AMES IRON WORKS

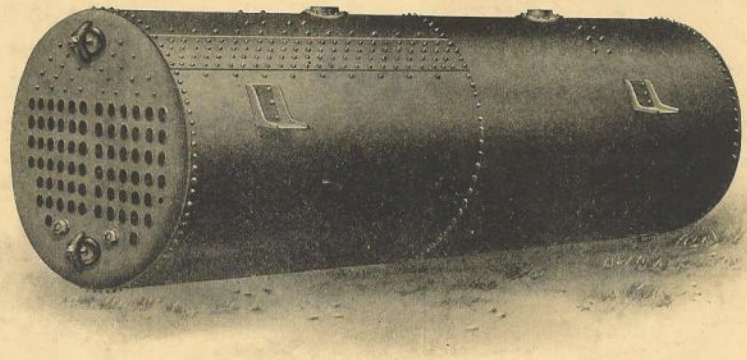
ENGINES **AMES IRON WORKS** BOILERS

OSWEGO, N.Y., U.S.A.

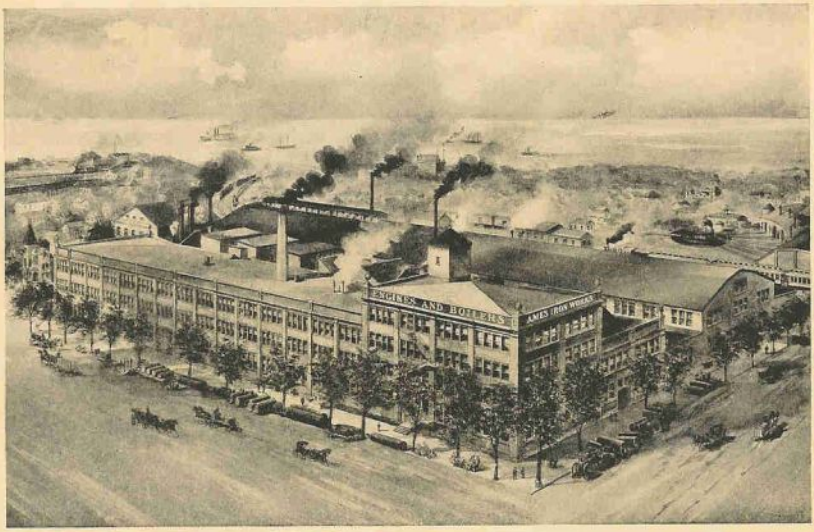
Bulletin No. 58

Horizontal Tubular Boilers

100, 125 and 150 Pounds Steam



Horizontal Tubular Boiler—Flush Front—125 and 150 Pounds Steam



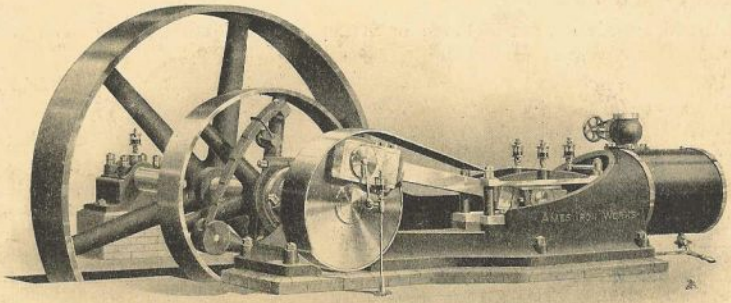
Ames Iron Works—Main Office and Works, Oswego, N. Y.

ENGINES **AMES IRON WORKS** BOILERS

OSWEGO, N.Y., U.S.A.

Bulletin No. 57

Regal Engines—Automatic Type



REGAL ENGINE—AUTOMATIC TYPE (RIGHT HAND)

Foundation Bolts and Steam-Cocks with Lever Connection for Cylinder-Drip are not furnished unless ordered, and at extra price.

THE Regal Automatic Engine, illustrated above, is offered to the trade in response to a demand for a moderate speed, moderate priced, thoroughly up-to-date side-crank automatic engine. The valve, fully balanced, gives a double opening for steam admission, being similar to that used in our high-grade automatic engines—viz., a flat casting working between seat and pressure-plate (this plate is maintained at proper distance by strips of iron slightly thicker than the valve and the wear of valve is corrected by scraping these strips). Locomotive guides and forged-steel connecting-rod fitted with crank-pin box of cast-iron lined with genuine babbitt, and provided with approved method of adjustment are features of this engine. Sizes Nos. 5, 6, 7 and 8 are fitted with adjustable quarter-boxes for the main-bearings.

An approved type of shaft-governor is used, combining the inertia and centrifugal principles in an extremely simple construction. The regulation is exceptionally close and all that the most exacting requirements of modern practice demand. By simply altering tension of the spring, without in any way changing the weight, speed of engine can be changed through a wide range. The simplicity and reliability of this governor insures little or no trouble in service.

Every engine is thoroughly tested under steam previous to shipment.

Regal Automatic Engines, Complete, all sizes, are furnished with full set sight-feed oil-cups, including wiper attachment for crosshead and centrifugal-oiler with floor-stand for crank-pin, one steam-chest drip-cock, two globe-valves for cylinder-drip, outboard-bearing, governor pulley complete, belt-pulley, throttle-valve, sight-feed lubricator and two wrenches.

Anything ordered, not included in the above list of fixtures, will be charged as an extra.

Foundation bolts and steam-cocks with lever connection for cylinder-drip shown in cut, are not furnished unless ordered, and at extra price.

All foundation bolts, unless otherwise ordered, are four feet eight inches to six feet in length (depending on size of engine), suitable for brick, stone or cement foundation.

No. of Size	Cylinder		Horse-Power as Usually Rated	Revolutions per Minute	Belt Pulley		Diam. Steam Pipe	Diam. Exhaust Pipe	Diam. Crank-Pin	Length Crank-Pin	Diam. Cross-head Pin	Length Cross-head-Pin	Diam. Shaft	Length Main Bearing	Length Over All Including Pulley		Width Over All		Weight Complete
	Diam. Inches	Stroke Inches			Diam. Inches	Face Inches									Feet	Inches	Feet	Inches	
3	12	15	60– 70	190–215	72	12½	3	3½	4⅞	3½	2⅝	3¾	5⅛	11	10	8	6	4	5800
4	13	15	70– 80	190–215	72	14½	3	3½	4⅞	3½	2⅝	3¾	5⅛	11	10	8	6	4	5900
5	14	18	85–100	160–185	84	17½	4	5	5⅜	4½	3⅜	4½	6⅛	13	12	6	7	4	9700
6	16	18	110–125	160–185	84	22½	4	5	5⅜	4½	3⅜	4½	6⅛	13	12	6	7	4	10200
7	19	22	165–200	140–160	96	23	5	6	6½	5	3½	5	8	17	15	6	9	9	18300
8	22	22	225–250	140–160	96	26	6	7	6½	5	3⅝	5	8	17	15	6	9	9	18800

Above ratings are based on a M. E. P. of 38 pounds, corresponding to a steam pressure at engine throttle of about 80 pounds.

