILER HINGE PLATE TIGHT TO FLUE DOORS WITH TWO FLAT HEAD STOVE BOLTS EACH THROUGH THE TWO OUTER BOLT HOLES. OPEN DOORS AND TIGHTEN THE THIRD FLAT HEAD STOVE BOLT THROUGH EACH BOILER HINGE AND FLUE DOOR.
8. ADJUST THE FLUE DOORS SO THAT, WHEN CLOSED, THE GASKETS ON THE DOORS SHOULD SEAT SQUARELY ON THE COMPRESSION BEADS ON THE FRONT SECTION. HORIZONTAL ADJUSTMENT IS ACCOMPLISHED BY LOOSENING THE 5/8 INCH CAP SCREW SLIGHTLY AND TURNING THE ECCENTRICS. VERTICAL ADJUSTMENT IS ACCOMPLISHED BY MEANS OF THE JACK SCREW IN THE BOILER HINGE SUPPORT.
9. WHEN THE ADJUSTMENT OF THE FLUE DOORS IS SATISFACTORY, TIGHTEN ALL BOLTS, NUTS AND SCREWS. THEN FASTEN FLUE DOORS IN THE CLOSED POSITION.

7/16" x 2-1/4" LENGTH BOLT AND WASHER



IF ANY BOLT BOTTOMS IN HOLE BEFORE DOOR IS TIGHT REMOVE BOLT AND ADD A WASHER.

FLUE DOOR BOLT ASSEMBLY DETAIL
FIGURE NO. 15.

FIRE DOOR FRAMES AND DOORS

1. ASSEMBLE R.H. AND L.H. FIRE DOORS (2943) ON R.H. AND L.H. FIRE DOOR FRAMES USING 1 DOT HINGE LUGS (295).
2. FASTEN FIRE DOOR FRAMES TO FRONT SECTIONS WITH 5/16" BY 1-3/4" ROUND HEAD BRASS STOVE BOLTS.
3. THE FIRE DOOR FRAMES SHOULD BE SET SO THAT THE SPACING FROM THE EDGE OF THE FRAME TO THE EDGE OF THE FLUE DOOR ARE UNIFORM ALL AROUND.

STEAM OR WATER TRIM

1. ON STEAM BOILERS THE WATER COLUMN IS FURNISHED WITH A COMPLETE COMPLEMENT OF PRECUT PIPE AND FITTINGS. THE CROSSES ARE PROVIDED TO PERMIT THE EASY INSTALLATION OF PIPING FOR LOW WATER CUT-OFF, AUTOMATIC WATER FEEDER OR OTHER FLOAT ACTUATED DEVICE. IF NO SUCH PIPING IS REQUIRED, PLUG THE OPEN CONNECTIONS.
2. SEE PAGE 4 FOR DETAILS.
3. THE SAFETY VALVE OR RELIEF VALVES SHOULD NOT BE INSTALLED UNTIL THE INTERIOR OF THE BOILER HAS BEEN CLEANED AND FLUSHED OUT.

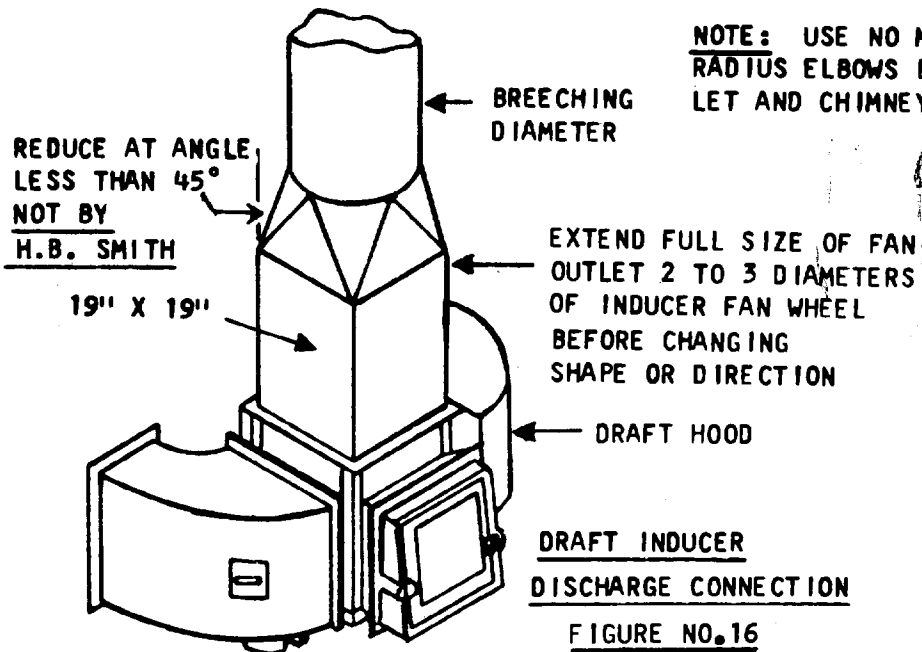
FIRING AND CLEANING THE BOILER

NOTE: CLEANING OF THE BOILER SHOULD BE DONE BEFORE INSTALLATION OF THE CONNECTED PIPING.

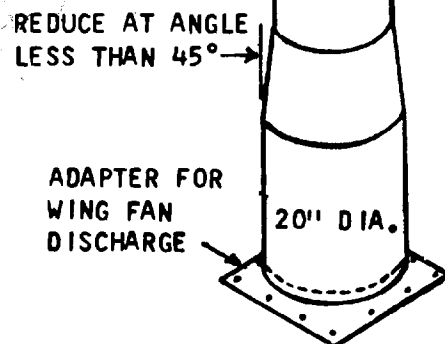
1. THE FUEL BURNING EQUIPMENT SHOULD BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
2. THE BOILER SHOULD BE FILLED WITH WATER TO A POINT NEAR THE CENTER LINE OF THE TOP HEADER. ADD AN APPROVED BOILER CLEANING COMPOUND TO WATER IN THE BOILER THROUGH THE SAFETY OR RELIEF VALVE TAPPING. BE SURE TO USE COMPOUND ACCORDING TO INSTRUCTIONS.
3. FIRE THE BOILER FOR AT LEAST ONE HOUR AT A MODERATE RATE SO AS TO INSURE COMPLETE CIRCULATION OF THE COMPOUND.
4. DRAIN SURFACE PRODUCTS THROUGH TEMPORARY PIPING CONNECTED TO THE SKIMMER IN THE REAR OF THE SUPPLY DRUM.
5. WHEN COOL, OPEN THE BOTTOM DRAIN VALVES AND DRAIN BOILER COMPLETELY. FLUSH THE BOILER INTERIOR WITH CLEAN WATER INTRODUCED BY A HOSE INTO THE TOP HEADER. WHEN THE FLUSHING IS COMPLETE, CLOSE THE DRAIN VALVES AND FILL THE BOILER WITH CLEAN WATER.
6. COMPLETE THE INSTALLATION OF PERMANENT PIPING CONNECTIONS, CONTROLS, SAFETY OR RELIEF VALVES AND ANY OTHER COMPONENTS.
7. CHECK CAREFULLY FOR AIR LEAKS IN THE SEALING OF THE BOILER AND REPAIR WHEN NECESSARY.

