

Established 1879

Incorporated 1893

ERIE ENGINE WORKS

ERIE, PENNA., U. S. A.

Manufacturers of

ENGINES AND BOILERS

WM. HARDWICK, Pres't and Gen'l Mgr.
F. L. CLEVELAND, - Sec'y and Treas.

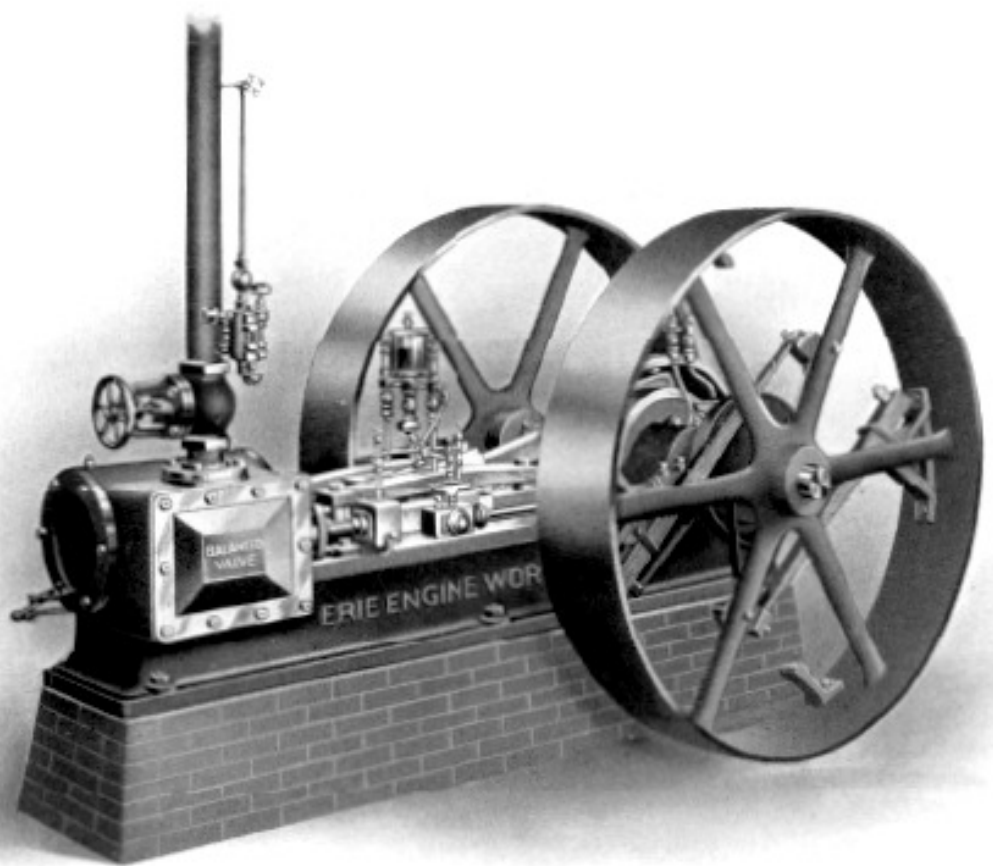
Cable Address: "Hardwick-Erie"

Catalogue "C," 1908

We reserve the right to modify or change the goods specified in this catalogue in such details as will in our judgment improve them. Our terms of sale are invariably based on delivery F. O. B. cars, Erie, Penn'a.

ASHBY PRINTING CO., ERIE, PA.

ERIE ENGINE WORKS



MEDIUM SPEED (CENTRE-CRANK) AUTOMATIC CUT-OFF ENGINES—Class "A."

ERIE ENGINE WORKS

MEDIUM SPEED AUTOMATIC CUT-OFF ENGINES.

We are prepared to furnish these Engines of the Side-Crank style (either right or left hand) when preferred. See page 4. Change in size of Balance Wheel can be made when desired; Governor Wheel on each size must be used as listed, except it can be made wider face if desired.

These Engines, when furnished **complete**, include Governor Wheel (with Governor fitted), Balance Wheel, Throttle Valve,

Sight Feed Lubricator, Gravity Oiling System as shown in illustration, and Cylinder Drainage fitted into exhaust. With Side-Crank Engines, unless otherwise specified, we furnish the Fly Wheel instead of Balance Wheel. The Governor Wheel is intended to be used as a Band Wheel when its diameter makes it applicable. Any other fixtures wanted will be furnished and charged as extras.

Table of Dimensions, Powers and Speeds.

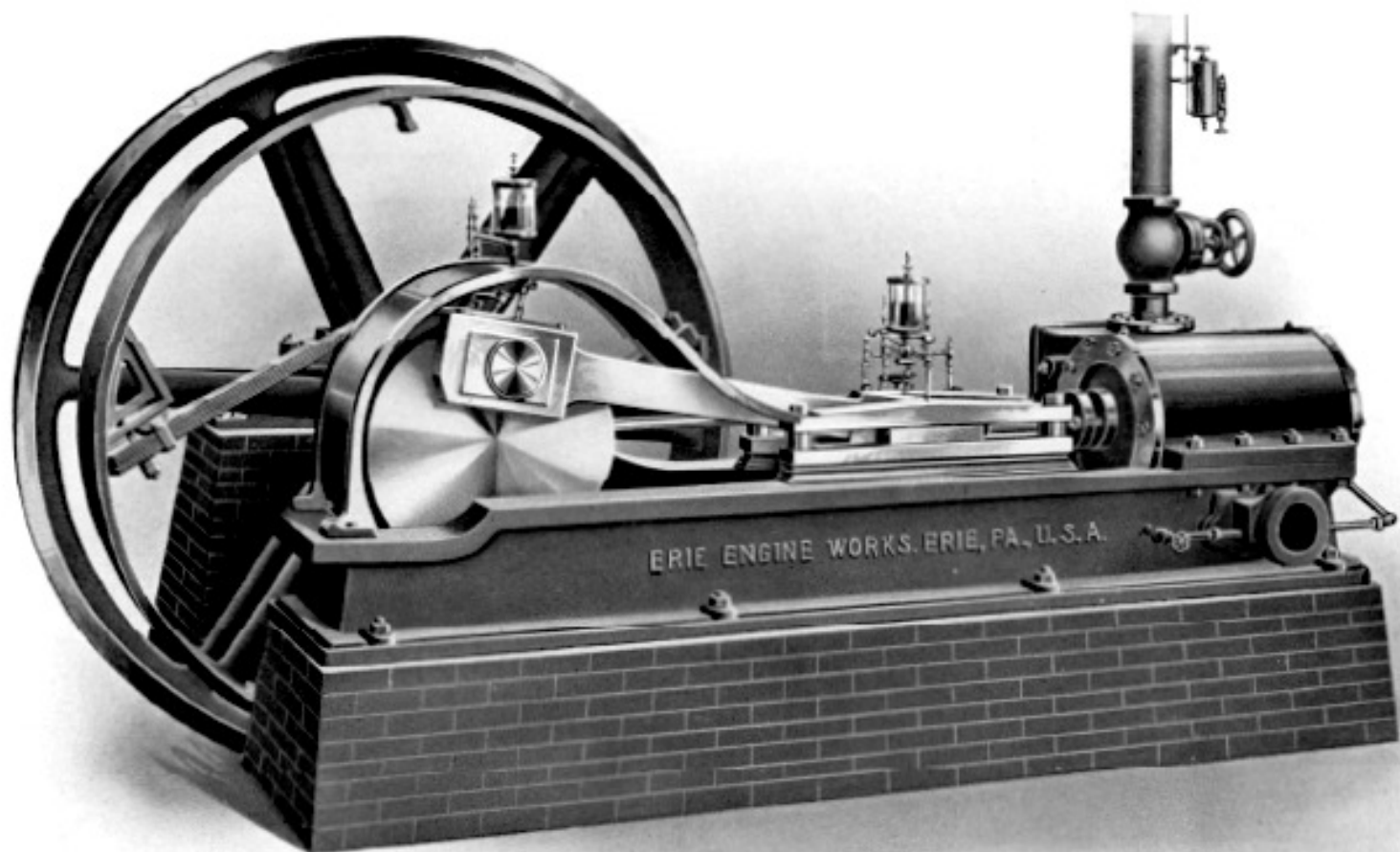
Number of Size	5			6			7			8			9			10			11			11½			13			14			16		
Dia. of Cyl. & Lgth. of Stroke In.	8 x 12			9 x 12			10 x 12			10 x 15			11 x 15			12 x 16			13 x 16			14 x 16			15 x 18			16 x 18			19 x 18		
Revolutions	200	250	300	200	250	300	200	250	300	175	225	250	175	225	250	150	200	225	150	200	225	150	200	225	150	175	200	150	175	200	150	175	200
H. P. 40 lbs. M. E. P.	24	31	37	31	39	46	38	48	57	42	54	60	50	65	72	55	73	82	64	86	97	74	100	112	96	113	129	110	128	146	155	180	206
H. P. 50 lbs. M. E. P.	31	38	46	39	48	58	48	60	71	52	67	74	63	81	90	71	94	106	80	107	126	93	124	140	120	141	161	137	160	183	193	225	258
H. P. 60 lbs. M. E. P.	37	46	55	46	58	69	57	71	86	66	80	89	76	97	108	82	110	123	97	123	145	112	149	168	144	169	193	165	192	219	232	271	309
Piston Speed	400	500	600	400	500	600	400	500	600	437	562	625	437	562	625	400	533	600	400	533	600	400	533	600	450	525	600	450	525	600	450	525	600
Size of Gov. Wheel Ins.	54 x 10½			54 x 10½			60 x 10½			66 x 12½			66 x 12½			72 x 14½			72 x 14½			72 x 14½			78 x 16½			78 x 16½			78 x 20½		
Size Balance Wheel "	54 x 10½			54 x 10½			60 x 10½			66 x 12½			66 x 12½			72 x 14½			72 x 14½			72 x 14½			78 x 16½			78 x 16½			78 x 20½		
Diameter of Shaft "	3			3¾			3¾			4½			4½			4¾			4¾			5¾			6½			6½			7½		
Length of Journals "	7			8			8			9			9			11			11			12			12½			12½			14½		
Diam. of Steam Pipe "	2½			2½			3			3			3½			3½			4			4			4½			4½			6		
Diam. of Rod. Pipe "	2			2			2¼			2¼			3			3			4			4			5			5			6		
Diam. of Fly Wheel for Side-Crank Engines "	60"			60"			72"			72"			72"			84"			84"			84"			86"			86"			96"		

Iron Sub-bases furnished when desired and charged extra.

See pages 6 and 7 for description and illustration of Governor and Valve. For Side-Crank illustration see page 4.

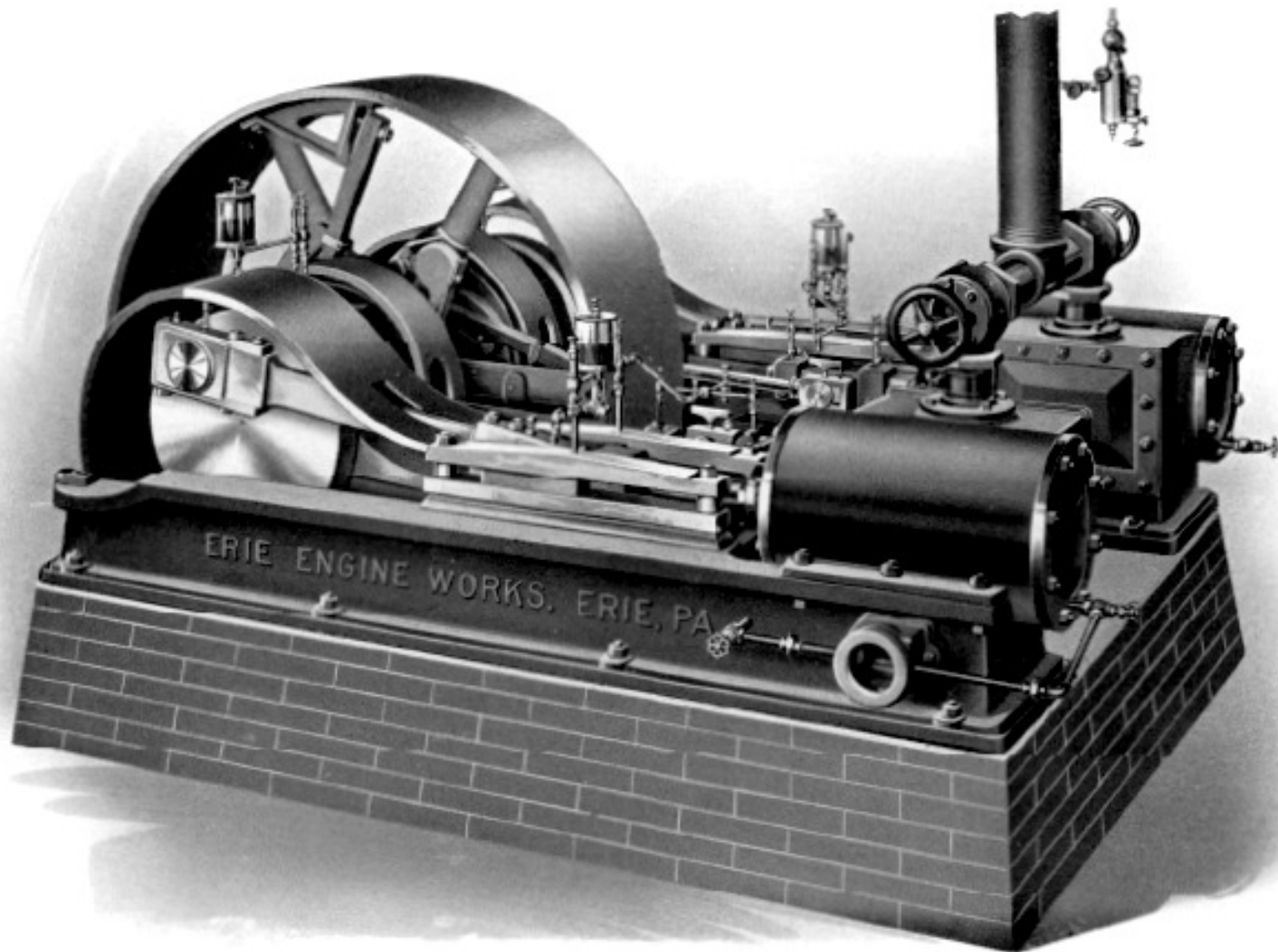
See page 16 for illustration of Crank Shaft.