These engines can be set to run either over or under, as desired. Unless otherwise ordered, they will always be arranged to run over, and at the lowest number of revolutions given above.

Pulleys of larger diameter or wider face than above specified, if ordered, will be charged extra.

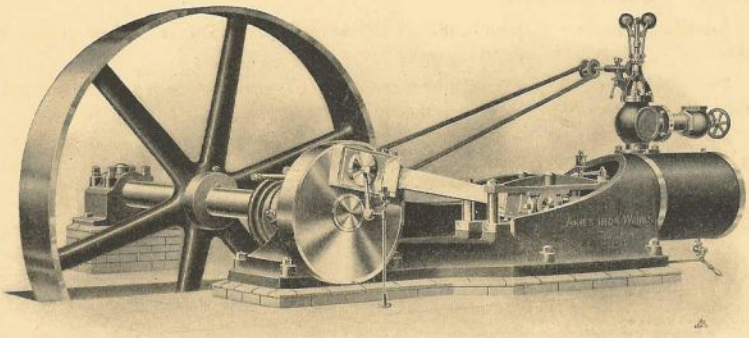
All sizes can be built either right or left hand. Unless otherwise ordered, they will be furnished right hand as shown in cut.

ENGINES **AMES IRON WORKS** BOILERS

OSWEGO, N.Y., U.S.A.

Bulletin No. 55

Regal Engines—Throttling Type



Foundation Bolts and Steam-Cocks with Lever Connection for Cylinder-Drip are not furnished unless ordered, and at extra price.

THE Regal Throttling Engine, illustrated above, is built with a balanced slide-valve, similar in general construction to that used in our high-grade automatic engines—viz., a flat casting working between seat and pressure-plate (this plate is maintained at proper distance by strips of iron slightly thicker than the valve and the wear of valve is corrected by scraping these strips), locomotive guides, forged-steel connecting-rod fitted with crank-pin box of cast-iron lined with genuine babbitt, and provided with approved method of adjustment. The bearings are large, as reference to table of dimensions will show, and the wearing surfaces very liberal throughout.

Sizes Nos. 5, 6, 7 and 8 are fitted with adjustable quarter-boxes for the main bearings. All sizes can be furnished either right or left hand. Unless otherwise specified, they will always be furnished right hand as shown in cut. Every engine is thoroughly tested under steam previous to shipment.

Regal Throttling Engines, Complete, all sizes, are furnished with oil-cups, including wiper attachment for crosshead and centrifugal-oiler with floor-stand for crank-pin, one steam-chest drip-cock, two globe-valves for cylinder-drip, outboard-bearing complete, belt pulley, automatic-stop governor, governor belt, throttle-valve, sight-feed lubricator and two wrenches.

Anything ordered, not included in the above list of fixtures, will be charged as an extra.

Foundation bolts and steam-cocks with lever connection for cylinder-drip shown in cut, are not furnished unless ordered, and at extra price.

All foundation bolts, unless otherwise ordered, are four feet eight inches to six feet in length (depending on size of engine), suitable for brick, stone or cement foundation.

No. of Size	Cylinder		Horse-Power as Usually Rated	Revolutions per Minute	Pulley		Diam. Steam Pipe	Diam. Exhaust Pipe	Diam. Crank-Pin	Length Crank-Pin	Diam. Cross-head Pin	Length Cross-head Pin	Diam. Shaft	Length Main Bearing	Length Over All Including Pulley		Width Over All		Weight Complete
	Diam. Inches	Stroke Inches			Diam. Inches	Face Inches									Feet	Inches	Feet	Inches	
3	12	15	50– 60	160–190	72	12⅜	3	3½	4⅞	3⅞	2⅝	3⅝	5½	11	10	8	6	4	4900
4	13	15	60– 70	160–190	72	14½	3	3½	4⅞	3⅞	2⅝	3⅝	5½	11	10	8	6	4	5000
5	14	18	75– 85	140–160	84	17½	4	5	5⅝	4½	3⅜	4½	6¼	13	12	6	7	4	8600
6	16	18	100–110	140–160	84	22½	4	5	5⅝	4½	3⅜	4½	6¼	13	12	6	7	4	9100
7	19	22	150–165	125–140	96	23	5	6	6½	5	3½	5	8	17	15	6	9	9	17200
8	22	22	200–225	125–140	96	26	6	7	6½	5	3½	5	8	17	15	6	9	9	17700

Above ratings are based on a M. E. P. of 38 pounds, corresponding to a steam pressure at engine throttle of about 80 pounds.

These engines can be set to run either over or under, as desired. Unless otherwise ordered, they will always be arranged to run over, and at the lowest number of revolutions given above.

Pulleys of larger diameter or wider face than above specified, will be furnished, if ordered, at extra price.

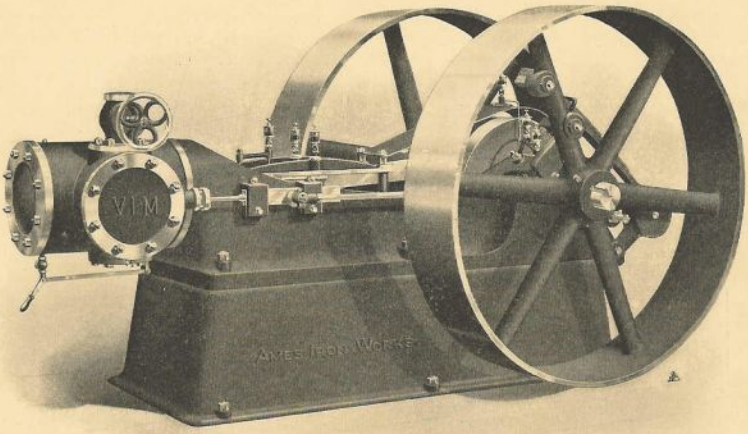
Adjustable sole-plate for outboard-bearing will be furnished, if ordered, at extra price.

ENGINES **AMES IRON WORKS** BOILERS

OSWEGO, N.Y., U.S.A.

Bulletin No. 54

Vim Engines—Automatic Type



Sub-Base, Foundation Bolts and Steam-Cocks with Lever Connection for Cylinder-Drip are not furnished unless ordered, and at extra price.