SERIES 450 MILLS WATER TUBE BOILER

PAGE 11



NOTE: USE NO MORE THAN 2 LONG RADIUS ELBOWS BETWEEN FAN OUT-LET AND CHIMNEY ENTRANCE.



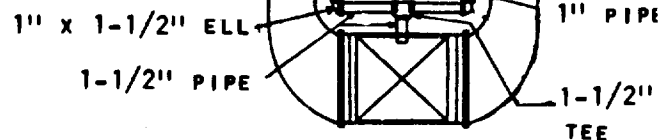
OPTIONAL DISCHARGE CONNECTION NOT BY H.B. SMITH

FIGURE NO. 17

SMOKEHOOD FOR WING I.D. FAN

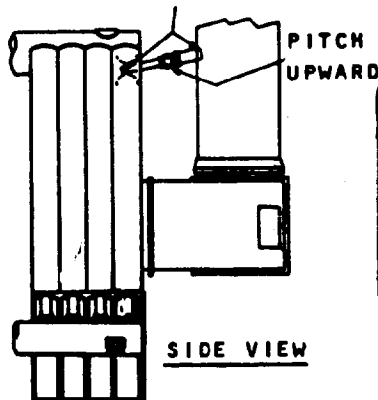
1. INSTALL THE SMOKEHOOD ADAPTER FRAMES (3335 & 3336) ON THE BACK SECTION USING $7/16"$ x $2-1/2"$ MACHINE BOLTS WITH ONE WASHER EACH. THE ROPE SEAL IS APPLIED TO THE FRAMES AT THE FACTORY, BUT CARE MUST BE TAKEN TO MAKE SURE THAT THE ROPE HAS NOT TWISTED OR KINKED DURING SHIPMENT. LINE THE FRAMES UP WITH THE OPENINGS IN THE BACK SECTIONS AND TIGHTEN ALL FASTENING BOLTS.
2. SEAL ALL OPENINGS BETWEEN THE REAR SECTION AND THE FLANGE OF THE ADAPTER FRAMES WITH BLACK FURNACE CEMENT.
3. ASSEMBLE THE $5/16"$ x $1"$ SQUARE HEAD MACHINE BOLTS AND SQUARE NUTS WITH ONE WASHER EACH LOOSELY ON THE INSIDE FLANGES OF THE SMOKEHOOD ELBOWS ON THE ENDS WHICH WILL BE SECURED TO THE ADAPTER FRAMES. ONE AT A TIME, INSTALL THE ELBOWS BY CATCHING THE INSIDE BOLTS IN THE SLOTS OF THE ADAPTER FRAMES AND THEN INSTALLING THE REMAINING $5/16"$ x $1"$ SQUARE HEAD MACHINE BOLTS AND SQUARE NUTS WITH ONE WASHER EACH. THE BOLTS FOR THE TOP AND BOTTOM HOLES SHOULD BE INSERTED WORKING THROUGH THE SMOKEHOOD ELBOW. DO NOT TIGHTEN THE NUTS, BUT ALLOW THE ELBOWS TO REST LOOSELY IN POSITION.
4. UNPACK THE INDUCED DRAFT FAN AND ASSEMBLE THE SIDE PANELS AS REQUIRED.

FIGURE NO. 18

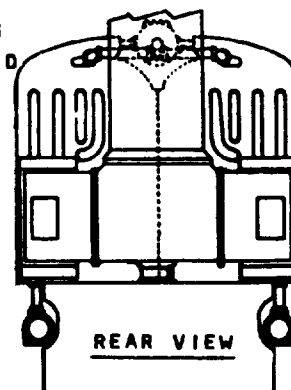


PLAN VIEW

SEAL AROUND PIPE WITH FURNACE CEMENT



SIDE VIEW



REAR VIEW

AUXILIARY FLUE GAS VENT FOR GAS FIRED BOILERS.

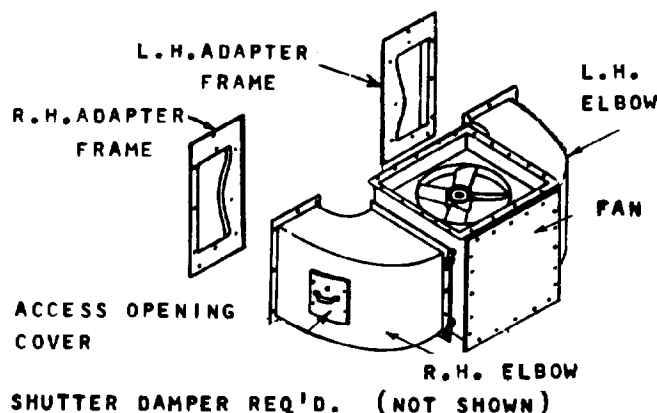


FIGURE NO. 19

EXPLODED VIEW OF SMOKEHOOD ASSEMBLY FOR WING FAN

SERIES 450 MILLS WATER TUBE BOILER

SMOKEHOOD FOR WING I.D. FAN

NOTE: TWO MEN CAN INSTALL THE INDUCED DRAFT FAN. ONE MAN SHOULD WORK IN THE SPACE BETWEEN THE FAN AND THE REAR SECTION, THE OTHER ON THE OUTSIDE. THE POSITIONING OF THE FAN IS EASILY DONE USING BLOCKING OF THE PROPER HEIGHT UNDER THE FAN MOTOR BRACKET FOR SUPPORT.

5. TAKE UP THE INDUCED DRAFT FAN, PLACE IT IN POSITION BETWEEN THE SMOKEHOOD ELBOWS, LINE UP THE FLANGES AND INSTALL THE 1/4" x 3/4" SQUARE HEAD MACHINE BOLTS AND SQUARE NUTS WITH ONE WASHER EACH. TAKE CARE TO LINE UP THE INSIDE OPENING OF THE SMOKEHOOD ELBOWS WITH THE INLET OPENINGS OF THE FAN.

6. THE DAMPER OPERATOR MOTOR BRACKET AND MAIN DAMPER SPINDLE SUPPORT BEARINGS SHOULD BE PLACED IN POSITION. (SEE FIGURE NO.22 AND PAR. NO.9.