ERIE ENGINE WORKS



MEDIUM SPEED (SIDE-CRANK) AUTOMATIC CUT-OFF ENGINES—Class "B."

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DOUBLE AUTOMATIC CUT-OFF ENGINES.

MEDIUM SPEED AUTOMATIC CUT-OFF ENGINES.

General Description.

ENGINE.

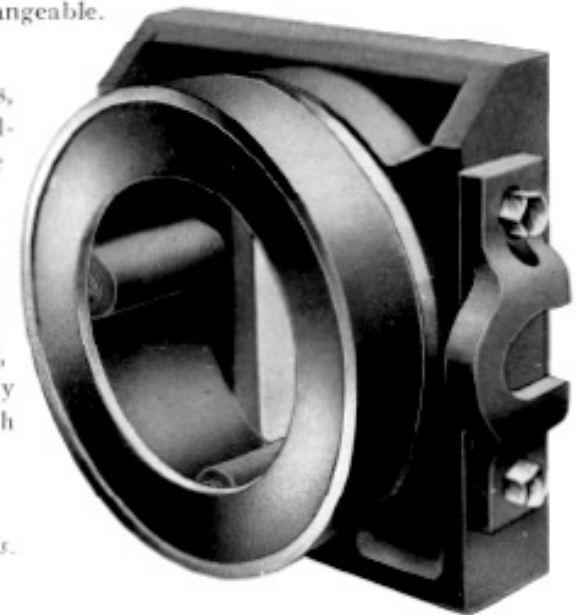
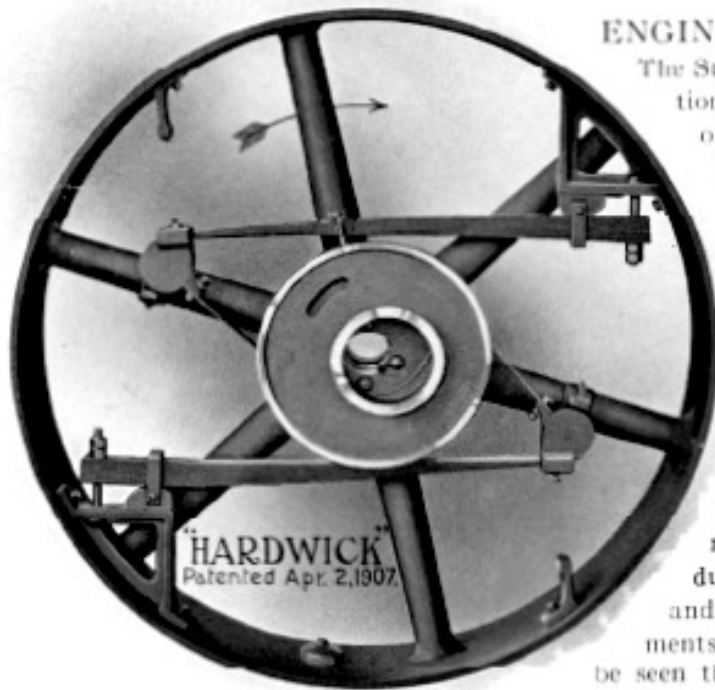
The Standard Engines, herein offered to the trade, are so well known that little description is necessary. The design has been approved as the very best, after many years of experience. They are large in proportion, modern in every detail of construction. The cylinders are set low on the beds, and have hot air jackets, thereby decreasing condensation; special attention having been paid to the arrangement of the steam chest ports and exhaust, so that the most perfect drainage is secured. All material used in the construction of these Engines is of the very highest quality. The workmanship throughout is the best; all parts are built on iron jigs and are in consequence, interchangeable.

GOVERNOR.

As will be seen by the illustrations, we use on these Engines the "Hardwick" Governor, deriving thereby the benefit of safety of operation, symmetry of construction, simplicity, durability, regulation exceptionally close, and all that the most exacting requirements of modern practice demand. It will be seen that the spring power is in two units, thus insuring safety in operation, and that symmetry

of construction exists, in that the centre of gravity of the whole Governor is identical with the centre of rotation, in any position of cut-off.

See pages 2, 3, 4 and 5 for illustration and dimensions.



MEDIUM SPEED AUTOMATIC ENGINES.

“Description.”

Bed. These Engines have our improved form of bed with solid oil bottom, and beaded around bottom so as to catch all drippings and convey same to one point of exit at Crank End of bed.

Crank Shaft. The Crank is made from a solid forging of open hearth steel slotted out to make the pin. It is ample in proportions and thoroughly counterbalanced, the discs being firmly attached to shaft by our patented method.

Oil for the lubrication of the Crank Pin is delivered from the oil cup to a groove in side of Crank Disc, carried from there by the centrifugal motion through a hole drilled to center of pin, thus giving the most positive lubrication possible.

**Connect-
ing
Rod.** The Connecting Rod is of forged steel, and perfectly fitted throughout. The boxes are made of cast iron, crank end is bushed with special babbitt metal, and a bronze bushing at the Crosshead end. These parts can be replaced at a minimum cost independent of the box holding them. The adjustment is made with wedges, thus admitting of the most accurate adjustment.

Cylinder. The Cylinder is made of a mixture of steel and re-melted iron, giving a very close grain, and having an increased tensile strength over ordinary gray iron, and the walls soon acquire a smooth, hard polish under the

influence of oil. These Cylinders are air jacketed. Indicator Plugs are provided, and fitted.

Piston. The Piston is of the hollow head type, fitted with two rings, which are expanded by the action of the steam. The Piston is fitted onto a crucible steel Piston rod; the rod is riveted to the Piston, thus eliminating the possibility of its becoming loose.

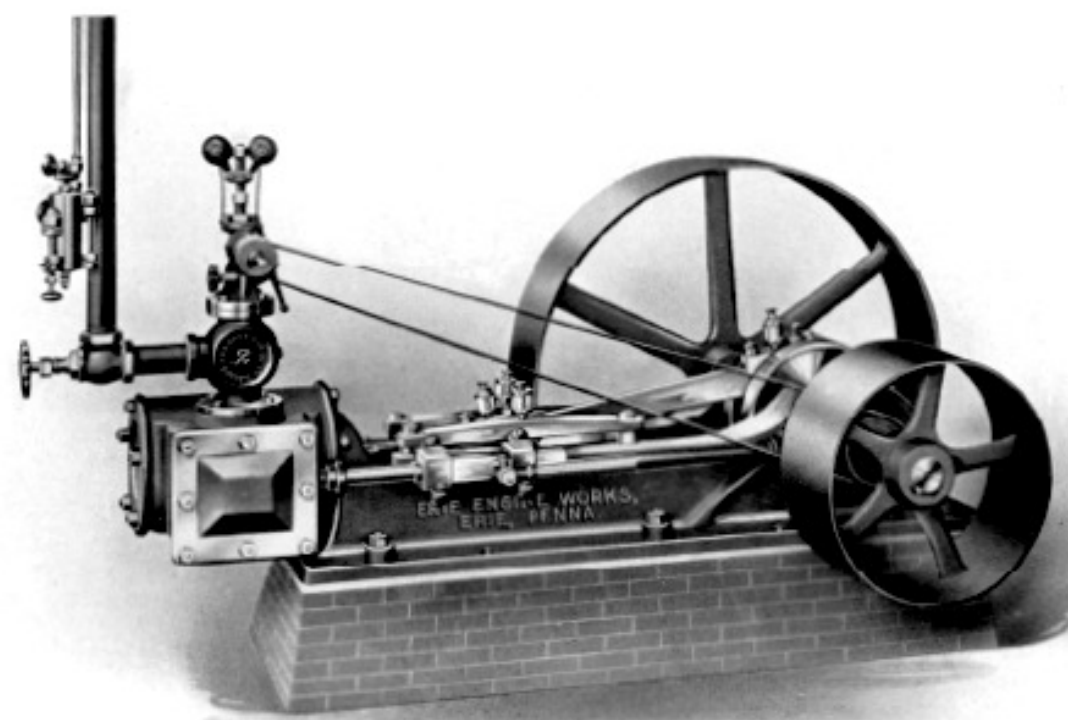
Valve. We use an improved balanced valve, and it is one of the strongest points of the engine. The ring on the back relieves the valve of eighty per cent of the steam pressure, always leaving sufficient pressure to hold the valve in steam tight contact with the seat. This valve takes up its own natural wear, is free to lift from the seat, and will remain steam tight under the most trying conditions. See illustration on page 6.

Guides. The Guides are of the Locomotive type, adjustable top and bottom, and with large wearing surfaces.

Test. The Engines are thoroughly tested before shipment, and will be found perfectly satisfactory as regards speed, regulation and adjustment. This test includes throwing off and on heavy overloads, putting different strains on engine to test working parts.

Finish. The Engines will be finished in a thoroughly satisfactory manner throughout.

See page 16 for illustration of Crank Shaft used in these Engines.



CENTRE-CRANK ENGINES—Class "C."

CENTRE-CRANK ENGINES—Class "C."

These Engines have our improved form of bed with solid oil bottom, and beaded around bottom so as to catch all drippings and convey same to one point of exit at Crank End of bed.

The Crank is made from a solid forging of open hearth steel slotted out to make the pin. It is ample in proportions and thoroughly counterbalanced, the discs being firmly attached to shaft by our patented method.

The Crank Pin is unusually large; this and all other working parts being lubricated by oilers, as shown in illustration of Engine, or grease cups if preferred.

The Connecting Rod is of forged steel, and perfectly fitted throughout. The boxes are made of cast iron, crank end is bushed with special babbit metal, and a bronze bushing at the Crosshead end. These parts can be replaced at a minimum cost independent of the time holding them. The adjustment is made with wedges, thus admitting of the most accurate adjustment.

The Cylinder is made of a mixture of steel and re-melted iron, giving a very close grain, and having an increased tensile strength over ordinary gray iron, and the walls soon acquire a smooth, hard polish under the influence of oil. These Cylinders are air jacketed.

The Piston is of the hollow head type, fitted with two rings which are expanded by the action of the steam. The Piston is fitted onto a crucible steel Piston rod; the rod is riveted to the Piston, thus eliminating the possibility of its becoming loose.

The Guides are of the Locomotive type, adjustable top and bottom and with large wearing surfaces.

Gardner Governor Co. Style B Spring Governors are regularly used. If other style or make are preferred we will supply them.

The Engines are thoroughly tested before shipment and will be found perfectly satisfactory as regards speed, regulation and adjustment. This test includes throwing off and on heavy overloads, putting different strains on Engine to test working parts.

The Engines will be finished in a thoroughly satisfactory manner throughout.