THESE up-to-date engines, illustrated above, are built with a balanced slide-valve, similar in general construction to that used in our high-grade automatic engines—viz., a flat casting working between seat and pressure-plate (this plate is maintained at proper distance by strips of iron slightly thicker than the valve and the wear of valve is corrected by scraping these strips), locomotive guides, steel crank-shaft with disc counter-weights, forged-steel connecting-rod fitted with crank-pin box of cast-iron lined with genuine babbitt, and provided with approved method of adjustment. The bearings are large, as reference to table of dimensions will show, and the wearing surfaces very liberal throughout.

An approved type of shaft-governor is used, combining the inertia and centrifugal principles in an extremely simple construction. The regulation is exceptionally close and all that the most exacting requirements of modern practice demand. By simply altering tension of the spring, without in any way changing the weight, speed of engine can be changed through a wide range. The simplicity and reliability of this governor insures little or no trouble in service.

The oil required for lubricating crank-pin drops from the sight-feed cup on crank-case through tube to a groove in side of disc and thence to center of pin. This arrangement, which permits feeding any required amount of oil to pin, insures positive lubrication and continuous operation of engine.

Every engine is thoroughly tested under steam previous to shipment.

Vim Automatic Engines, Complete, all sizes, are furnished with full set of sight-feed oil-cups, including wiper attachment for crosshead, one steam-chest drip-cock, two globe-valves for cylinder-drip, governor-pulley complete, opposite pulley, throttle-valve, sight-feed lubricator and two wrenches.

Anything ordered, not included in the above list of fixtures, will be charged as an extra.

Sub-base, foundation bolts and steam-cocks with lever connection for cylinder-drip shown in cut, are not furnished unless ordered, and at extra price.

All foundation bolts, unless otherwise ordered, are three to five feet in length (depending on size of engine), suitable for brick, stone or cement foundation.

No. of Size	Cylinder		Horse-Power as Usually Rated	Revolutions per Minute	Pulleys			Diam. Steam Pipe	Diam. Exhaust Pipe	Diam. Crank-Pin	Length Crank-Pin	Diam. Crosshead-Pin	Length Crosshead-Pin	Diam. Shaft Bearings	Length Shaft Bearings	Length Over All Including Pulleys		Width Over All Including Pulleys		Weight Compl'te with Sub-Base	Weight Compl'te without Sub-Base
	Diam. Inches	Stroke Inches			Diam. Inches Each	Face Inches Gov. Wheel	Face Inches Oppo. Wheel									Feet	Ins.	Feet	Ins.		
3	7	8	16– 18	300–325	34	9½	9½	2	2½	2⅝	2½	1¼	2½	2⅜	6	5	10	3	6½	2250	1950
5	8	8	20– 22	300–325	34	9½	9½	2	2½	2⅝	2½	1¼	2½	2⅜	6	5	10	3	6½	2300	2000
6	8	10	25– 28	275–300	40	10½	10½	2	2½	3⅜	3	2	3	3½	7½	7	1	4	1	3250	2750
7	9	10	30– 35	275–300	40	10½	10½	2	2½	3⅜	3	2	3	3½	7½	7	1	4	1	3300	2800
8	10	12	40– 45	240–265	54	12½	12½	2½	3	$4\frac{7}{16}$	3½	$2\frac{7}{16}$	3½	3½	10½	8	7½	5	1	5200	4300
9	11	12	50– 55	240–265	54	12½	12½	2½	3	$4\frac{7}{16}$	3½	$2\frac{7}{16}$	3½	3½	10½	8	7½	5	1	5300	4400
10	12	15	60– 70	190–215	66	13½	15½	3	3½	4½	3½	2½	3½	4½	12½	10	5	5	9½	7550	6400
11	13	15	70– 80	190–215	66	13½	15½	3	3½	4½	3½	2½	3½	4½	12½	10	5	5	9½	7650	6500
12	14	18	85–100	160–185	72	16½	16½	4	5	5⅜	4½	3⅜	4½	5½	14½	12	...	6	7½	11700	9900
13	16	18	110–125	160–185	72	16½	20½	4	5	5⅜	4½	3⅜	4½	5½	14½	12	...	6	7½	12250	10450

Above ratings are based on a M. E. P. of 38 pounds, corresponding to a steam pressure at engine throttle of about 80 pounds.

These engines can be set to run either over or under, as desired. Unless otherwise ordered, they will always be arranged to run over, and at the lowest number of revolutions given above.

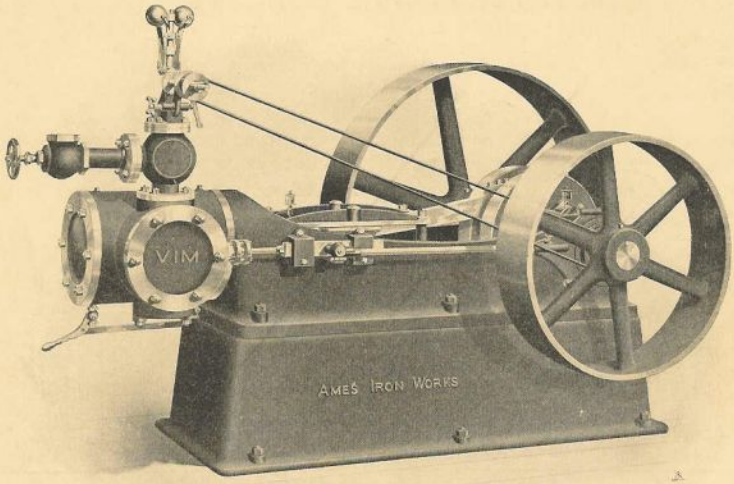
Pulleys of larger diameter or wider face than above specified, will be furnished, if ordered, at an extra price.

The governor-pulley cannot be made of less diameter than standard.

ENGINES AMES IRON WORKS BOILERS
OSWEGO, N.Y., U.S.A.

Bulletin No. 53

Vim Engines—Throttling Type



Sub-Base, Foundation Bolts and Steam-Cocks with Lever Connection for Cylinder-Drip are not furnished unless ordered, and at extra price.

THESE up-to-date engines, illustrated above, are built with a balanced slide-valve, similar in general construction to that used in our high-grade automatic engines—viz., a flat casting working between seat and pressure-plate (this plate is maintained at proper distance by strips of iron slightly thicker than the valve and the wear of valve is corrected by scraping these strips), locomotive guides, steel crank-shaft with disc counter-weights, forged-steel connecting-rod fitted with crank-pin boxes of

cast-iron lined with genuine babbitt, and provided with approved method of adjustment. The bearings are large, as reference to table of dimensions will show, and the wearing surfaces very liberal throughout. Every engine is thoroughly tested under steam previous to shipment.

The oil required for lubricating crank-pin drops from the sight-feed cup on main bearing through tube to a groove in side of disc and thence to center of pin. This arrangement, which permits feeding any required amount of oil to pin, insures positive lubrication and continuous operation of engine.