7. TIGHTEN NUTS ON FAN FLANGES AND SEAL ANY OPENINGS BETWEEN FLANGES WITH BLACK FURNACE CEMENT.

8. WHEN THE INDUCED DRAFT FAN AND THE SMOKEHOOD ELBOWS ARE COMPLETELY ASSEMBLED AND TIGHT, LEVEL UP THE ASSEMBLY AND CENTER THE CONNECTIONS TO THE ADAPTER FRAMES AND TIGHTEN NUTS TO FASTEN THE SMOKEHOOD ELBOWS TIGHT TO THE ADAPTER FRAMES. SEAL OPENINGS BETWEEN FLANGES AND ADAPTER FRAMES WITH BLACK FURNACE CEMENT.

9. AFTER THE INDUCED DRAFT FAN AND SMOKEHOOD ELBOWS ARE INSTALLED, POSITION THE DAMPER SPINDLE SUPPORT BEARINGS, INSERT THE DAMPER SPINDLE WITH END HAVING "FLAT" ON L.H. SIDE, THEN TIGHTEN THE NUTS TO HOLD THE BRACKETS. (SEE FIGURE NO. 22). SEE THAT MAIN DAMPER SPINDLE TURNS FREELY.

10. SLIP THE OPERATING ARM ON THE RIGHT HAND END OF MAIN DAMPER SPINDLE AND THE QUADRANT ON THE LEFT HAND END OF MAIN DAMPER SPINDLE. PLACE THE DAMPERS IN THE L.H. ELBOW IN THE CLOSED POSITION, THEN TIGHTEN QUADRANT SET SCREW ON THE FLAT OF MAIN DAMPER SPINDLE. NEXT PLACE BOTH DAMPERS IN THE CLOSED POSITION AND FASTEN CRANK ARM TO R.H. END OF MAIN DAMPER SPINDLE BY TIGHTENING LOCKING NUT. CHECK THE OPERATION THROUGH THE FULL TRAVEL. IF THE DAMPERS AND LINKAGE DO NOT MOVE FREELY, CHECK THE ENTIRE ASSEMBLY FOR RESTRICTION. THE ALIGNMENT OF THE LINKAGE IS THE MOST LIKELY SOURCE OF EXCESSIVE FRICTION. ADJUST ALIGNMENTS UNTIL FREE OPERATION IS OBTAINED.

11. AFTER ASSEMBLY OF THE ACTUATOR TO THE BRACKET, CONNECT THE DRIVE LINKAGE BETWEEN THE DAMPER MOTOR AND THE PIVOT PLATE, AS ILLUSTRATED WITH THE DAMPER BLADES IN THE CLOSED POSITION. IT MAY BE NECESSARY TO POWER THE CONTROL AND RE-POSITION THE BRACKET ON THE DAMPER MOTOR SPINDLE TO MATCH FIGURE NO. 23.

12. OPEN CLEANOUT COVERS ON SMOKEHOOD ELBOWS TO CHECK DAMPER POSITIONS. RIGHT AND LEFT HAND MUST BE THE SAME.

DRAFT CONTROL DAMPER (WING)

1. THE BAROMETRIC TYPE DRAFT CONTROL DAMPER OR THE MOTOR OPERATED BYPASS TYPE DAMPER BOTH ARE TO BE INSTALLED ON THE REAR SIDE OF THE INDUCED DRAFT FAN ASSEMBLY USING BOLTS, NUTS AND WASHERS AS REQUIRED.

2. WHEN USING THE BAROMETRIC TYPE DAMPER, THE COUNTER-WEIGHTS WILL BE ADJUSTED TO OBTAIN THE OVERFIRE DRAFT REQUIRED BY THE BURNER INSTALLER.

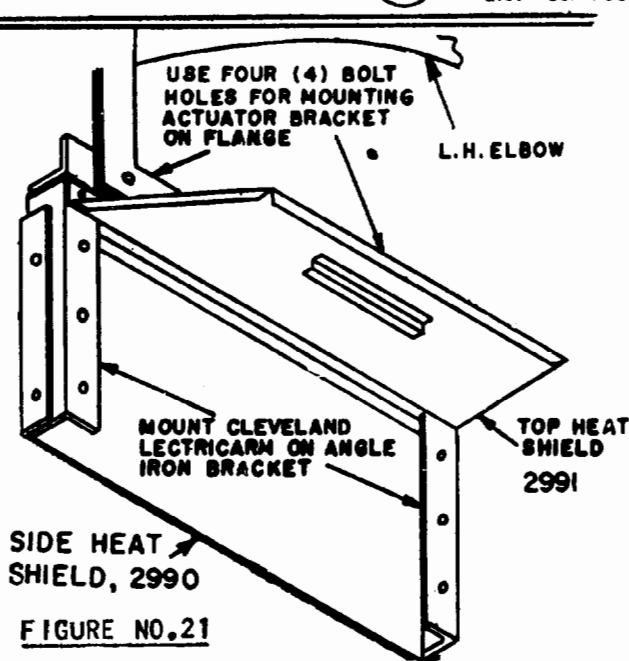
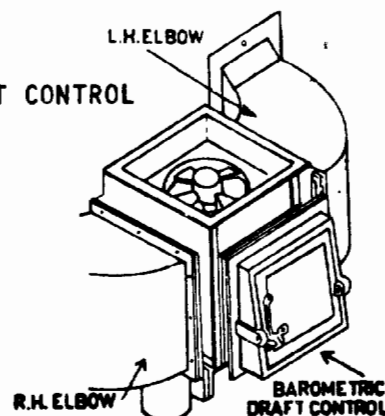
3. WHEN USING THE MOTOR OPERATED BYPASS TYPE DAMPER, THE MOTOR OPERATOR IS NOT FURNISHED BY THE H.B. SMITH CO. THE DAMPER MOTOR BRACKET AND LINKAGE SHOULD BE LEFT READY FOR THE USE OF THE BURNER INSTALLER WHO WILL SET, CONNECT AND ADJUST THE DAMPER OPERATING EQUIPMENT.

4. WHEN USING THE MOTOR OPERATED SHUTTER DAMPER, THE SMOKEHOOD ELBOWS ARE SHIPPED WITH THE DAMPERS AND LINKAGE INSTALLED.

5. AFTER THE INDUCED DRAFT FAN AND SMOKEHOOD ELBOWS ARE INSTALLED, POSITION THE DAMPER SPINDLE SUPPORT BEARINGS, INSERT THE DAMPER SPINDLE AND TIGHTEN THE NUTS TO HOLD THE BRACKETS IN POSITION. (SEE FIG. 22).

6. INSTALL THE OPERATING ARM ON THE RIGHT HAND END OF THE SHAFT AND THE QUADRANT ON THE LEFT HAND END OF THE SHAFT. CONNECT THE DAMPER LINKAGE TO THE CONNECTING SHAFT ARMS. PLACE BOTH DAMPERS IN BOTH ELBOWS IN THE CLOSED POSITION AND SET BOTH THE OPERATING ARM AND THE QUADRANT ON THE SHAFT BY TIGHTENING THE LOCKNUT NUT AND SET SCREW. CHECK THE OPERATION THROUGHOUT THE FULL TRAVEL. IF THE DAMPERS AND LINKAGE DO NOT MOVE FREELY, CHECK THE ENTIRE ASSEMBLY FOR RESTRICTION. THE ALIGNMENT OF LINKAGE IS THE MOST LIKELY SOURCE OF EXCESSIVE FRICTION. ADJUST ALIGNMENTS UNTIL FREE OPERATION IS OBTAINED.