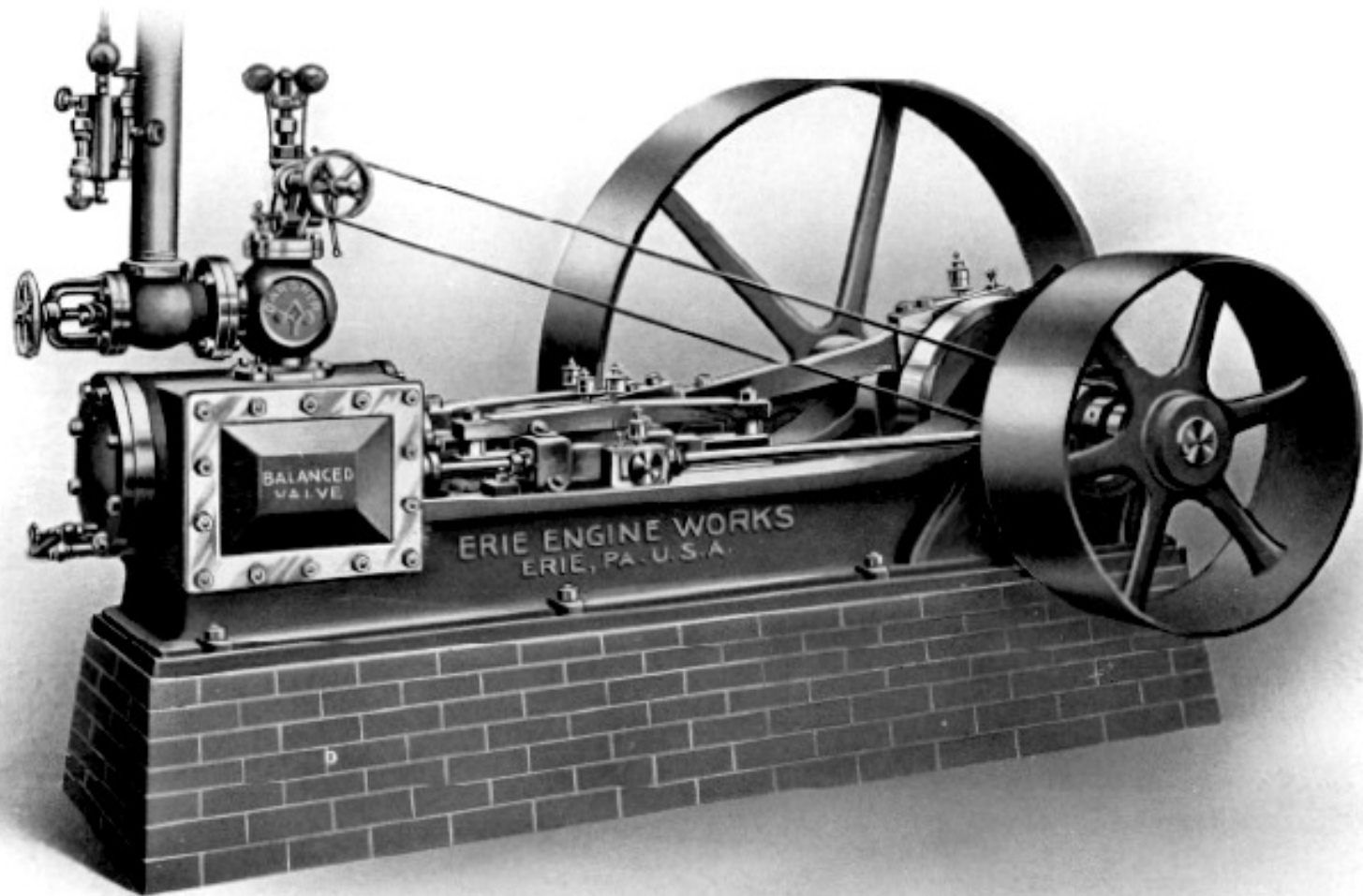
When quoted complete we furnish two pulleys (sizes specified), Gardner Governor with belt, throttle valve, sight feed lubricator, all necessary glass oil cups, and two steel wrenches.

Cast iron bases, foundation bolts, or any other fittings will be furnished and charged extra.

Specifications.

Number of Size	A	B	0	1	2	3	4	4½
HORSE POWER (as usually rated).....	4	6	6	8	10	12	15	20
Diameter of Cylinder.....inches	4	5	5	5	6	7	8	9
Length of Stroke....."	6	6	8	8	9	10	10	10
Usual Number of Revolutions (See page 13).....	220	220	185	240	190	160	160	200
Diameter of Pulleys.....inches	12	14	14	14	16	20	20	20
	18	21	32	32	36	44	44	44
Face of Pulleys....."	4	5	8½	8½	8½	10½	10½	10½
	4	6	8½	8½	9½	10½	10½	12½
Diameter of Shaft....."	2½	2½	2½	2½	2½	2½	2½	2½
Length of Shaft....."	29	29	37	37	41	51	51	51
Length of Journals....."	4	4	5	5	5½	6½	7	7
Length of Engine Bed....."	42	42	46	46	53	56	59	59
Width of Engine Bed....."	12	12	11	11	12	13½	15	15
Diameter of Steam Pipe....."	¾	1	1	1	1¼	1½	2	2½
Diameter of Exhaust Pipe....."	1¼	1½	1½	1½	2	2	2½	3

ERIE ENGINE WORKS



CENTRE-CRANK THROTTLING ENGINES—Class "D."

Description and specifications on pages 11 and 12.

ERIE ENGINE WORKS

CENTRE-CRANK ENGINES—Class “D.”

Specifications.

Number of Size	5	6	7	8	9	10	11	11½	12	13	14	16
HORSE POWER (as usually rated) ...	20	25	30	35	40	50	60	70	80	100	125	200
Diameter of Cylinder.....inches	8	9	10	10	11	12	13	14	14	15	16	19
Length of Stroke	12	12	12	15	15	16	16	16	18	18	18	18
Usual Number of Revs. (See page 13)	170	170	170	150	150	150	150	150	150	150	165	175
Diameter of Pulleys..... { inches	30	32	32	36	36	36	36	36	36	48	48	48
{ "	48	54	54	60	60	72	72	72	78	78	78	78
Face of Pulleys..... { "	8½	10½	10½	10½	10½	12½	12½	12½	12½	12½	12½	14½
{ "	12½	12½	12½	14½	14½	14½	16½	16½	16½	16½	16½	20½
Diameter of Shaft	3	3¾	3¾	4½	4½	4¾	4¾	5¾	6½	6½	6½	7½
Length of Shaft	52	57	60	65	65	69	69	72	81	81	81	84
Length of Journals.....	7½	8	8	9	9	11	11	12	12½	12½	12½	15
Diameter of Steam Pipe.....	2	2½	2½	2½	3	3½	3½	4	4	4½	4½	6
Diameter of Exhaust Pipe ...	2½	3	3½	3½	4	4½	4½	5	5	6	6	8

By the attachment of a reversing link, these Engines are well adapted to hoisting purposes. Each Engine carefully tested before shipment.

Balanced Valves in all sizes. See illustration page 6. The Engine complete includes Pulleys, Governor with Belt, Throttle Valve, Sight Feed Lubricator, all necessary Glass Oil Cups and Two Steel Wrenches.

Iron Sub bases furnished when desired and charged extra.

CENTRE-CRANK ENGINES—Class “D.”

Illustration page 10.

“Description.”

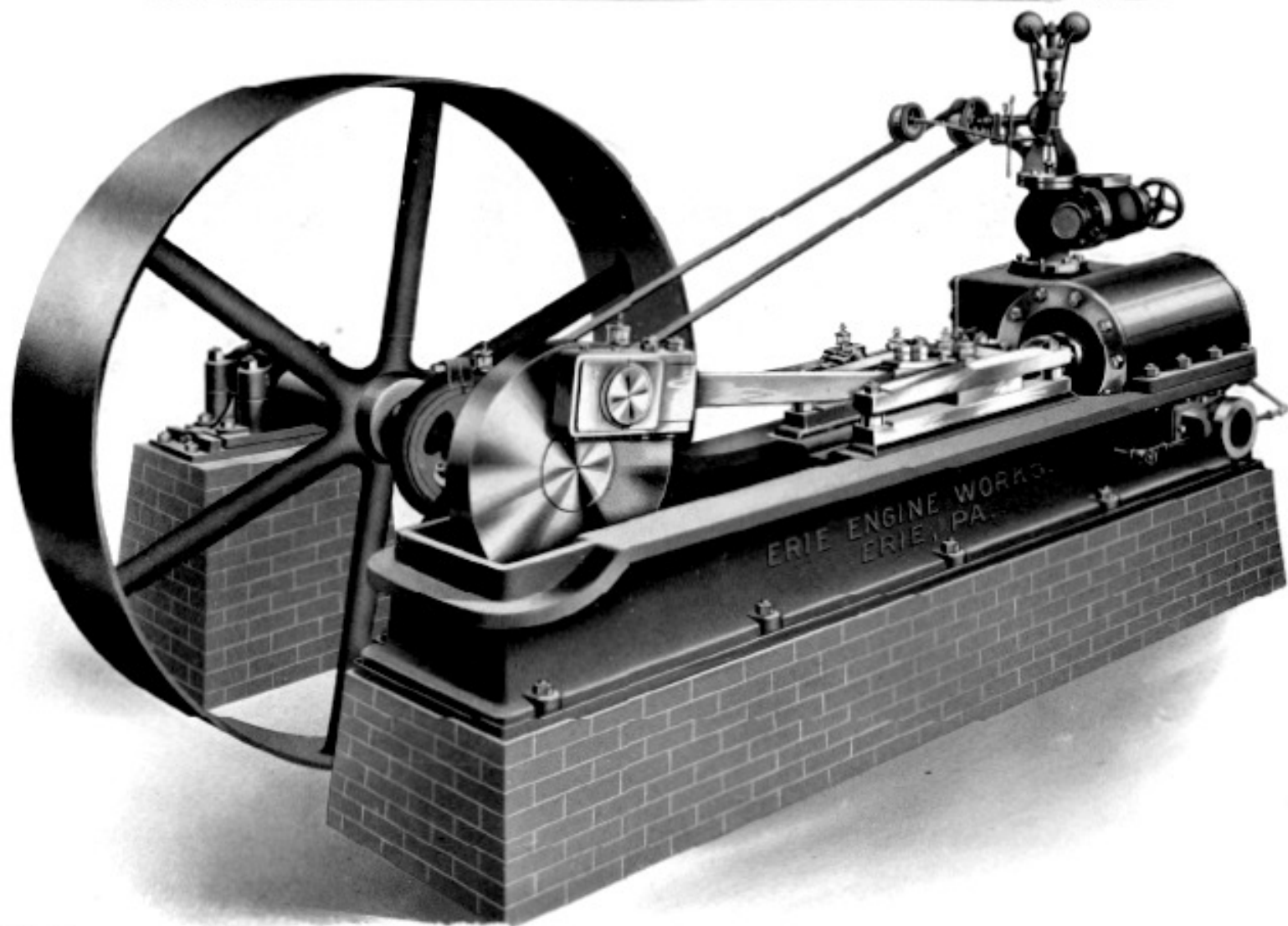
- | | |
|---|---|
| <p>Bed. These Engines have our improved form of bed with solid oil bottom, and beaded around bottom so as to catch all drippings and convey same to one point of exit at Crank End of bed.</p> <p>Crank Shaft. The Crank is made from a solid forging of open hearth steel slotted out to make the pin. It is ample in proportions and thoroughly counterbalanced, the discs being firmly attached to shaft by our patented method. The Crank Pin is unusually large; this and all other working parts being lubricated by oilers, as shown in illustration of Engine, or grease cups, if preferred.</p> <p>Connecting Rod. The Connecting Rod is of forged steel, and perfectly fitted throughout. The boxes are made of cast iron, crank end is bushed with special babbit metal, and a bronze bushing at the Crosshead end. These parts can be replaced at a minimum cost independent of the box holding them. The adjustment is made with wedges, thus admitting of the most accurate adjustment.</p> <p>Cylinder. The Cylinder is made of a mixture of steel and re-melted iron, giving a very close grain, and having an increased tensile strength over ordinary gray iron, and the walls soon acquire a smooth, hard polish under the influence of oil. These Cylinders are air jacketed. Indicator Plugs are provided, and fitted.</p> | <p>Piston. The Piston is of the hollow head type, fitted with two rings, which are expanded by the action of the steam. This Piston is fitted onto a crucible steel Piston rod; the rod is riveted to the Piston, thus eliminating the possibility of its becoming loose.</p> <p>Valve. We use an improved balanced valve, and it is one of the strongest points of the engine. The ring on the back relieves the valve of eighty per cent. of the steam pressure, always leaving sufficient pressure to hold the valve in steam tight contact with the seat. This valve takes up its own natural wear, is free to lift from the seat, and will remain steam tight under the most trying conditions. See illustration page 6.</p> <p>Guides. The Guides are of the Locomotive type, adjustable top and bottom, and with large wearing surfaces.</p> <p>Governor. Gardner Governor Co., Style B, Spring Governors are regularly used. If other style or make are preferred we will supply them.</p> <p>Test. The Engines are thoroughly tested before shipment, and will be found perfectly satisfactory as regards speed, regulation and adjustment. This test includes throwing off and on heavy overloads, putting different strains on engine to test working parts.</p> <p>Finish. The Engines will be finished in a thoroughly satisfactory manner throughout.</p> |
|---|---|