Vim Throttling Engines, Complete, all sizes, are furnished with oil-cups, including wiper attachment for crosshead, one steam-chest drip-cock, two globe-valves for cylinder-drip, two pulleys, governor, governor-belt, throttle-valve, sight-feed lubricator and two wrenches.

Anything ordered, not included in the above list of fixtures, will be charged as an extra.

Sub-base, foundation bolts and steam-cocks with lever connection for cylinder-drip shown in cut, are not furnished unless ordered, and at extra price.

All foundation bolts, unless otherwise ordered, are three to five feet in length (depending on size of engine), suitable for brick, stone or cement foundation.

No. of Size	Cylinder		Horse-Power as Usually Rated	Revolutions per Minute	Pulleys		Diam. Steam Pipe	Diam. Exhaust Pipe	Diam. Crank-Pin	Length Crank-Pin	Diam. Cross-head-Pin	Length Cross-head-Pin	Diam. Shaft Bearings	Length Shaft Bearings	Length Over All Including Pulleys		Width Over All Including Pulleys		Weight Compl'te with Sub-Base	Weight Compl'te without Sub-Base
	Diam. Inches	Stroke Inches			Diam. Inches	Face Inches									Feet	Ins.	Feet	Ins.		
3	7	8	12– 15	265–300	20–34	9½	2	2½	2⅝	2½	1⅝	2½	2⅝	6	5	10	3	10½	2000	1700
5	8	8	17– 20	265–300	20–34	9½	2	2½	2⅝	2½	1⅝	2½	2⅝	6	5	10	3	10½	2050	1750
6	8	10	22– 25	250–275	28–40	10½	2	2½	3⅝	3	2	3	3½	7½	7	1	4	5	3000	2500
7	9	10	27– 30	250–275	28–40	10½	2	2½	3⅝	3	2	3	3½	7½	7	1	4	5	3050	2550
8	10	12	35–.40	200–240	36–54	12½	2½	3	$4\frac{3}{16}$	3½	$2\frac{7}{16}$	3½	3½	10½	8	7½	5	6	4800	3900
9	11	12	45– 50	200–240	36–54	12½	2½	3	$4\frac{3}{16}$	3½	$2\frac{7}{16}$	3½	3½	10½	8	7½	5	6	4900	4000
10	12	15	50– 60	160–190	40–66	15½	3	3½	4½	3½	2½	3½	4½	12½	10	5	6	4½	6900	5750
11	13	15	60– 70	160–190	40–66	15½	3	3½	4½	3½	2½	3½	4½	12½	10	5	6	4½	7000	5850
12	14	18	75– 85	140–160	48–72	16½	4	5	5⅜	4½	3⅜	4½	5½	14½	12	...	7	1	10050	9150
13	16	18	100–110	140–160	48–72	16½–20½	4	5	5⅜	4½	3⅜	4½	5½	14½	12	...	7	1	11400	9600

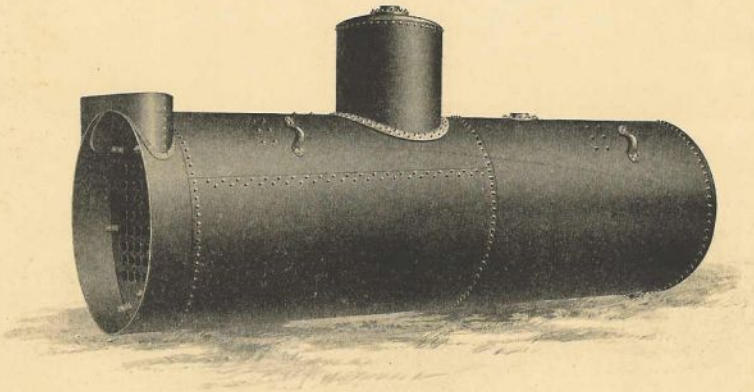
Above ratings are based on a M. E. P. of 38 pounds, corresponding to a steam pressure at engine throttle of about 80 pounds.

These engines can be set to run either over or under, as desired. Unless otherwise ordered, they will always be arranged to run over, and at the lowest number of revolutions given above.

Pulleys of larger diameter or wider face than above specified, if ordered, will be charged extra.

It is important that engines intended for saw-mill service should be fitted with proper diameter driving pulley (special if necessary) to give the required rim speed to saw.

WE build our Standard Horizontal Tubular Boilers with shells in circular courses, believing this construction is preferred quite generally by the trade, and that it represents the best practice. However, when customers prefer boilers with single plate in bottom of shell, we are prepared to build them for pressures not exceeding 100 pounds, without extra charge. There is usually some delay in getting out this type of boiler, as we have to order material for same from the mills; whereas we aim to carry on hand at all times a complete line of plate for circular course boilers. The design and construction of our standard or commercial boilers have been approved by a responsible steam boiler inspection and insurance company, who have stationed in our shops a regular inspector, under whose supervision all boilers are built and tested.



Horizontal Tubular Boiler—Arch Front—100 Pounds Steam

In our standard construction, boilers are built with flush heads; *i. e.*, shell is not extended to form the smoke-box. For Arch Front setting, a smoke-box extension of steel-plate, fitted with sheet-steel stack-base and cast-iron flue-doors and frame, is bolted to front-head. For Flush Front setting, smoke-box extension is unnecessary and is not furnished unless specially ordered, and at extra price.

Boilers, Sizes Nos. 4 to 18 inclusive, are built with shell in two courses; Size No. 18½, three courses; one plate to each course.

Boilers, all Sizes, 100 pounds steam, are provided with domes. The vertical seams of domes, all sizes, single riveted; flange seams, domes smaller than 26-inches diameter, single riveted; larger Sizes, double riveted. Boilers for pressures exceeding 100 pounds are not provided with domes unless specially ordered, and at extra price.

The number, size and arrangement of tubes conform with the latest and most approved practice for this type of boiler; the ratings are conservative and based on the usual commercial conditions of ordinary good draft, fuel and firing. Boilers 54 inches diameter and larger have a circulating space of two inches or more left vertically through center line of tubes, with no tube nearer shell than three inches.

Flush Front—Style A

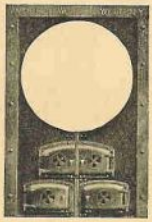
Arch Front—Style A

Overhanging Front—Style A

Side columns for flush and overhanging fronts can be furnished, if ordered, at extra price

Flush Front—Style B

Arch Front—Style B



Overhanging Front—Style B

Fronts for Horizontal Tubular Boilers

Style "A" Fronts are included with standard equipment unless otherwise specified

Boilers are built of open-hearth, homogeneous steel plate, having a tensile strength of 60,000 pounds per square inch of net section; an elastic limit of not less than one-half the tensile strength; with an elongation of 20 to 25 per cent in a length of eight inches; and a reduction of area of 45 to 50 per cent. Specimens cut from these plates can be turned over and closed down solid without fracture when cold, and do not blister.