BAROMETRIC DRAFT CONTROL
ON WING FAN
FIGURE NO.20



DRAFT CONTROL DAMPER MOTOR MOUNTING

1. THE MOTOR OPERATOR IS NOT FURNISHED BY THE H.B. SMITH CO. THE DAMPER MOTOR BRACKET AND LINKAGE SHOULD BE LEFT READY FOR THE USE OF THE BURNER INSTALLER WHO WILL SET, CONNECT AND ADJUST THE DAMPER OPERATING EQUIPMENT.

2. FIG. NO. 21 ILLUSTRATES THE ANGLE IRON MOUNTING BRACKET WITH THE TOP AND SIDE HEAT SHIELDS IN POSITION.

SHUTTER DAMPER LINKAGE

FIGURE NO. 22

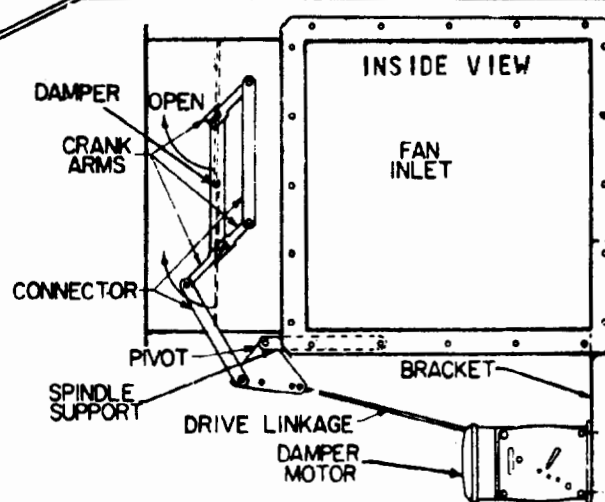
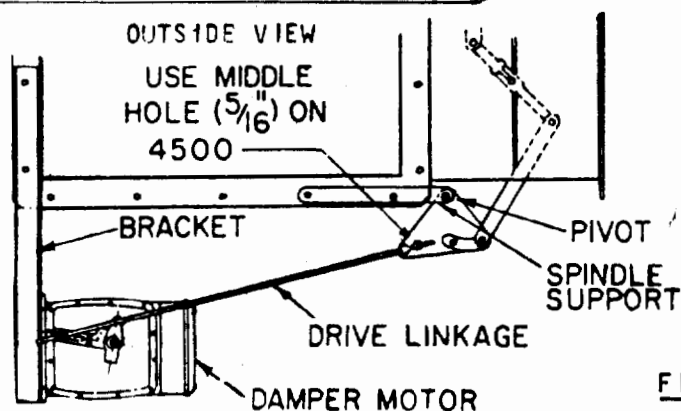
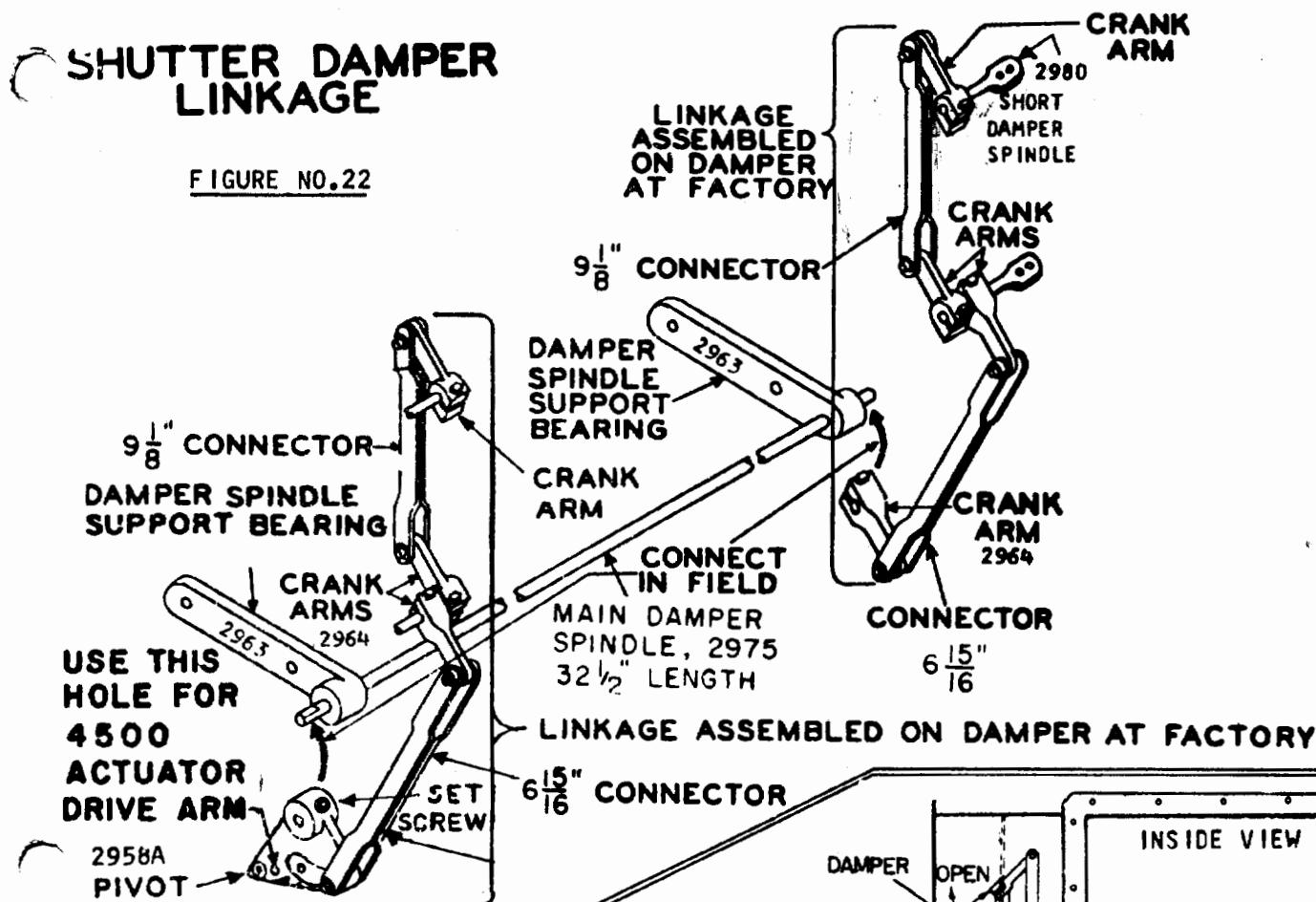