ERIE ENGINE WORKS

H. P. Ratings of Throttling Engines at Different Speeds and Pressures.

Revolutions per Minute.....		150			175			200			225			250		
Mean Effective Pressure..... (About 40% of Boiler Pressure)		30	35	40	30	35	40	30	35	40	30	35	40	30	35	40
No. 1	5 x 8	4	4½	5	5	5½	6	5	6	7	6	7	8	7	8	9
" 2	6 x 9	6	7	8	7	8	9	8	9	10	9	10	12	10	12	13
" 3	7 x 10	9	11	12	11	12	14	12	13	15	13	15	18	15	17	20
" 4	8 x 10	12	14	15	14	16	18	15	18	20	17	20	23	19	22	26
" 4½	9 x 10	15	17	20	17	20	23	20	23	26	22	25	29	24	28	32
" 5	8 x 12	14	16	19	16	19	22	19	22	25	21	24	28	23	27	31
" 6	9 x 12	18	20	24	20	24	27	24	27	31	26	30	35	29	34	39
" 7	10 x 12	22	25	29	25	30	34	29	33	35	32	37	43	36	41	48
" 8	10 x 15	27	31	36	31	37	42	36	42	48	40	47	54	45	52	60
" 9	11 x 15	33	38	43	38	44	50	43	50	58	57	67	76	63	74	85
" 10	12 x 16	41	48	55	48	56	64	55	64	73	62	72	82	70	80	92
" 11	13 x 16	48	56	64	56	66	75	64	75	85	73	84	97	80	94	107
" 11½	14 x 16	56	65	74	65	76	87	75	87	100	84	98	112	93	110	125
" 12	14 x 18	63	73	84	74	86	98	84	98	112	95	110	126			
" 13	15 x 18	72	85	96	85	98	112	96	112	129	108	121	145			
" 14	16 x 18	82	96	110	95	112	128	110	128	146	126	144	165			
" 16	19 x 18	115	135	155	135	158	180	155	180	206						

ERIE ENGINE WORKS



STATIONARY (SIDE-CRANK) ENGINES—Class "E."

ERIE ENGINE WORKS

STATIONARY (SIDE-CRANK) ENGINES—Class "E."

These Engines have our improved form of bed with solid oil bottom, and beaded around bottom so as to catch all drippings and convey same to one point of exit at Crank end of bed.

The Shaft is made from a forging of open hearth steel.

The Crank Pin is unusually large; this and all other working parts being lubricated by oilers, as shown in illustration of Engine, or grease cups, if preferred.

The Connecting Rod is of forged steel, and perfectly fitted throughout. The boxes are made of cast iron; crank end is bushed with special babbitt metal, and a bronze bushing at the Crosshead end. These parts can be replaced at a minimum cost independent of the box holding them. The adjustment is made with wedges, thus admitting of the most accurate adjustment.

The Cylinder is made of a mixture of steel and remelted iron, giving a very close grain. These Cylinders are air jacketed.

The Piston is of the hollow head type, fitted with two rings, which are expanded by the action of the steam. The Piston is fitted onto a crucible steel Piston Rod; the rod is riveted to the Piston, thus eliminating the possibility of its becoming loose.

We use an improved balanced valve, and it is one of the strongest points of the engine. The ring on the back relieves the valve of eighty per cent. of the steam pressure, always leaving sufficient pressure to hold the valve in steam tight contact with the seat. This valve takes up its own natural wear, is free to lift from the seat, and will remain steam tight under the most trying conditions.

The Guides are of the Locomotive type, adjustable top and bottom, and with large wearing surfaces.

Gardner Governor Co. style A Spring Governors are regularly used. If other style or make are preferred, we will supply them.

The Engines are thoroughly tested before shipment and will be found perfectly satisfactory as regards speed, regulation and adjustment. This test includes throwing off and on heavy overloads, putting different strains on engine to test working parts.

FIXTURES—Complete, comprise: Band Wheel, (size specified), Governor with belt, Throttle Valve, Sight Feed Lubricator, all necessary Oil Cups (or Grease Cups if preferred), and Wrenches for connecting rod.

Specifications.

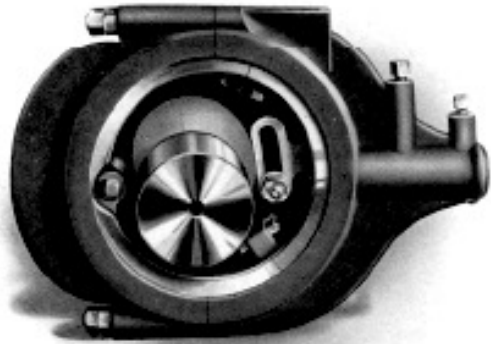
Number of Size	3	4	5	6	7	8	9	10	11	11½	12	13	14	16
HORSE POWER (as usually rated)	12	15	20	25	30	35	40	50	60	70	80	100	125	200
Usual Number of Revolutions (See page 13)	160	160	170	170	170	150	150	150	150	150	150	150	165	170
Diam. Cyl. and Length of Stroke inches	7x10	8x10	8x12	9x12	10x12	10x15	11x15	12x16	13x16	14x16	14x18	15x18	16x18	19x18
Diameter of Band Wheel "	48	48	54	60	60	72	72	84	84	84	84	84	96	96
Face of Band Wheel "	12½	12½	12½	14½	14½	14½	14½	16½	16½	16½	16½	16½	18½	20½
Diameter of Shaft "	2½	2¾	3	3¾	3¾	4¾	4¾	4¾	4¾	5¾	6¾	6¾	6¾	7¾
Length of Shaft feet	4	4	4½	4½	5	5½	5½	6	6	6	6	6	6	7½
Length of Journals inches	6½	6½	7	8	8	9	9	11	11	12	12½	12½	12½	16
Diameter of Steam Pipe "	1½	2	2	2½	2½	2½	3	3½	3½	4	4	4½	4½	6
Diameter of Exhaust Pipe "	2	2½	2½	3	3½	3½	4	4½	4½	5	5	5	5	8

SIZES OF FLY WHEEL AND PULLEY.

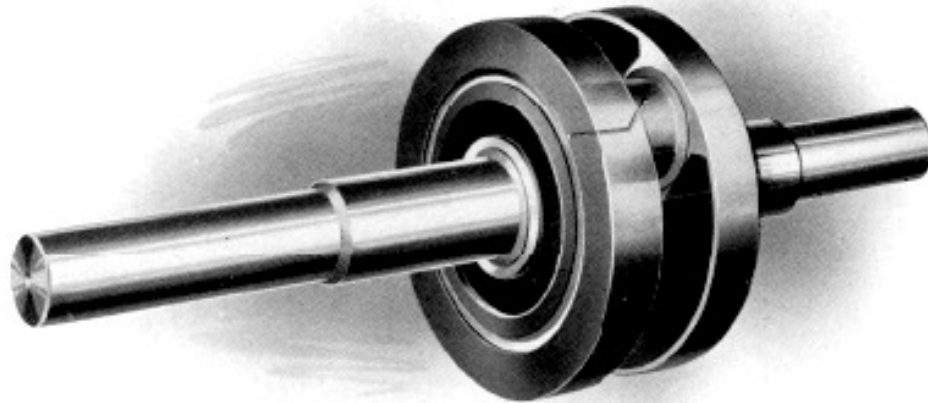
Substituted in place of Balance Wheel, when so ordered, at extra cost.

Diameter of Fly Wheel inches	60	60	60	62	72	72	84	84	84	84	96	96	96	96
Diameter of Pulley "	32	32	36	36	40	40	44	44	44	44	48	48	48	48
Face of Pulley "	10½	10½	10½	12½	12½	12½	12½	14½	16½	16½	16½	16½	18½	20½

ERIE ENGINE WORKS

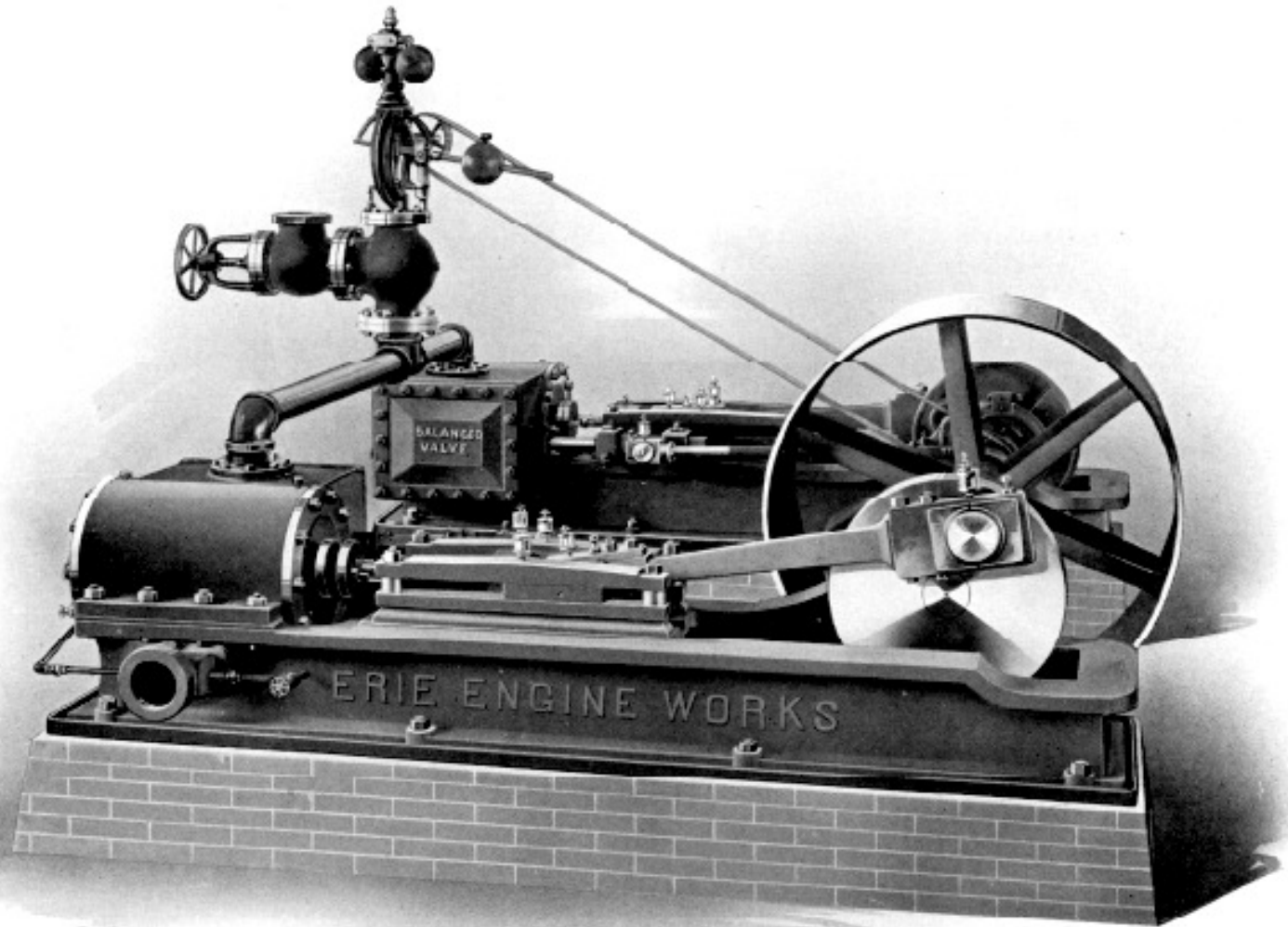


Above we illustrate our Variable Cut-off or Shifting Eccentric. By the use of this on throttling engines in place of the usual fixed eccentric it is possible for an engineer to procure any desired point of cut-off ranging from $\frac{1}{4}$ to $\frac{5}{8}$ stroke of piston. This is accomplished by loosening the nut and shifting the eccentric across the shaft, changing the travel of valve until the desired cut-off is procured, then securing it in that position. The actual power required to do the work under varying conditions is thereby procured by the use of this device on throttling engines. It can be attached in place of our fixed eccentric on throttling engines, both side and centre-crank, at a slight additional cost which we would be glad to quote upon application.