Boilers for 100 and 125 pounds steam are built throughout of "Flange" steel; boilers for 150 pounds steam are built with shell and butt-straps "Fire-box," heads "Flange" steel.

Unusual care is taken in bracing these boilers to meet the modern requirements of good practice, weldless steel braces of the most approved form being used exclusively.

The longitudinal seams of shells, all Sizes, 100 pounds steam, double lap-riveted; 125 pounds steam, butt-joint triple riveted; 150 pounds steam, Sizes Nos. 10 to 17

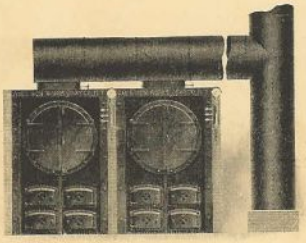


Fig. D

Tee for stack is not furnished with smoke connection except as an extra

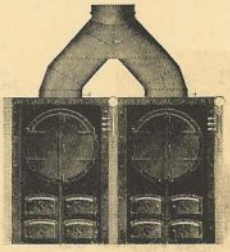


Fig. E

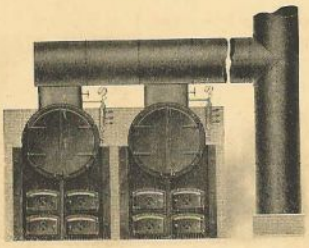


Fig. F

Tee for stack is not furnished with smoke connection except as an extra

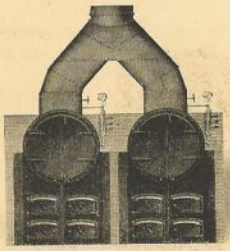


Fig. G

Smoke Connections for Battery of Two Horizontal Tubular Boilers

inclusive, butt-joint triple riveted; larger Sizes, butt-joint quadruple riveted. All butt-joint seams are provided with inside and outside covering strips. Girth seams, all pressures, single riveted. Rivet holes in all boilers are punched small and reamed to full size after plates are rolled and pinned in position; in boilers with butt-joint seams, the covering strips are then removed and the burrs brushed off.

Tube-holes are punched small, reamed to full size and chamferred.

All flanges are turned by improved machinery to proper radius at one operation, thus avoiding undue strain, buckling and burning.

Boilers 36 inches diameter have handhole each head under tubes and front head above tubes. Boilers 44 inches and 48 inches diameter have handhole each head under tubes, and manhole (Eclipse style) front head above tubes. Boilers 54 inches diameter and larger have two manholes (Eclipse style) front head, one above and one below tubes; no handholes.

Arch Front Boilers, Sizes Nos. 4 to 10½ inclusive, are provided with two Ames standard pressed-steel loops, one at each end; Sizes Nos. 12½ to 17 inclusive, with four loops, same style; larger Sizes, with four Hartford style loops, two at each end. Flush Front Boilers, Sizes Nos. 4 to 17 inclusive, are provided with four Ames standard pressed-steel lugs, two on each side; larger Sizes, with eight lugs, same style, four on each side, in pairs on end courses.

Threaded openings 2½ inches diameter and larger are regularly re-inforced with pressed-steel flanges. Blow-off openings, all Sizes, rear end bottom shell, re-inforced with pressed-steel flanges.

Ames standard feed-pipe enters top of shell near front head, extending down to within about two inches of top row of tubes, with elbow on end, discharging toward rear in direct line of circulation.

All boilers are tested and made thoroughly tight at a hydrostatic pressure 50 per cent in excess of the required steam working pressure and a certificate of test and inspection issued by a responsible steam boiler inspection and insurance company is furnished. Insurance policy will be furnished, if ordered, at extra price.

For complete setting plans, see pages 10 and 11. When two or more standard boilers set in battery, the fronts, smoke-connections, etc , are arranged for a 26-inch division wall unless otherwise specified.

In addition to the standard line of boilers illustrated and described in this bulletin, we are prepared to quote on and build boilers to comply with the various insurance companies', engineers' and architects' special specifications and local boiler requirements. Our large shops, equipped with modern tools and a force of skilled workmen, present facilities for getting out this class of work which are unsurpassed. Will furnish estimates promptly upon receipt of inquiries.

#17 Boiler has 5" Flange Steam Outlet

Horizontal Tubular Boilers—100 Pounds Steam—With Domes

Number of Size	4	4½	6	7	8	8½	9	10	10½	12½	15½	16	17	18	18½
Horse-Power as usually rated	20	25	30	35	40	45	50	60	70	80	100	125	150	180	200
Diameter Shell, inches	36	36	44	44	44	48	48	54	54	60	66	72	72	78	78
Length Tubes, feet	10	12	10	12	14	12	14	14	16	16	16	16	18	18	20
Number Tubes 3-in. dia.; Size No. 10 and up, 4-in.	28	28	46	46	46	52	52	36	36	44	54	70	70	88	88
Mean Thickness Plate — Shell, Flange Steel, inches	¼	¼	¼	¼	¼	9/32	9/32	5/16	5/16	11/32	3/8	7/16	7/16	11/32	11/32
Mean Thickness Plate — Heads, Flange Steel, inches	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4
Mean Thickness Plate — Dome Shell, Flange Steel, inches	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
Mean Thickness Plate — Dome Head, Flange Steel, inches	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
Diameter Dome, inches	20	20	22	22	22	26	26	30	30	32	36	36	36	36	36
Height Dome, inches	20	20	22	22	22	26	26	30	30	32	36	36	36	36	36
Diameter Stack, inches	16	16	22	22	22	24	24	26	26	28	30	34	34	38	38
Length Stack, feet	35	40	35	40	50	40	50	50	60	60	60	60	60	60	70
Weight Arch Front Boiler without Fixtures	3000	3400	4300	4900	5500	5900	6600	8100	8900	10800	13200	16600	18300	21900	24000
Weight Flush Front Boiler without Fixtures	2900	3300	3900	4500	5100	5400	6100	7500	8300	10100	12300	15500	17200	20400	22500
Weight Arch Front Boiler Complete	4800	5400	6700	7400	8300	8500	9500	11600	12700	15200	18000	21800	23600	28500	31200
Weight Flush Front Boiler Complete	5000	5600	7000	7700	8600	8800	9800	12000	13100	15600	18500	22400	24200	29500	32200

Changes in Numbers and Sizes of Tubes Without Extra Charge

These changes apply for all pressures

3-inch Tubes substituted for 4-inch	...	...	...	...	...	...	...	56	56	70	84	110	110	136	136
3½-inch Tubes substituted for 3 and 4-inch	20	20	34	34	34	40	40	44	44	54	68	88	88	108	108
4-inch Tubes substituted for 3-inch	16	16	28	28	28	34	34	...	...	...	...	...	...	...	...