FIGURE NO. 23

WHITTY FAN INSTALLATION

1. INSTALL THE SMOKEHOOD ADAPTER FRAMES (3335 & 3336) ON THE BACK SECTIONS USING 7/16" x 2-1/2" MACHINE BOLTS WITH ONE WASHER. THE ROPE SEAL IS APPLIED TO THE FRAMES AT THE FACTORY, BUT CARE MUST BE TAKEN TO MAKE SURE THAT THE ROPE HAS NOT TWISTED DURING SHIPMENT. LINE UP REAR SECTION AND TIGHTEN ALL THE FASTENING BOLTS. SEE FIGURE NO. 27.
2. SEAL ALL OPENINGS BETWEEN THE REAR SECTION AND THE FLANGE OF THE ADAPTER FRAMES WITH BLACK FURNACE CEMENT.
3. REMOVE CLEANOUT COVERS FROM SMOKEHOOD. ASSEMBLE THE 5/16" SQUARE HEAD MACHINE BOLTS AND SQUARE NUTS WITH ONE WASHER EACH LOOSELY ON THE FLANGES OF THE SMOKEHOOD ELBOWS. SEE FIGURE NOS. 24 AND 27.

4. PLACE SMOKEHOOD UP AGAINST ADAPTER FRAMES AND ENGAGE BOLTS WITH SLOTS IN THE FRAMES. ASSEMBLE THE BOLTS TO THE TOP AND BOTTOM OF THE SMOKEHOOD THROUGH THE CLEANOUT COVER OPENING, ADDING THE NUTS AND WASHERS ON THE OUTSIDE OF THE FLANGE. ASSEMBLE AND TIGHTEN THE REMAINING BOLTS, NUTS, AND WASHERS ON THE INSIDE FLANGES. REPLACE CLEANOUT COVERS.
5. SUPPORT THE FAN HOUSING AND MOTOR UNIT IN POSITION AGAINST THE SMOKEHOOD MATCHING THE HOLES IN THE THIMBLE WITH THE 1/2" STUDS. ASSEMBLE THE 1/2" HEX NUTS AND TIGHTEN.
6. PREPARE THE 2" PIPE STAND LEG (NOT FURNISHED) AND ASSEMBLE TO THE COUPLING PRIOR TO SLIDING THE PLATE UNDER THE MOTOR BASE SUPPORTS. SEE FIG. NO. 24 AND FIG. NO. 28. SLIDE STAND LEG PLATE IN POSITION, ASSEMBLE BOLTS AND NUTS, THEN TIGHTEN. ADJUST PIPE TO SUPPORT WEIGHT OF UNIT.

SERIES 450 MILLS WATER TUBE BOILER

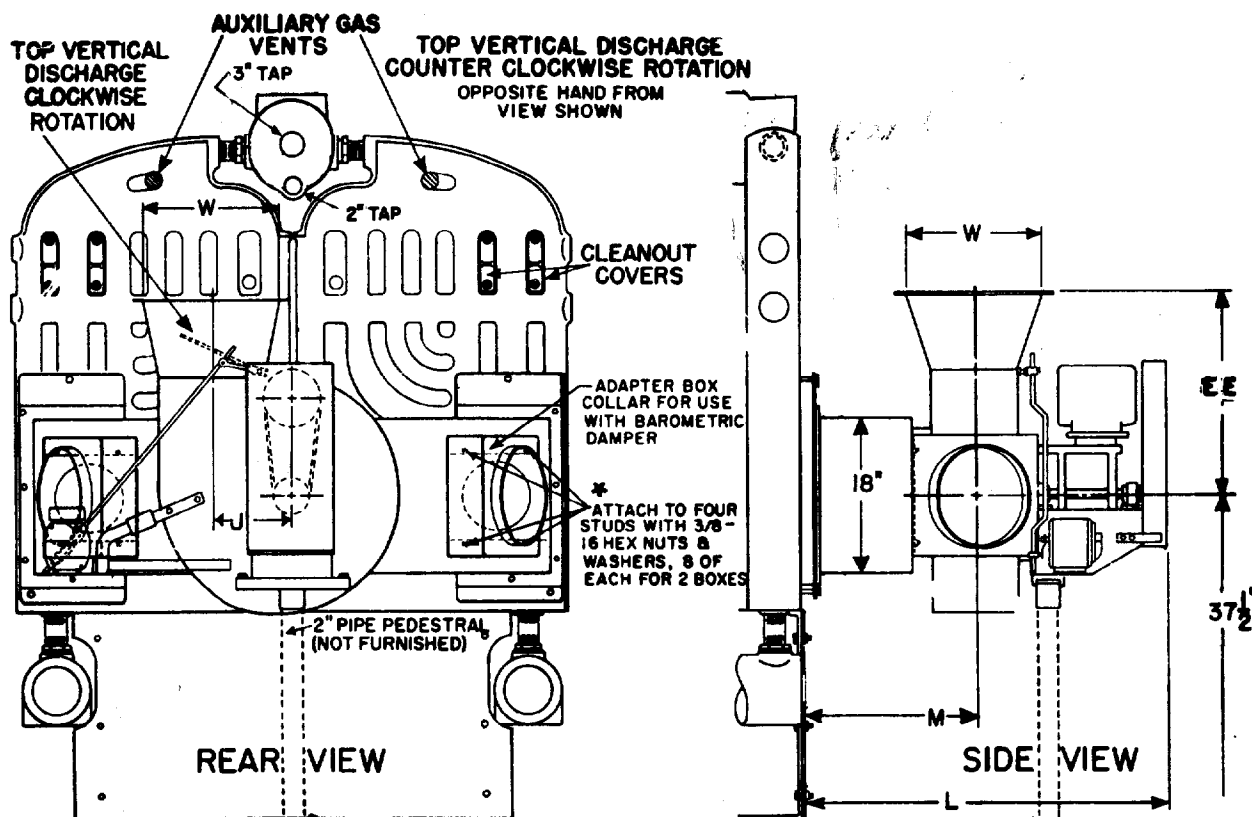


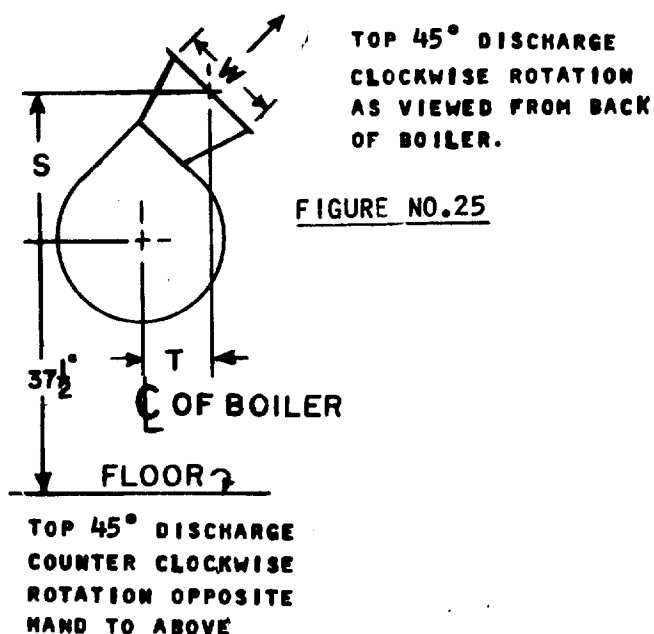
FIGURE NO.24

WHITTY FAN INSTALLATION SHOWING OPTIONAL ADAPTER BOX AND BAROMETRIC COLLAR TO FACE AWAY FROM FAN.