This illustration shows the crank as constructed in all our Automatic Centre-Crank Engines and manner of lubricating the crank pin.

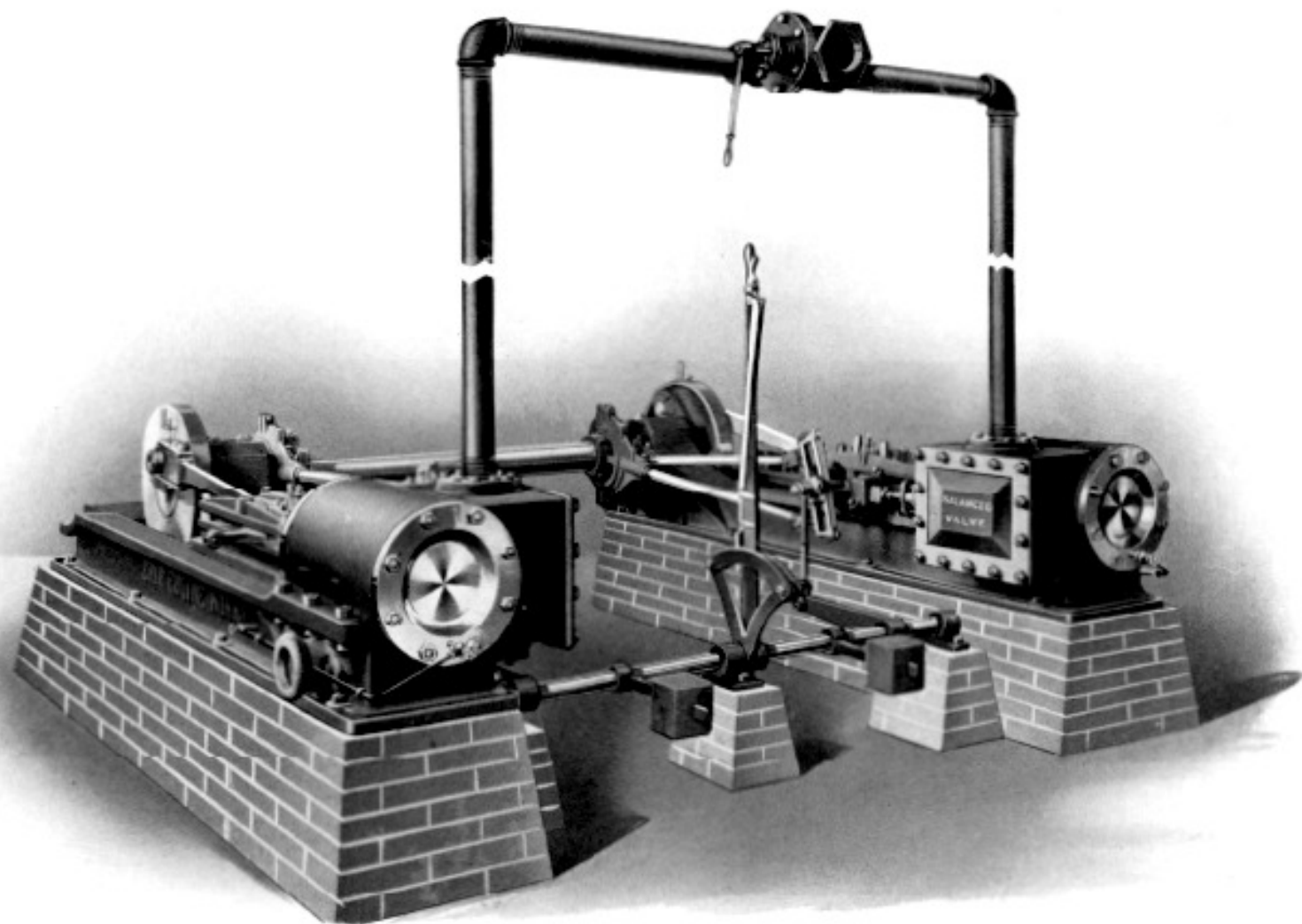
ERIE ENGINE WORKS



DOUBLE ENGINES FOR STATIONARY PURPOSES—Class "F."

Nos. 3 and 4 have Cylinders overhanging the bed.

ERIE ENGINE WORKS



DOUBLE ENGINES WITH LINKS, ETC.—Class "G."
Nos. 3 and 4 have Cylinders overhanging the bed.

ERIE ENGINE WORKS

DOUBLE ENGINES—Class "F" and "G."

The cuts illustrate our Double Engine, fitted with Links, Tumbling Shaft, Reverse Lever, Piping and Lever Throttle, and is adapted especially for hoisting purposes. The Cranks being set at right angles prevent the Engine from "getting on its center," and it is at all times ready to start. Full description of the Engine will be found on Catalogue page 15.

This style Engine complete includes Link Motion, Tumbling Shaft, Quadrant, Double Eccentrics, Reverse Lever, overhead Piping, Lever Throttle, Two Steel Wrenches, and all necessary Oil Cups, including Sight Feed Lubricator.

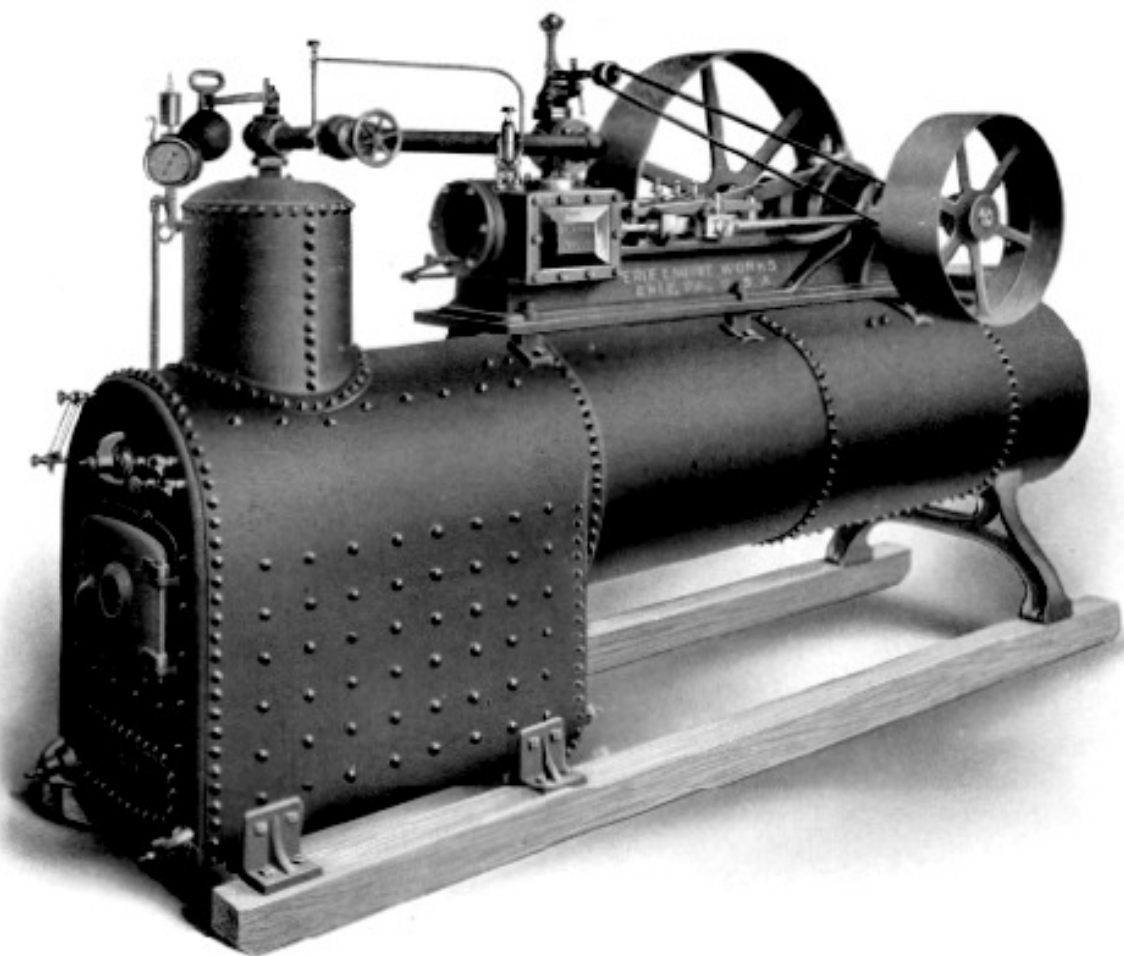
The Engine will also be furnished without reversible attachment for ordinary stationary work, with fixtures as follows: Band Wheel, Governor with Belt, Throttle Valves and Piping, Sight Feed Lubricator and all necessary Glass Oil Cups, and Cylinder drainage piped. See page 17 for illustration.

Every Engine is tested under steam before it leaves our shops, and any part can be duplicated, as they are built with special tools and templates.

Balanced Valves in all sizes except Nos. 3 and 4.

Specifications.

Number of Size	3	4	5	6	7	8	9	10	11	11½	12	13	14	16
HORSE POWER (as usually rated).....	25	30	40	50	60	70	80	100	120	140	160	200	250	400
Diameter of Cylinder inches	7	8	8	9	10	10	11	12	13	14	14	15	16	19
Length of Stroke "	10	10	12	12	12	15	15	16	16	16	18	18	18	18
Usual Number of Revolutions. (See p. 13)	160	160	170	170	170	150	150	150	150	150	150	150	165	175
Diameter of Band Wheel inches	54	60	60	60	72	72	78	84	84	84	96	96	96	96
Face of Band Wheel "	12½	14½	14½	16½	14½	16½	16½	16½	18½	18½	16½	18½	20	36
Diameter of Shaft "	3¾	3¾	3¾	4¾	4¾	4¾	4¾	5¾	5¾	6	6½	6½	6¾	8½
Diam. of Steam Pipe bet. Engines. "	1½	2	2	2¼	2½	2½	3	3½	3½	4	4	4½	4½	6
Diam. of Steam Pipe Eng. to Boiler "	2¼	2½	2½	3	3½	3½	4	4½	5	5	5	6	6	9
Diam. of Exh. Pipe for each Engine "	2	2½	2½	3	3½	3½	4	4½	4½	5	5	6	6	8



PORTABLE ENGINES ON SKIDS.

ERIE ENGINE WORKS

PORTABLE ENGINES ON SKIDS.

The engines used in these outfits are our Class C and D Centre-Crank Engines which are fully described pages 8 to 13 inclusive. The boilers are the Standard Water Front Boiler described pages 34 and 35 and no further description is here necessary.

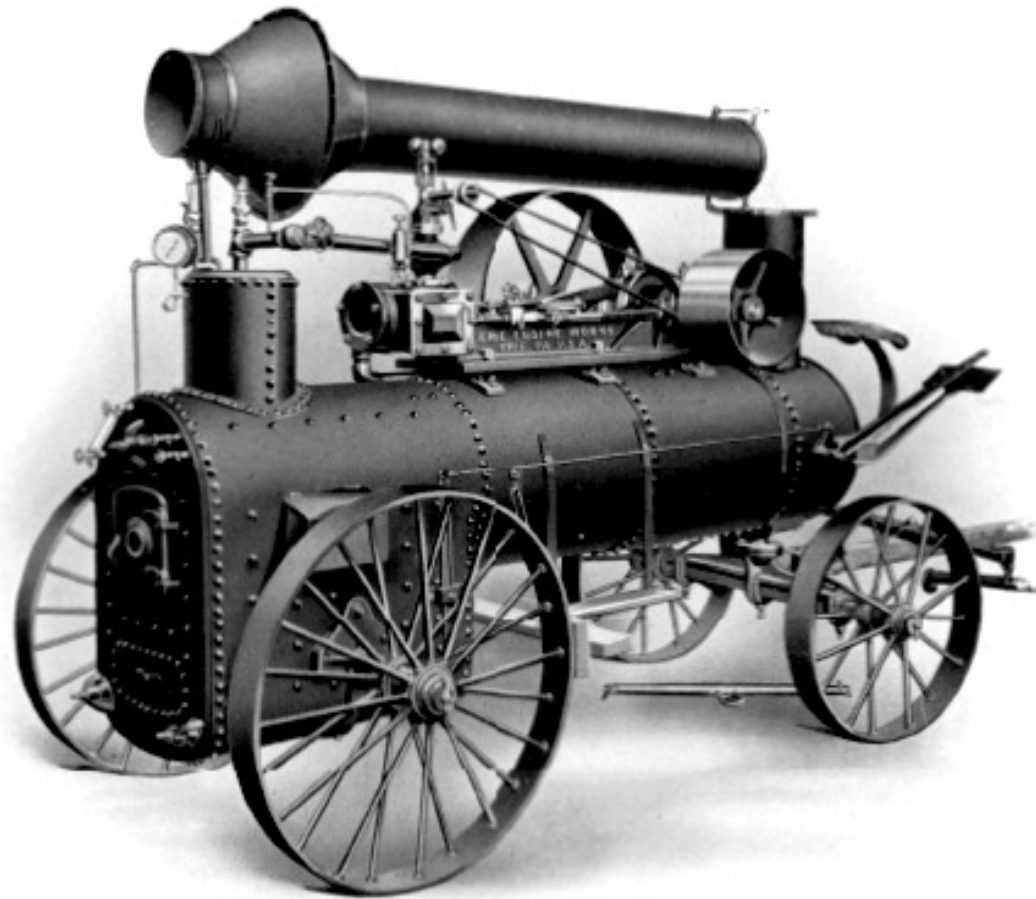
The sizes of pulleys as given in specifications can be changed when necessary to meet installing conditions. Nos. 9 and 10 have extra feet and an additional leg for support. Balanced Valve in No. 5 and larger sizes. Shaking grates furnished when desired at additional cost.