Horizontal Tubular Boilers—125 Pounds Steam—No Domes

Number of Size	10	10½	12½	15½	16	17	18	18½
Mean Thickness Plate — Shell, Flange Steel, inches	5/16	5/16	11/32	3/8	7/16	7/16	11/32	11/32
Mean Thickness Plate — Butt-Straps, Flange Steel, inches	1/4	1/4	5/16	5/16	5/16	5/16	5/16	5/16
Mean Thickness Plate — Heads, Flange Steel, inches	7/16	7/16	7/16	7/16	1/2	1/2	1/2	1/2
Weight Arch Front Boiler without Fixtures	8200	9100	11000	13400	16800	18600	22200	24400
Weight Flush Front Boiler without Fixtures	7600	8500	10300	12500	15700	17500	20700	22900
Weight Arch Front Boiler Complete	11700	12900	15400	18200	22000	23900	28800	31600
Weight Flush Front Boiler Complete	12100	13300	15800	18700	22600	24500	29800	32600

Dimensions (excepting those applying to domes) other than enumerated above, same as boilers for 100 pounds steam.

Horizontal Tubular Boilers, Arch, Flush and Overhanging Front Types, 125 Pounds Steam, are furnished with same equipment as specified on pages 8 and 9, except that no domes are provided and the gauge-cocks are of the compression type.

Horizontal Tubular Boilers—150 Pounds Steam—No Domes

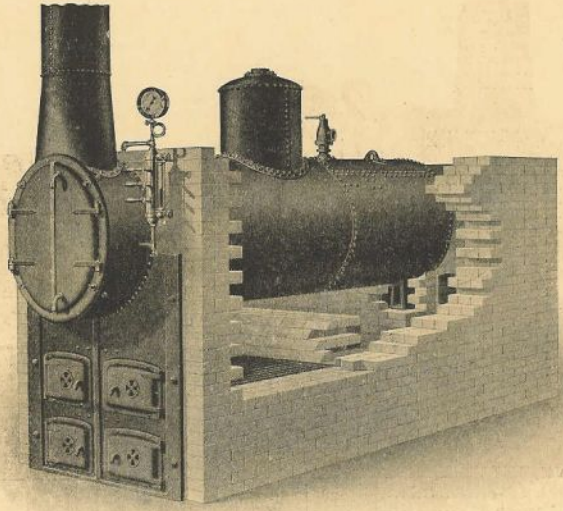
100 H.P.

Number of Size	10	10½	12½	15½	16	17	18	18½
Mean Thickness Plate — Shell, Fire-Box Steel, inches	5/16	5/16	11/32	3/8	7/16	7/16	7/16	7/16
Mean Thickness Plate — Butt-Straps, Fire-Box Steel, inches	5/16	5/16	5/16	5/16	5/16	5/16	5/16	5/16
Mean Thickness Plate — Heads, Flange Steel, inches	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16
Weight Arch Front Boiler without Fixtures	9200	10200	12200	14600	18100	20100	23400	25700
Weight Flush Front Boiler without Fixtures	8600	9600	11500	13700	17000	19000	21900	24200
Weight Arch Front Boiler Complete	12700	14000	16600	19400	23300	25400	30000	32900
Weight Flush Front Boiler Complete	13100	14400	17000	19900	23900	26000	31000	33900

Dimensions (excepting those applying to domes) other than enumerated above, same as boilers for 100 pounds steam.

Horizontal Tubular Boilers, Arch, Flush and Overhanging Front Types, 150 Pounds Steam, are furnished with same equipment as specified on pages 8 and 9, except that no domes are provided; 8½-inch steam-gauge, ¾-inch water-gauge and three ¾-inch compression gauge-cocks are provided in place of those specified; and the blow-off cock, check-valves and feed-valves are extra heavy.

For general specifications and complete description see pages 3, 4, 5 and 6.



Horizontal Tubular Boiler—Arch Front—100 Pounds Steam—Style "A" Front

Arch Front Horizontal Tubular Boiler without Fixtures, 100 Pounds Steam, is furnished with dome, manhole and handhole fittings, feed-pipe, extension, stack-base, flue-doors and frame, and loops.

Arch Front Horizontal Tubular Boiler Complete, 100 Pounds Steam, is furnished, in addition to the above, with arch front, grates, grate-bearers, arch-bars, back-door and frame, boiler-stand, 5-inch steam-gauge, ½-inch water-gauge, three ½-inch ball-lever gauge-cocks, air-cock, pop safety-valve, blow-off cock, check-valve, feed-valve, water-column, piping to attach these fittings in our usual manner, stack with one guy band and guy wire four times length of stack.

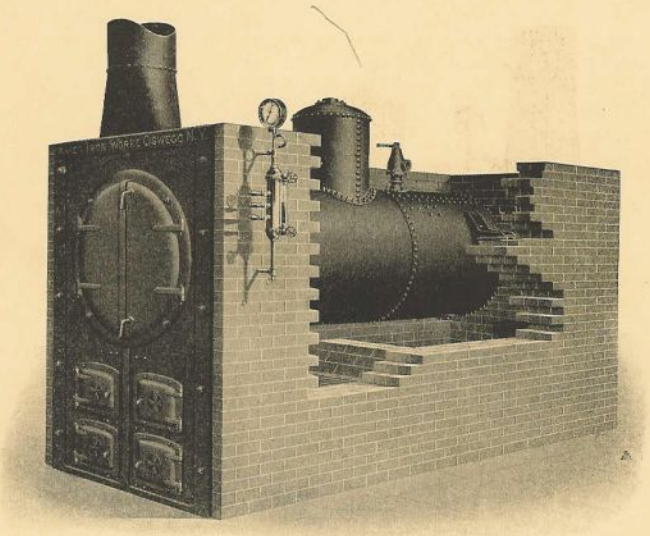
Overhanging Front Horizontal Tubular Boiler Without Fixtures, 100 Pounds Steam, is furnished with dome, manhole and handhole fittings, feed-pipe, extension, stack-base, flue-doors and frame and pressed-steel lugs.

Overhanging Front Horizontal Tubular Boiler Complete, 100 Pounds Steam, is furnished in addition to the above, with overhanging front, otherwise same equipment as specified for the Arch Front Boiler, except without boiler-stand.

See illustration Overhanging Front, page 4.

Anything ordered, not included in the above list of fixtures, will be charged as extra.

Independent dome, attached by nipple and flange to shell of boiler, will be substituted for regular dome on boilers for 100 pounds steam, when so ordered, without extra charge. Independent dome or regular riveted dome will be furnished on boilers for 125 or 150 pounds steam when ordered, at extra price. Dry-pipes, either U-shaped or wrought-iron pipe-style, will be furnished when ordered, at extra price. When dry-pipe is furnished with boiler for 100 pounds steam, suitable deduction will be made for dome.