*NOT USED WITH MOTOR DRIVEN DISCHARGE DAMPER

WHITTY FAN DIMENSIONS (Inches)

No. of Sections	J	L	M	S	T	W	EE
8-14	9 $\frac{3}{8}$	40 $\frac{3}{8}$	19	19	5 $\frac{3}{8}$	14	17 $\frac{1}{2}$
15-22	11 $\frac{1}{4}$	42 $\frac{1}{4}$	20	22 $\frac{3}{8}$	7	16	21

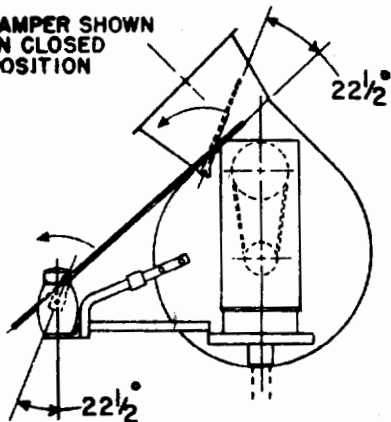


ACTUATOR INSTALLATION

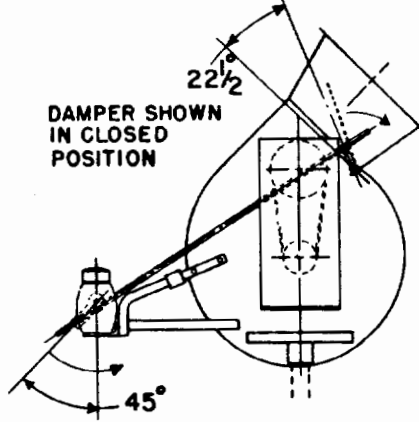
1. PLACE THE ACTUATOR IN POSITION ON THE MOUNTING ANGLE BRACKET WITH THE RED POSITION INDICATOR AWAY FROM THE BOILER. USE $1/4" \times 5/8"$ SQUARE HEAD BOLTS (3). SEE FIGURE NO. 26.
2. SEE PREFERRED INSTRUMENTS BULLETIN SD1 DM-1 DATED 11/65 FOR ADJUSTMENT AND MAINTENANCE OF MOTOR ACTUATORS. PAGE 4, PARAGRAPH "DAMPER LINKAGE" COVERS DETAIL OF LINKAGE ASSEMBLY.
3. SEE FIGURE NO. 26 FOR LINKAGE POSITION ON STANDARD VERTICAL DISCHARGE FAN INSTALLATIONS. (OPTIONAL DISCHARGE POSITION REQUIRES DIFFERENT CRANK ARM AND LINKAGE POSITIONS.

4. ASSEMBLE D5-600 $5/16"-18$ THREAD BALL JOINT CONNECTOR STUD TO THE D5-600 CRANK ARM.
5. ASSEMBLE D5-602 $1/4"-28$ THREAD BALL JOINT CONNECTOR STUD TO THE DAMPER CRANK OF THE DAMPER CRANK SHAFT. ADJUST CRANK ARM TO POSITION SHOWN IN FIGURE NO. 26 FOR DISCHARGE POSITION REQUIRED.
6. CONNECT PUSH ROD BETWEEN ACTUATOR CRANK ARM AND DAMPER CRANK ARM. TIGHTEN SET SCREWS TO LOCK PUSH ROD IN POSITION AS ILLUSTRATED. CHECK TO BE SURE ALL THREADED PARTS ARE DRAWN UP TIGHT.