These outfits **complete** have two pulleys, a smoke stack (size specified below), grates, governor with belt, throttle valve, oil cups, (or grease cups, if preferred), sight feed lubricator, steam gauge, water gauge, gauge cocks, whistle, blow-off, check, stop and safety valves, guy rods four times the length of stack, an injector fitted, two steel wrenches, cylinder drainage, all steam and exhaust connections furnished and fitted per illustration.

If cast front boilers are preferred they will be furnished at slightly reduced prices.

Specifications.

Number of Size	0	1	2	3	4	4½	5	6	7	8	9	10
HORSE POWER	6	8	10	12	15	20	20	25	30	35	40	50
Diameter of Cylinder inches	5	5	6	7	8	9	8	9	10	10	11	12
Length of Stroke "	8	8	9	10	10	10	12	12	12	15	15	16
Usual Number of Revolutions	185	240	190	160	160	170	170	170	170	150	150	150
Diameter of Pulleys { inches	14	14	16	20	20	20	30	32	32	36	36	36
	32	32	36	44	44	44	48	54	54	60	60	72
Face of Pulleys { "	8½	8½	8½	10½	10½	10½	8½	10½	10½	10½	10 ½	12½
	8½	8½	9½	10½	10½	12½	12½	12½	12½	14½	14½	14½
Diameter of Boiler "	26	28	30	32	32	34	34	36	36	40	40	48
Length of Furnace "	34	36	38	38	44	52	52	52	52	52	60	60
Height of Furnace "	29	32	34	38	38	38	38	40	40	44	44	50
Width of Furnace "	21	22	24	26	26	28	28	30	30	34	34	42
Number of 3-inch Tubes	17	20	22	26	26	30	30	34	34	40	42	52
Length of Tubes inches	60	66	72	72	78	90	90	96	108	108	120	120
Diameter of Stack "	12	14	14	15	15	16	16	18	18	20	20	22
Length of Stack feet	18	18	20	20	20	24	24	24	30	35	35	40



PORTABLE ENGINES ON WHEELS.

ERIE ENGINE WORKS

PORTABLE ENGINES ON WHEELS.

For further detail description of these Engines refer to pages 8 to 13 inclusive, Class C and D. The boilers are the standard water front style per description pages 34 and 35, and any further description here is not necessary.

These outfits Nos. 0 to 3 are mounted upon steel wheels having 4" tire; larger size outfits on wheels having 6" tire. The axles are forged from steel in one piece, and in every detail of proportion are suitable to make them adapted for strong continuous service.

The outfits when quoted and furnished complete are equipped all as shown in the illustration, including an injector fitted and grates.

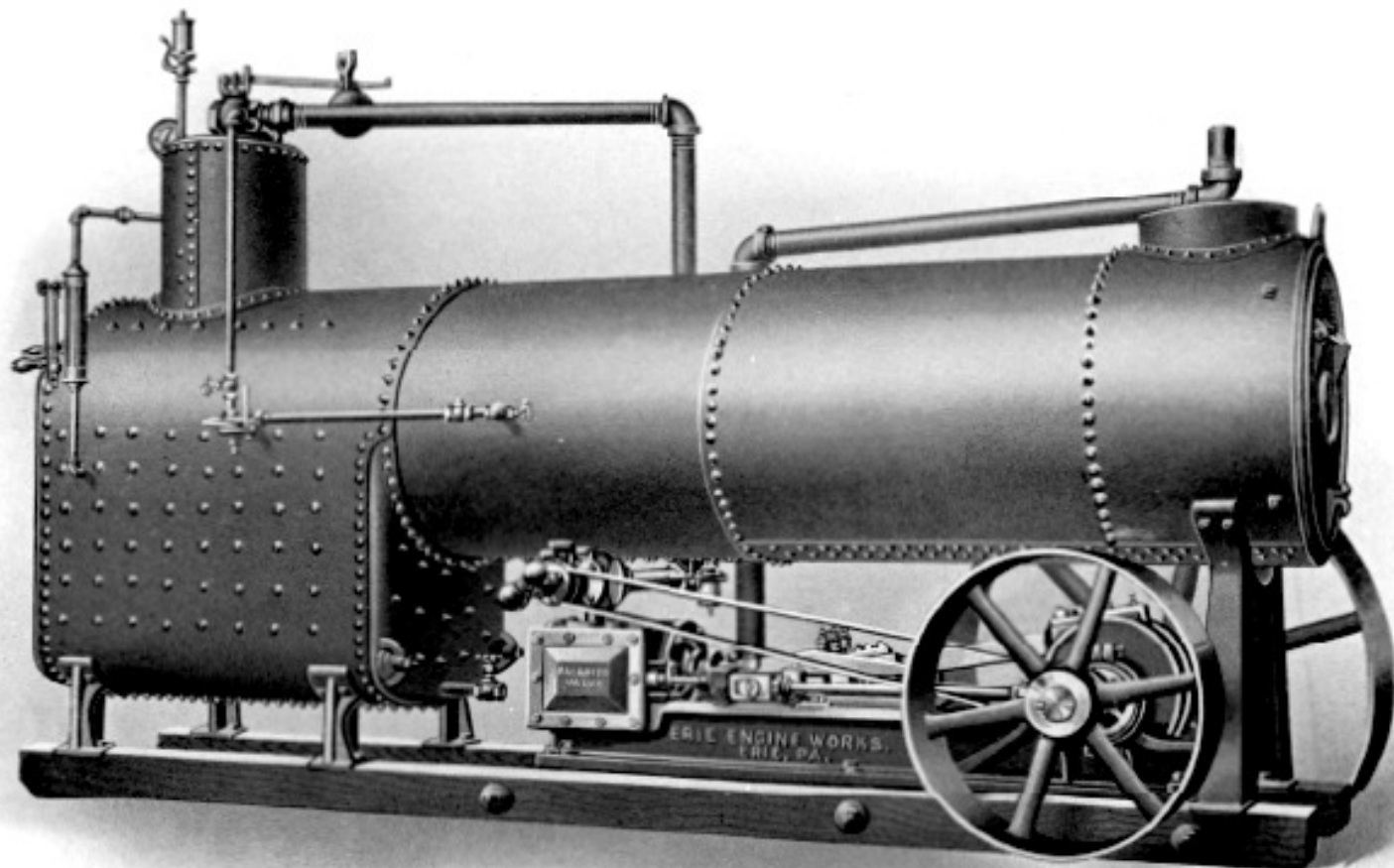
If cast front boilers are preferred they will be furnished at slightly reduced cost.

Each outfit is tested under steam and hydraulic pressure before shipment and hand pump with hose for filling boiler will be furnished, if desired, and charged extra.

Specifications.

Number of Size	0	1	2	3	4	4½	5	6	7	8
Horse Power	6	8	10	12	15	20	20	25	30	35
Diameter of Cylinder..... inches	5	5	6	7	8	9	8	9	10	10
Length of Stroke..... "	8	8	9	10	10	10	12	12	12	15
Usual Number of Revolutions	185	240	190	160	160	170	170	170	170	150
Diameter of Pulleys..... { inches	14	14	16	20	20	20	30	32	32	36
	32	32	36	44	44	44	48	54	54	60
Face of Pulleys..... { "	8½	8½	8½	10½	10½	10½	8½	10½	10½	10½
	8½	8½	9½	10½	10½	12½	12½	12½	12½	14½
Diameter of Boiler	26	28	30	32	32	34	34	36	36	40
Length of Furnace	34	36	38	38	44	52	52	52	52	52
Height of Furnace	29	32	34	38	38	38	38	40	40	44
Width of Furnace	21	22	24	26	26	28	28	30	30	34
Number of 3-inch Tubes	17	20	22	26	26	30	30	34	34	40
Length of Tubes	60	66	72	72	78	90	90	96	108	108

ERIE ENGINE WORKS



UNDERMOUNTED PORTABLE ENGINES.

UNDERMOUNTED PORTABLE ENGINES.

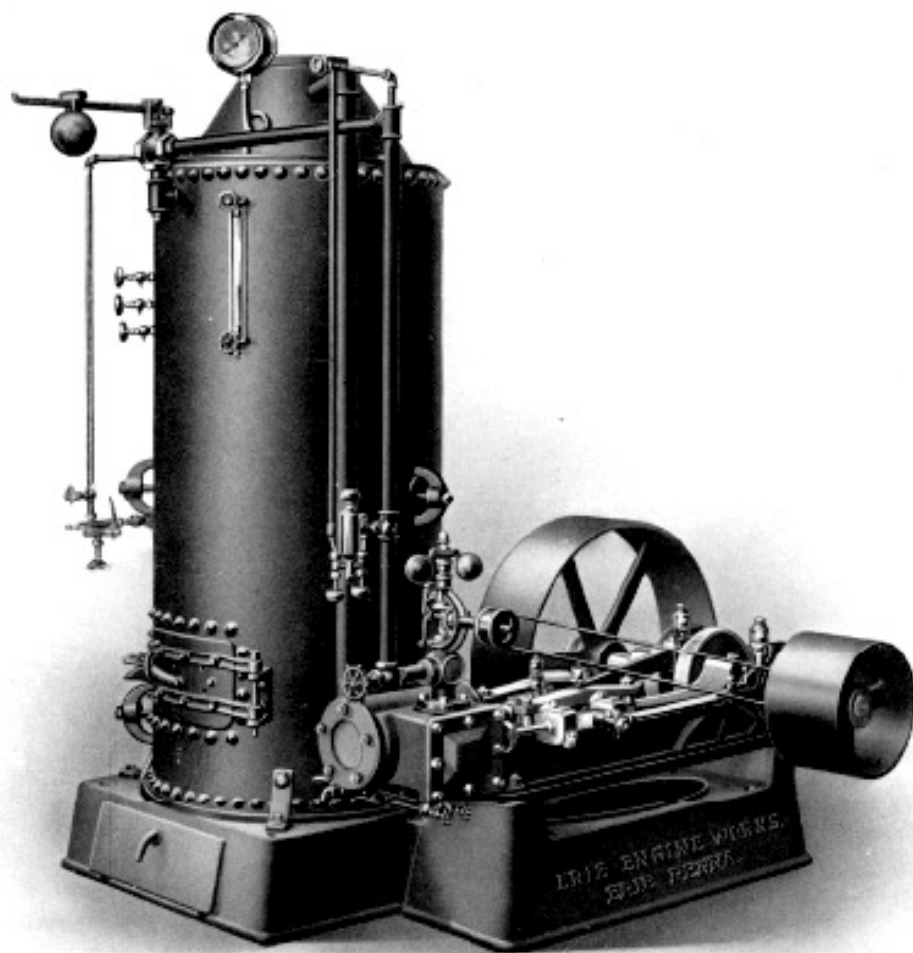
This style outfit is especially recommended to customers requiring a portable outfit for heavy duty. The engine being mounted underneath the boiler relieves the boiler from all strain. The engines used are our Class C and D Centre-Crank which are fully described pages 8 to 13 inclusive. The boilers are the standard water

front style described pages 34 and 35. Size of pulleys as given in specifications can be changed when necessary to meet installing conditions.

If cast front boilers are preferred they will be furnished at slightly reduced prices.