Horizontal Tubular Boiler—Flush Front—100 Pounds Steam—Style "A" Front

Flush Front Horizontal Tubular Boiler without Fixtures, 100 Pounds Steam, is furnished with dome, manhole and handhole fittings, feed-pipe and pressed-steel lugs.

Flush Front Horizontal Tubular Boiler Complete, 100 Pounds Steam, is furnished, in addition to the above, with flush front, oval stack-plate, grates, grate-bearers, arch-bars, back-door and frame, 5-inch steam-gauge, ½-inch water-gauge, three ½-inch ball-lever gauge-cocks, air-cock, pop safety-valve, blow-off cock, check-valve, feed-valve, water-column, piping to attach these fittings in our usual manner, stack with one guy band and guy wire four times the length of stack.

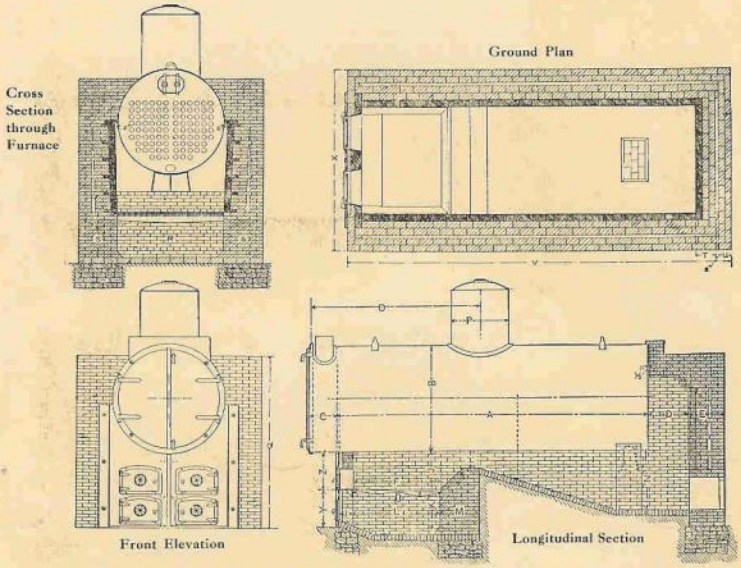
Anything ordered, not included in the above list of fixtures, will be charged as extra.

Fronts for boilers Nos. 4 and 4½ have single furnace and ash-pit doors. For larger size boilers, we can furnish Style "A" or "B" fronts illustrated on page 4. Style "A" fronts are included with standard equipment unless otherwise specified.

Our regular grates are of the straight-bar pattern (48 inches and longer in two lengths) with about one-half inch air space, suitable for ordinary grades of coal or wood. Grates suitable for burning sawdust or coal-dust, will be substituted for regular grates, when so ordered without extra charge. Tupper or herring-bone grates, special grates for burning pea coal (straight-bar pattern with three-eighths inch air space) or shaking grates will be furnished, if ordered, at extra price.

Stacks 26 inches diameter and under are made of No. 16 gauge plate; larger diameter, No. 14 gauge. Dampers, cleanout doors, extra guy bands and guy wire, and stacks of heavier gauge will be furnished, if ordered, at extra price.

Anchor bolts, wall plates and rollers, and buckstays and rods will be furnished, if ordered, at extra price. For various types standard smoke-connections, see page 5.

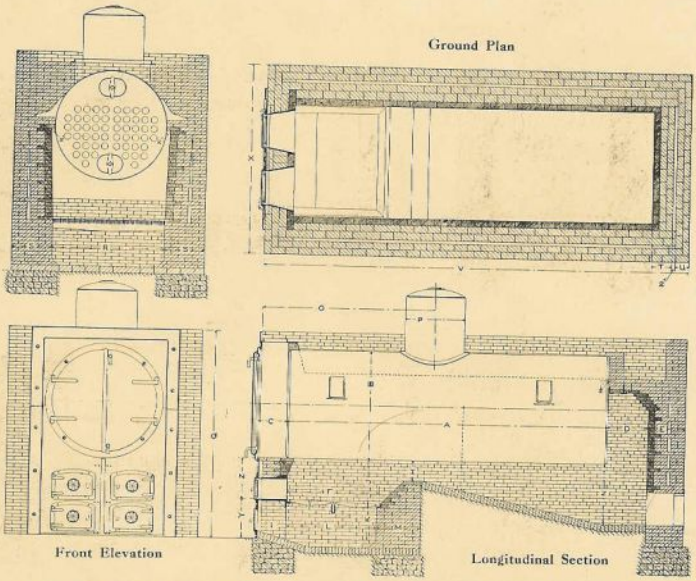


Standard Setting, Horizontal Tubular Boiler—Arch Front—All Pressures

At option of purchaser, fire-brick lining of side walls may be omitted beyond a point two feet back of bridge-wall as designated by dotted line, and common hard brick substituted (see column marked * below). Air-space in side and rear walls and the paving of ash-pit and flame-bed back of bridge-wall, may also be omitted.

No. of Size	A	B	C	D	E	F	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	X	Y	Z	No. Fire Brick Above Floor Level	No. Common Brick Above Floor Level	*Deduct Fire Brick and add Common Brick	No. of Size
	Ft.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.				
4	10	36	12	20	18	42	10	9	24	20	40	16	30	69	20	77	36	18	8	8	158	72	22	22	750	5350	350	**4**
4½	12	36	12	20	18	48	10	9	24	20	46	16	30	80	20	77	36	18	8	8	182	72	22	22	850	5950	375	**4½**
6	10	44	14	20	18	42	10	9	24	20	40	20	30	71	22	85	44	18	8	8	158	80	22	22	825	6650	400	**6**
7	12	44	14	24	18	48	10	9	24	20	46	20	36	82	22	85	44	18	8	8	186	80	22	22	950	7500	450	**7**
8	14	44	14	24	18	54	10	9	24	20	52	20	36	95	22	85	44	18	8	8	210	80	22	22	1075	8500	500	**8**
8½	12	48	14	24	18	48	12	9	24	22	46	24	36	77	26	89	48	22	8	8	186	92	24	22	1050	8900	475	**8½**
9	14	48	14	24	18	54	12	9	24	22	52	24	36	89	26	89	48	22	8	8	210	92	24	22	1100	11550	525	**9**
10	14	54	16	24	22	54	12	9	26	22	52	24	36	94	30	95	54	22	12	8	214	98	24	24	1200	11600	600	**10**
10½	16	54	16	24	22	60	12	9	26	22	58	24	36	98	30	95	54	22	12	8	238	98	24	24	1400	14100	675	**10½**
12½	16	60	16	24	22	60	12	9	26	22	58	24	36	98	32	102	60	26	12	8	238	112	24	24	1500	17175	900	**12½**
15½	16	66	18	24	22	60	12	9	26	22	58	24	36	98	36	108	66	26	12	8	238	118	24	24	1600	18275	950	**15½**
16	16	72	18	24	26	60	12	9	26	22	58	24	36	98	36	112	72	26	12	12	242	124	24	24	1650	19125	990	**16**
17	18	72	18	24	26	66	12	9	26	22	64	24	40	98	36	112	72	26	12	12	266	124	24	24	1800	22300	1025	**17**
18	18	78	20	24	26	66	14	9	29	25	64	24	40	100	36	124	78	26	12	12	266	130	27	27	1900	23400	1075	**18**
18½	20	78	20	24	26	72	14	9	29	25	70	24	40	140	36	124	78	26	12	12	290	130	27	27	2100	25500	1200	**18½**