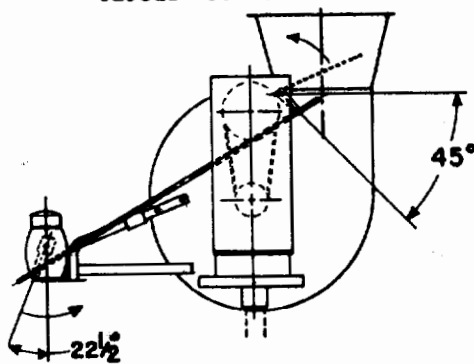
TOP 45° DISCHARGE
COUNTER-CLOCKWISE ROTATION
DAMPER SHOWN
IN CLOSED
POSITION



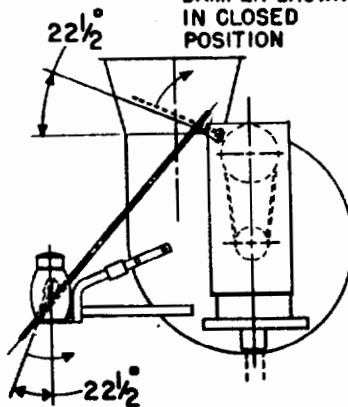
TOP 45° DISCHARGE
CLOCKWISE ROTATION
DAMPER SHOWN
IN CLOSED
POSITION



TOP VERTICAL DISCHARGE
COUNTER-CLOCKWISE ROTATION
DAMPER SHOWN
IN CLOSED
POSITION

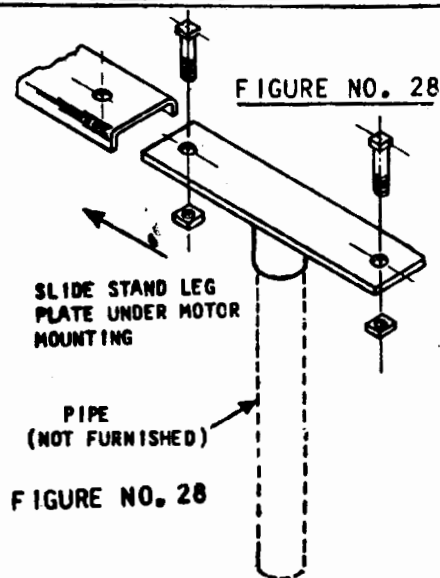
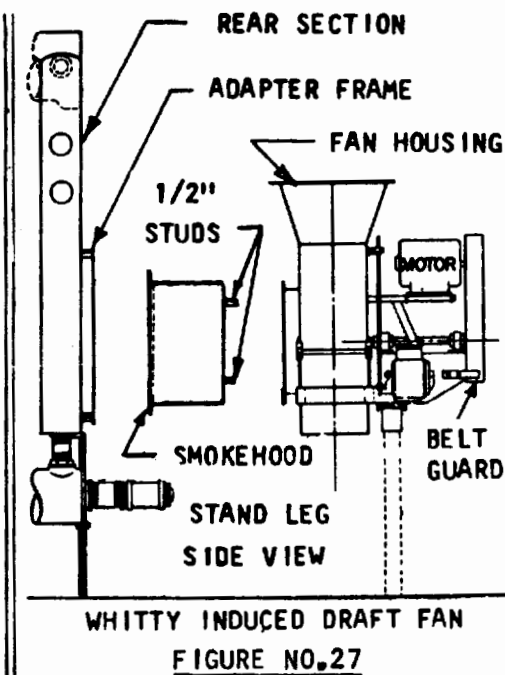


TOP VERTICAL DISCHARGE
CLOCKWISE ROTATION
DAMPER SHOWN
IN CLOSED
POSITION

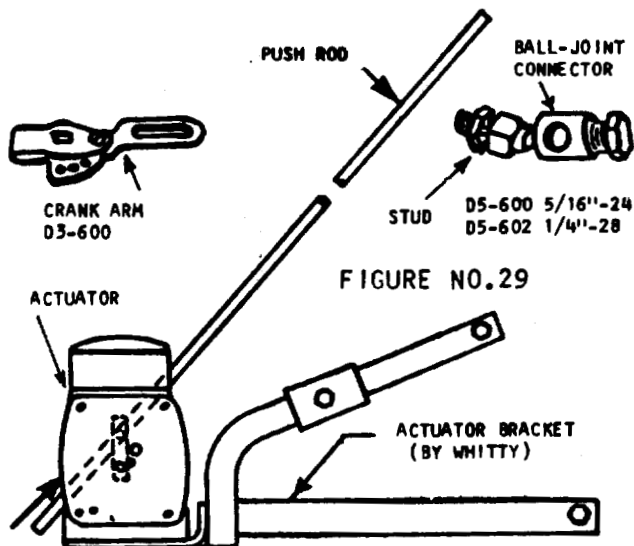


WHITTY INDUCED DRAFT FAN ACTUATOR INSTALLATION
AS VIEWED FROM BACK OF BOILER

FIGURE NO. 26



SERIES 450 MILLS WATER TUBE BOILER



INDUCED DRAFT FAN DISCHARGE DAMPER ACTUATOR PARTS

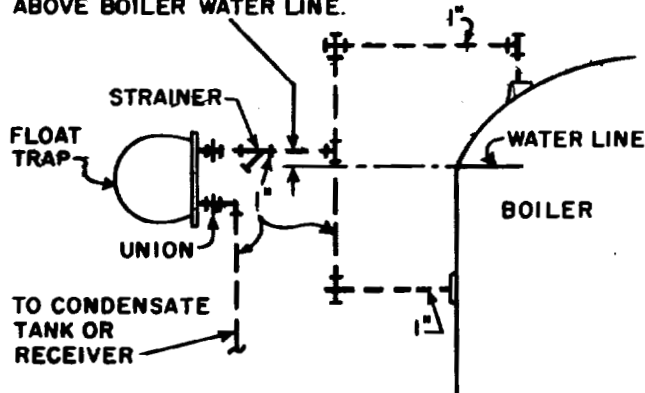
CAT. NO.	DESCRIPTION
ACTUATOR PARTS	
DM-1 3276	P. I. MOTOR ACTUATOR 24 V. DAMPER CRANK FOR WHITTY FAN DAMPER ASSEMBLY.
D3-600	CRANK ARM FOR MOTOR ACTUATOR, ADJ. RADIUS OF FROM 1-13/16" TO 2-7/8".
D5-600	5/16"-24 DIA. STUD-USE WITH D3-600 CRANK ARM.
D5-602	1/4"-28 DIA. STUD-USE WITH D3-601 CRANK ARM.
D5-100	PUSH ROD, 5/16" DIA. X 48" LONG PLATED STEEL SHAFT.

PUTTING COLD BOILER INTO SERVICE OR CHANGING WATER LEVEL UNDER STEAM PRESSURE

THE FOLLOWING PROCEDURE WILL PREVENT "STEAM HAMMER" CAUSED BY THE INTRODUCTION OF SYSTEM STEAM INTO THE PIPING AND STEAM SPACE OF A COLD BOILER:

1. CLOSE VALVES ON SUPPLY, RETURN AND EQUALIZING PIPING SO AS TO ISOLATE THE COLD BOILER FROM THE SYSTEM.
2. IF WATER LEVEL ADJUSTMENT IS NECESSARY, ADD OR DRAW OFF WATER TO DESIRED LEVEL.
3. START THE BURNER AND ALLOW STEAM PRESSURE TO BUILD UP TO EQUAL SYSTEM PRESSURE.
4. OPEN RETURN VALVE TO ALLOW FEED WATER TO ENTER THE BOILER. THEN OPEN THE SUPPLY VALVE SLOWLY UNTIL BOILER PRESSURE AND SYSTEM PRESSURE ARE EQUAL AND THE VALVE FULLY OPEN. THEN OPEN EQUALIZING VALVE, IF ONE HAS BEEN SUPPLIED.
5. THE BOILER IS NOW "ON LINE" AND SHOULD BE ALLOWED TO OPERATE ON AUTOMATIC CONTROL.

SET OVERFLOW LEVEL 2" OR 3" ABOVE BOILER WATER LINE.



SUGGESTED PIPING FOR OVERFLOW TRAP TO PREVENT FLOODING OF IDLE BOILERS IN MULTIPLE BOILER INSTALLATIONS WITH INDIVIDUAL WATER LEVEL CONTROL AND NO EQUALIZING CONNECTIONS.

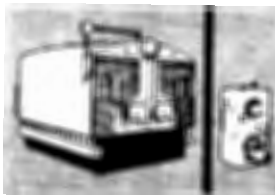
NOTE 1:

THE INSTALLATION OF THE BOILER, BURNER, FUEL STORAGE TANK, CONTROLS, WIRING, CHIMNEY CONNECTION, PROVISION FOR COMBUSTION AND VENTILATION AIR SUPPLY AND OTHER ASSOCIATED EQUIPMENT MUST CONFORM TO THE REQUIREMENTS OF LOCAL AUTHORITIES HAVING JURISDICTION OR, IN THE ABSENCE OF SUCH REQUIREMENTS, WITH THE "STANDARDS FOR OIL BURNING EQUIPMENT", NFPA NO. 31 AND/OR LATEST EDITION OF NATIONAL FUEL GAS CODE ANSI Z223.1.