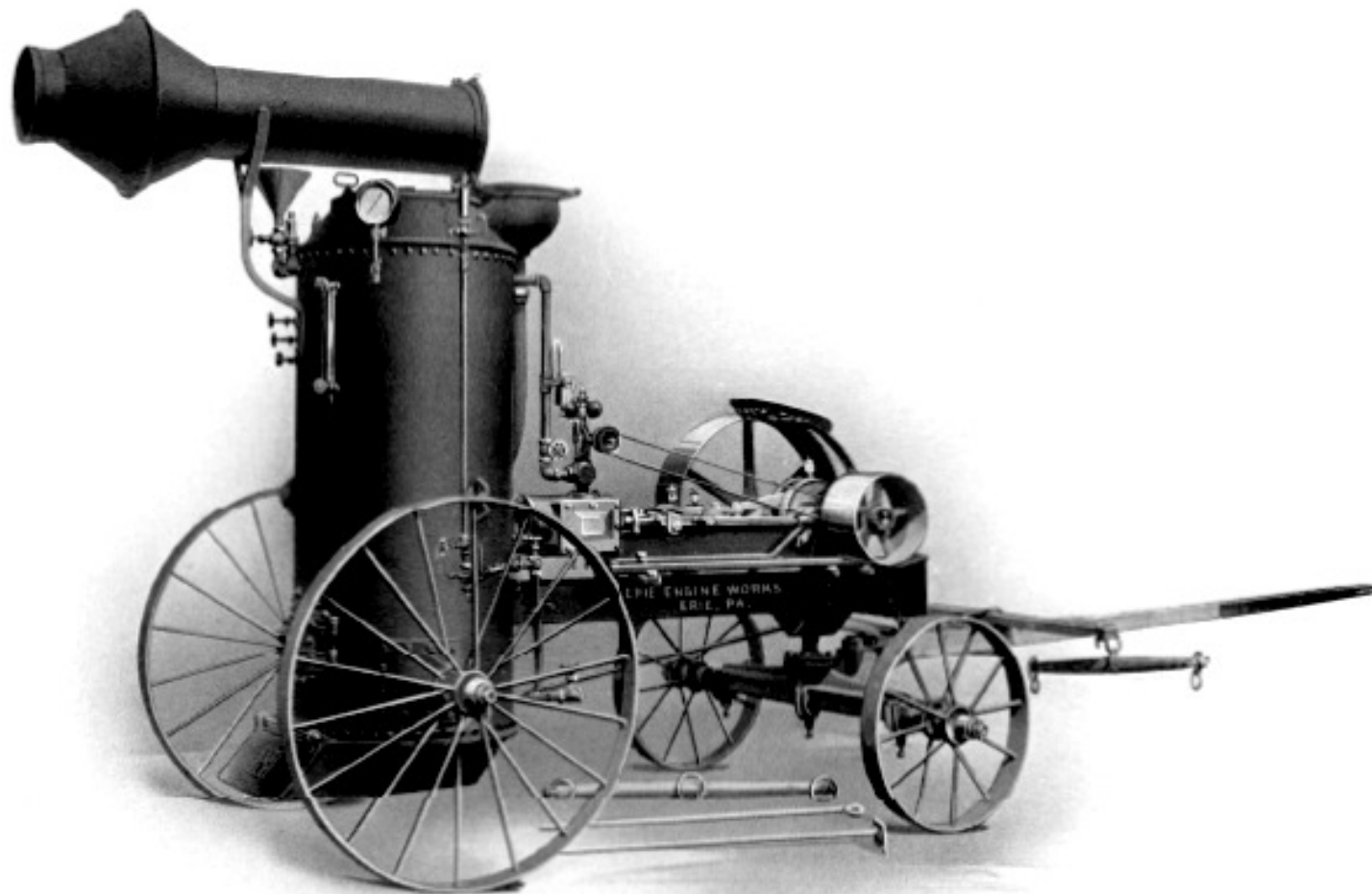
Specifications.

Number of Size.	4½	5	6	7	8	9	10	11	11½
HORSE POWER.	20	20	25	30	35	40	50	60	70
Diameter of Cylinderinches	9	8	9	10	10	11	12	13	14
Length of Stroke..... "	10	12	12	12	15	15	16	16	16
Usual Number of Revolutions.	170	170	170	170	150	150	150	150	150
Diameter of Pulleys { inches	20	30	32	32	36	36	36	36	36
	44	48	54	54	60	60	72	72	72
Face of Pulleys..... { "	10½	8½	10½	10½	10½	10½	12½	12½	12½
	12½	12½	12½	12½	14½	14½	14½	16½	16½
Diameter of Boiler..... "	34	34	36	36	40	40	48	48	48
Length of Furnace..... "	52	52	52	52	52	60	60	60	72
Height of Furnace..... "	38	38	40	40	44	44	50	50	50
Width of Furnace "	28	28	30	30	34	34	42	42	42
Number of 3-inch Tubes.....	30	30	34	34	40	42	52	52	54
Length of Tubesinches	90	90	96	102	102	120	120	144	168
Diameter of Stack "	16	16	18	18	20	20	22	22	24
Length of Stack..... feet	24	24	24	30	35	35	40	50	55



COMBINED ENGINES AND VERTICAL BOILERS ON CAST BASES.

ERIE ENGINE WORKS



See description page 28.

COMBINED ENGINES AND VERTICAL BOILERS ON WHEELS.
PATENTED.

Page Twenty-seven

ERIE ENGINE WORKS

COMBINED ENGINES AND VERTICAL BOILERS.

See illustrations pages 26 and 27.

The Class C and D Centre-Crank Engines used in these outfits are fully described pages 8 to 13 inclusive, and the boilers pages 42 and 43. The outfits when quoted complete include all the fittings and fixtures shown in the illustrations.

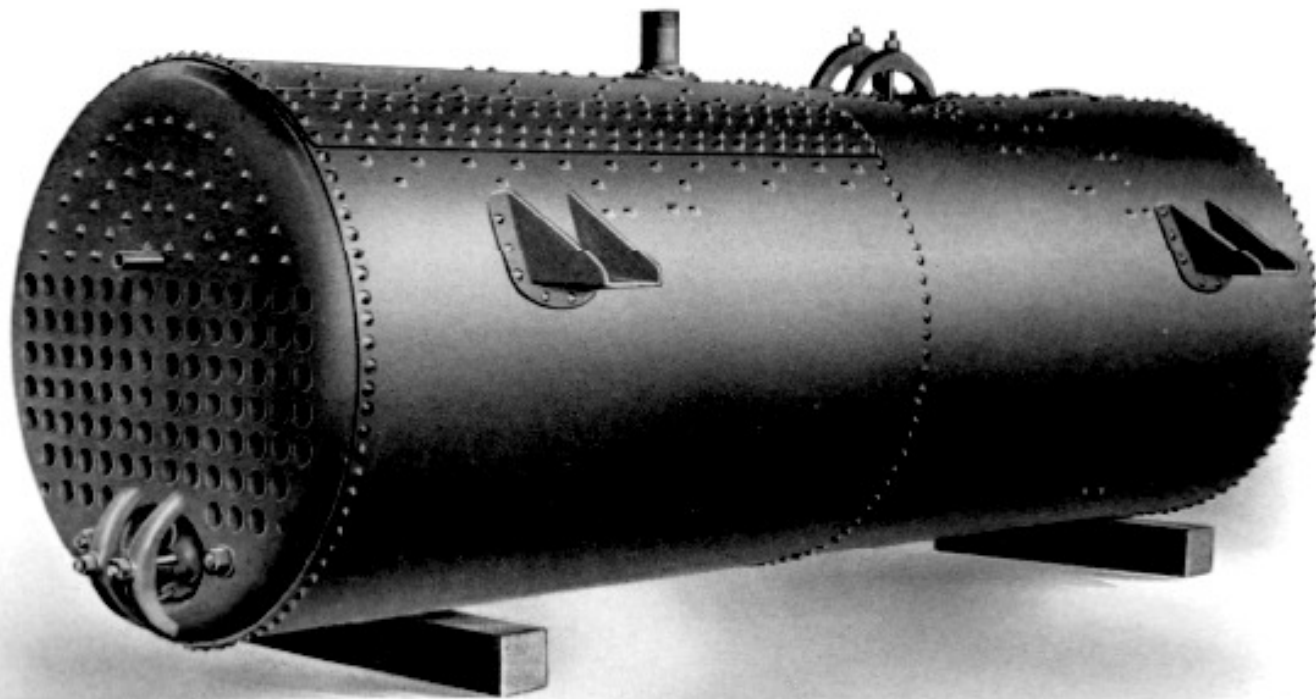
The engine and boiler bases are cast separate so the engine can

be set a distance from the boiler, if desired. We call special attention to the patented hood shown in the outfit on wheels, which is more convenient than the ordinary style for cleaning the tubes. This hood would be furnished at an extra cost with the outfit on bases when desired.

Specifications.

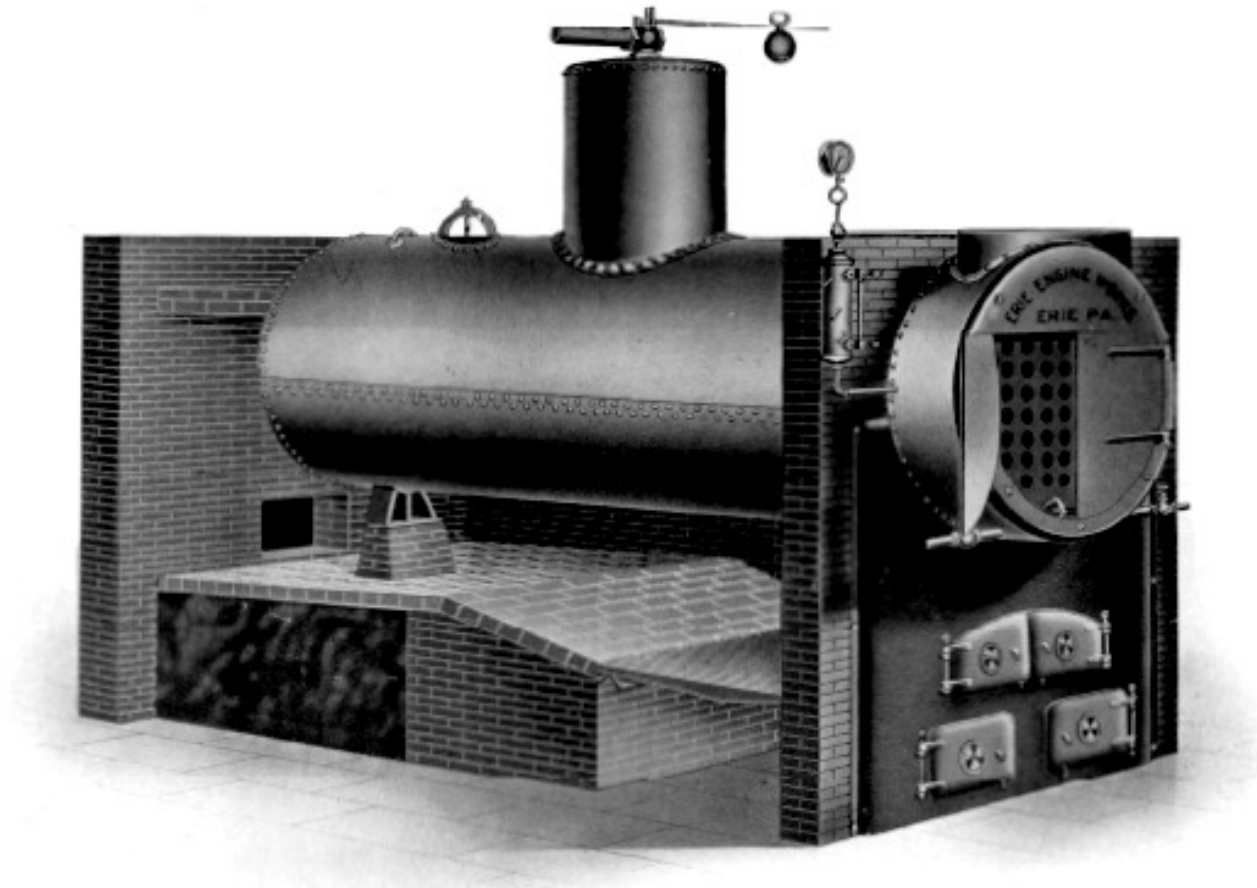
Number of Size	0	1	2	3	4	4½	5	6
HORSE POWER	6	8	10	12	15	20	20	25
Diameter of Cylinder	5	5	6	7	8	9	8	9
Length of Stroke	8	8	9	10	10	10	12	12
Usual Number of Revolutions	185	240	190	160	160	170	170	170
Diameter of Pulleys	14	14	16	20	20	20	30	32
..... inches	32	32	36	44	44	44	48	54
Face of Pulleys	8½	8½	8½	10½	10½	10½	8½	10½
..... inches	8½	8½	9½	10½	10½	12½	12½	12½
Diameter of Boiler	30	30	30	36	36	36	36	42
Diameter of Furnace	25	25	25	31	31	31	31	37
Height of Furnace	27	27	27	27	27	27	27	27
Number of 2-inch Tubes	49	51	53	68	68	68	68	109
Length of Tubes	30	39	45	45	57	73	73	57
Size of Feed Pipe	¾	¾	¾	¾	¾	1	1	1
Size of Blow-off Pipe	1	1	1	1	1¼	1¼	1¼	1½
Size of Safety Valve	1	1¼	1½	1½	2	2	2	2½
Diameter of Smoke Stack required	12	12	12	16	16	16	16	20

These Boilers will be furnished with Tubes submerged (see specifications page 43) when desired, and difference in price charged.