Arch-bars for supporting brick-work at rear of boiler, should be placed one inch above upper row of tubes. Standard Setting for Horizontal Tubular Boilers with Overhanging Front (shown on page 4) will be same as above except that walls are usually carried to top of front. Also boilers with Overhanging Front are provided with pressed-steel lugs in place of loops. Width of furnace, Standard Setting, equals diameter of boiler. Boiler should be set slightly lower at rear than at front end.

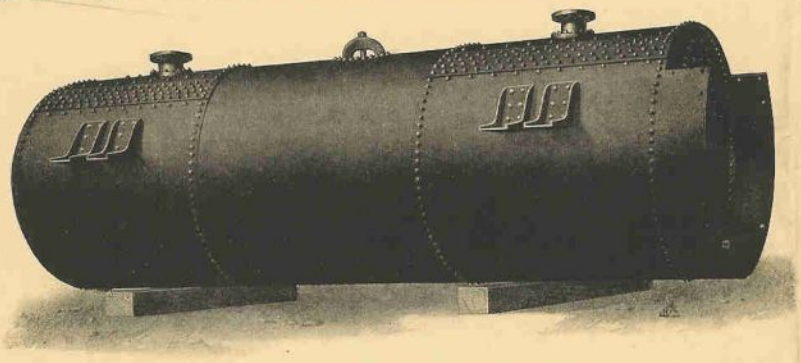


Standard Setting Horizontal Tubular Boiler—Flush Front—All Pressures

At option of purchaser, fire-brick lining of side walls may be omitted beyond a point two feet back of bridge-wall as designated by dotted line, and common hard brick substituted (see column marked * below). Airspace in side and rear walls and the paving of ash-pit and flame-bed back of bridge wall, may also be omitted.

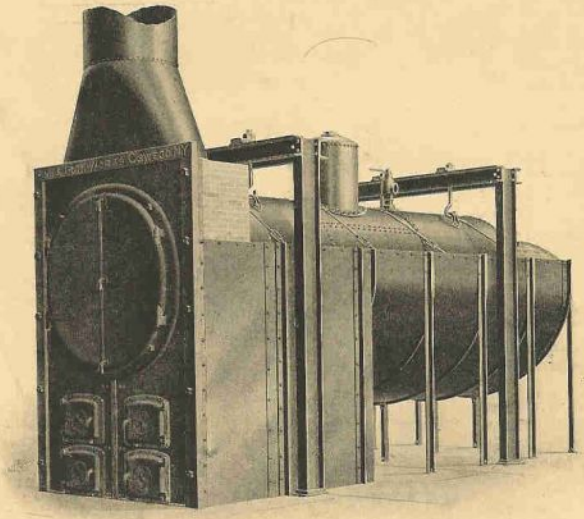
No. of Size	A	B	C	D	E	F	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	X	Y	Z	No. Fire Brick	No. Common Brick	*Deduct Fire Brick and add Common Brick	No. of Size
	Ft.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	In.	Above Floor Level			
4	10	36	10	20	18	42	10	12	24	20	40	16	30	67	20	89	36	18	8	8	169	72	22	22	750	8000	350	4
4	12	36	10	20	18	48	10	12	24	20	46	16	30	78	20	89	36	18	8	8	193	72	22	22	850	9200	375	4½
6	10	44	12	20	18	42	10	14	24	20	40	20	30	69	22	97	44	18	8	8	171	80	22	22	825	9300	400	6
7	12	44	12	24	18	48	10	14	24	20	46	20	36	80	22	97	44	18	8	8	199	80	22	22	950	11000	450	7
8	12	48	12	24	18	48	12	14	24	22	46	24	36	75	26	103	48	22	8	8	196	92	24	22	1075	13000	500	8
9	14	48	12	24	18	54	12	14	24	22	52	24	36	87	26	103	48	22	8	8	223	92	24	22	1050	12500	475	8½
10	14	54	14	24	22	54	12	16	26	22	52	24	36	89	30	112	54	22	12	8	228	98	24	24	1100	14000	525	9
10	16	54	14	24	22	60	12	16	26	22	58	24	36	96	30	112	54	22	12	8	253	98	24	24	1200	16300	600	10
12	16	60	14	24	22	60	12	16	26	22	58	24	36	96	32	118	60	26	12	8	253	112	24	24	1400	18000	675	10½
15	16	66	16	24	22	60	12	18	26	22	58	24	36	96	36	125	66	26	12	8	255	118	24	24	1500	22300	900	12½
16	16	72	16	24	26	60	12	18	26	22	58	24	36	96	36	131	72	26	12	12	259	124	24	24	1600	24000	950	15½
17	18	72	16	24	26	66	12	18	26	22	64	24	40	96	36	131	72	26	12	12	283	124	24	24	1650	26000	990	16
18	18	78	18	24	26	66	14	18	29	25	64	24	40	98	36	144	78	26	12	12	283	130	27	27	1800	29000	1025	17
18	20	78	18	24	26	72	14	18	29	25	70	24	40	138	36	144	78	26	12	12	307	130	27	27	2100	32500	1200	18½

Arch-bars for supporting brick at rear of boiler, should be placed one inch above upper row of tubes. Wh of furnace, Standard Setting, equals diameter of boiler. Boiler should be set slightly lower at rear than at nt end.



Horizontal Tubular Boiler—New England Style

These boilers are built with butt-joint longitudinal seams to comply with the requirements formulated by the Board of Boer Rules of the Commonwealth of Massachusetts. Prices quoted on application.



Steamboat Setting With Horizontal Tubular Boiler—Flush Front—100 Pound[illegible]am

The Steamboat Setting, illustrated above, is gaining in favor in a great many parts of the country, especially where the l[illegible] of skilled labor and the expense of transporting brick makes the cost of the regular brick setting prohibitive. We can furnish the Steamboat Setting with Horizontal Tubular Boilers of the Arch, Flush, Overhanging or Dutch-Oven Front Types. If interested, w[illegible]e glad to furnish proposition with complete details covering your requirements.