NOTE 2:

JACKET ASSEMBLY INSTRUCTIONS FOR THE 450 SERIES BOILERS ARE PUBLISHED IN A SEPARATE CATALOG.

THE
HB Smith
COMPANY, INC.
WESTFIELD, MASSACHUSETTS
Established 1853



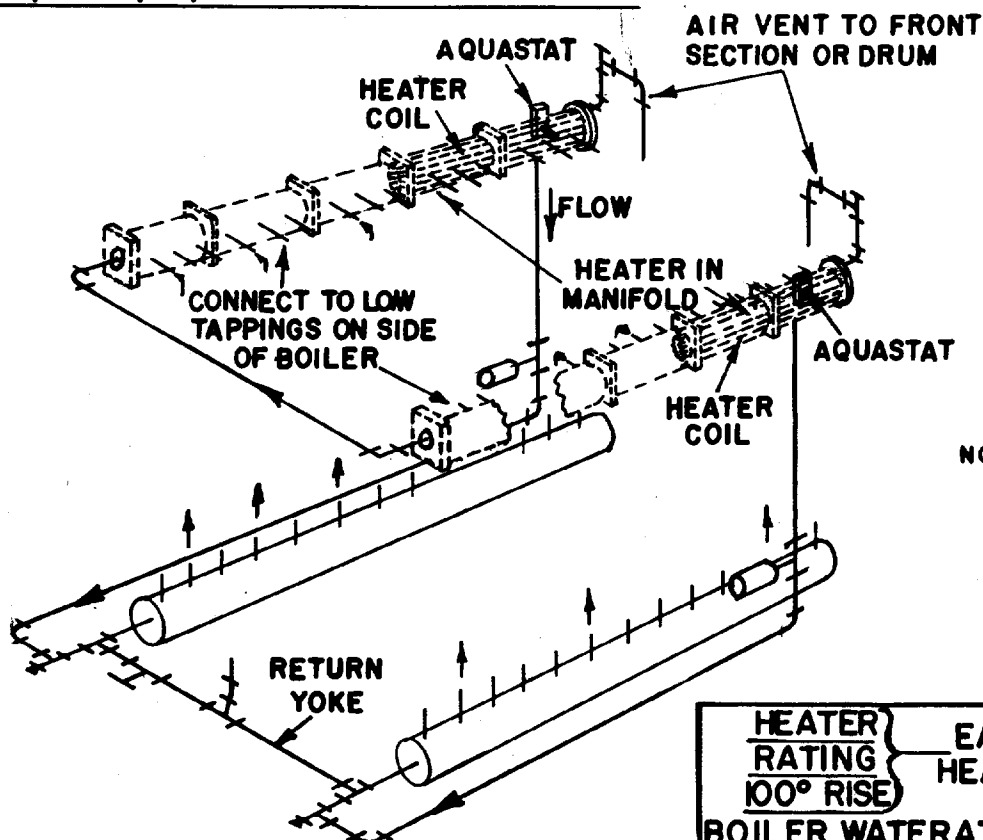
H. B. SMITH CO., INC.,

WESTFIELD
MASS.

DWG. B-2107

ITEM	DESCRIPTION	PATT. NO.	CAT. NO.	MAT'L.
	RECOMMENDED TANKLESS HEATER			

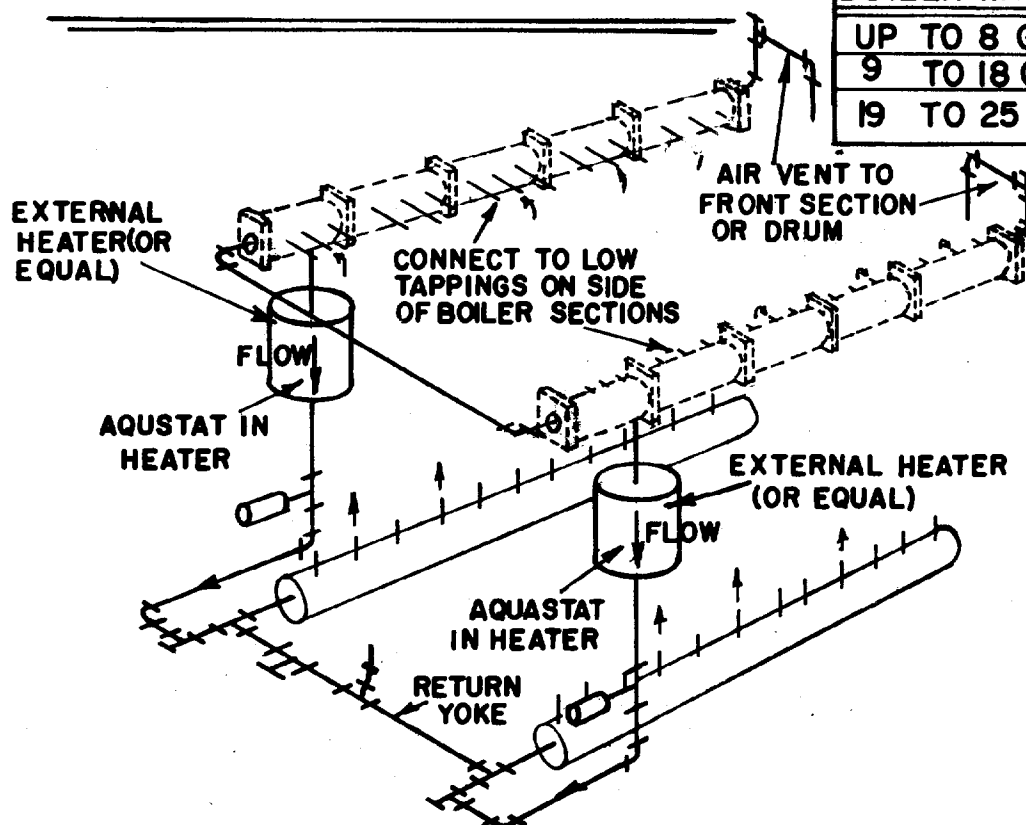
ARRANGEMENTS (2 HEATERS) FOR 450, 4500, 60 & 640 STEAM BOILERS



NOTE: AQUASTAT TO CONTROL BURNER OPERATION, CIRCULATOR TO RUN CONTINUOUSLY.

FIELD PIPING EQUAL TO PUMP SIZES.

HEATER RATING 100° RISE	EACH HEATER	PUMP SIZE
BOILER WATER AT 200°		
UP TO 8 GPM		1-1/2
9 TO 18 GPM		2
19 TO 25 GPM		2-1/2

SCALE *1/2"*DR. BY *R.P.A.*APPR. BY *IAE*DATE *11-28-66*