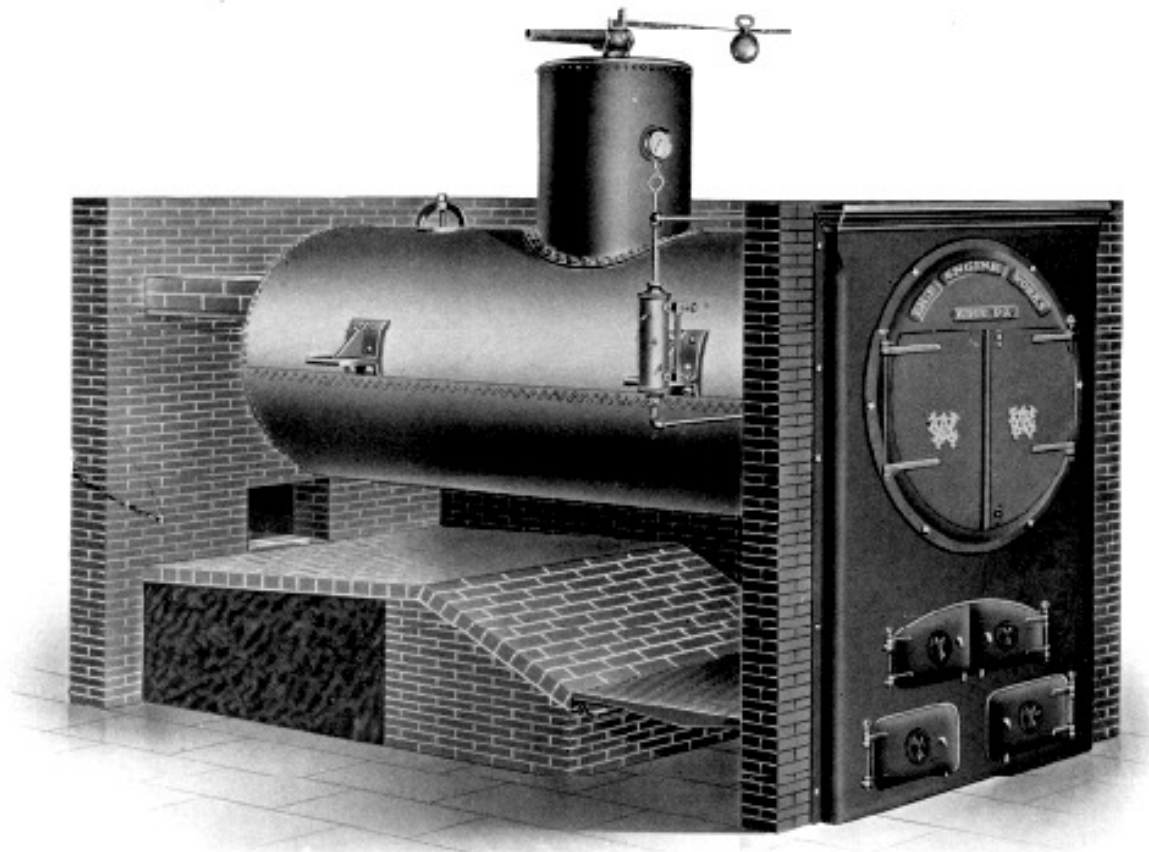


HIGH PRESSURE STATIONARY BOILERS.

For 125 and 150 lbs. pressure. Specifications and prices upon application.



STATIONARY TUBULAR BOILERS WITH HALF ARCH FRONT.



STATIONARY TUBULAR BOILERS WITH FULL FRONT.

ERIE ENGINE WORKS

STATIONARY TUBULAR BOILERS.

The fixtures for Half Front Boiler comprise: Half Arch Front with Doors, Liners, Dead Plate and Anchor Bolts; Grates and Bearers; Rear Arch Bars; Rear Ash Door and Frame; Stand for supporting rear end of Boiler; Safety Valve; Steam Gauge with Syphon and Cock; Water Column with Piping and Valves; Glass Water Gauge and three Gauge Cocks; Whistle and Valve; Blow-off Valve; Check Valve and Globe Valve for Feed Line.

The fixtures for the Full Front Boiler comprise: Full Front with Flue, Fire and Ash Doors; Liners; Dead Plate and Anchor

Bolts; Stack Plate and Damper; Grates and Bearers; Rear Arch Bars; Rear Ash Door and Frame; Wall Plates and Rollers; four Buckstays and Rods binding the side walls of setting; Safety Valve; Steam Gauge; Syphon and Cock; Water Column with Piping and Valves; Glass Water Gauge and Gauge Cocks; Whistle and Valve; Blow-off Valve; Check and Globe Valve for Feed Line.

Each Boiler also has Smoke Stack of size named in specifications with four times its length of galvanized Guy Wire.

For further description see following page.

Specifications.

Number of Size	1	2	3	4	5	6	7	7½	8	9	10	10½	11	12	13	14	15	16	17
Horse Power	10	12	15	20	25	30	35	40	40	45	50	60	60	70	80	90	100	125	150
Diameter of Boiler.....inches	30	36	36	36	42	44	44	44	48	48	54	54	60	60	60	66	66	72	72
Thickness of Shell in Boilers	¼	¼	¼	¼	⅜	⅜	⅜	⅜	⅝	⅝	⅝	⅝	¾	¾	¾	¾	¾	¾	¾
Thickness of Heads in Boilers..... "	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅝	⅝	⅝	⅝	⅝	⅝	⅝	⅝	¾
Length of Flues.....feet	8	7	8	10	10	10	12	14	12	14	12	15	12	14	16	15	16	16	18
Number of 3-in. Flues.....	20	25	28	28	38	46	46	46	52	52	60	60	78	78	78	92	92	70-4"	70-4"
Height of Dome..... inches	20	22	22	22	24	24	24	24	28	28	34	34	36	36	36	40	40	40	40
Diameter of Dome..... "	18	20	20	20	22	24	24	24	28	28	30	30	32	32	32	36	36	36	36
Diameter of Smoke Stack..... "	14	16	16	16	20	22	22	22	24	24	26	26	28	28	28	30	32	34	34
Length of Smoke Stack.....feet	24	24	28	35	35	35	40	50	40	50	40	50	40	50	60	60	60	60	60
Common Brick (Full Front).....	6000	6550	7000	7800	8700	8800	10200	11400	10800	11800	11800	13000	11900	12900	13400	14400	15200	16000	17000
Fire Brick (Full Front).....	580	630	700	850	960	1000	1300	1420	1380	1550	1550	1700	1570	1630	1710	1800	1850	1900	2000
Common Brick (Half Front).....	5000	5390	5750	6300	7000	7100	8100	9000	8000	9000	9000	10000	9500	10250	11000	12000	12500	12700	13500
Fire Brick (Half Front).....	470	520	600	700	840	900	1030	1180	1100	1200	1200	1350	1250	1350	1450	1400	1450	1650	1800

ERIE ENGINE WORKS

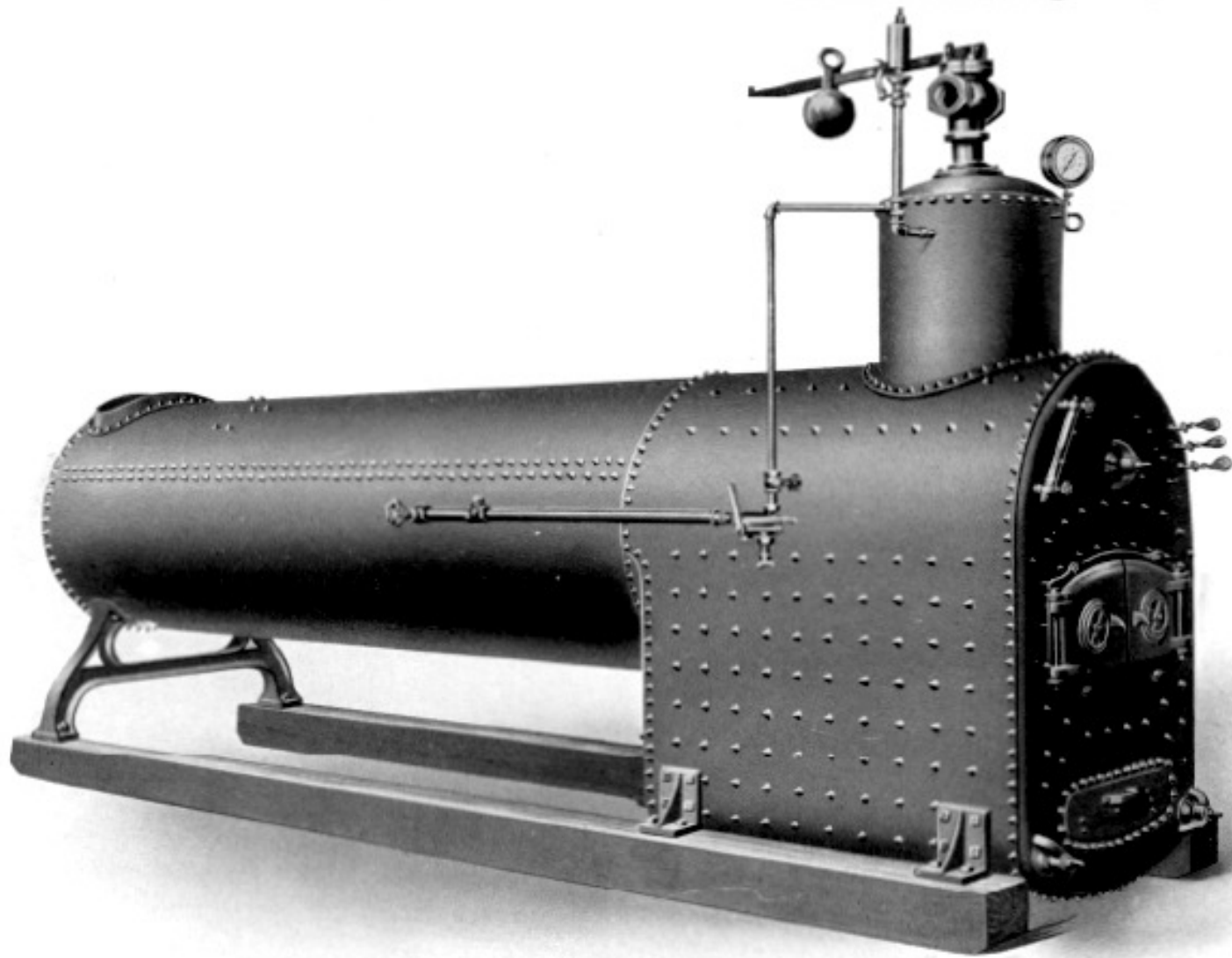
On the preceding pages we illustrate the Return Tubular Boilers. The excellent efficiency of these boilers is so well known that no further reference to this feature is necessary. This Boiler is made of best flange steel having tensile strength of 60,000 lbs., elastic limit of 30,000 lbs., and elongation of 25% in eight inch section. For 100 lbs. working pressure the longitudinal seams are lapped and double riveted. Up to and including size No. 17 the bottom of the shell is formed from one plate, thus eliminating the seam of rivets over the hottest part of the furnace and giving a smooth surface on the inside of shell from which sediment can be easily removed. Boiler is constructed in accordance with the best engineering practices and is inspected and tested by a representative of a responsible Inspection and Insurance Company under hydraulic and steam pressure, the former at one and one half times the working pressure. At slight extra cost we furnish certificate of test and policy of insurance for one year.

Grates for Boilers having 7 ft. and 8 ft. tubes are 36" long; 10 ft. tubes 42"; 12 ft. tubes, 48"; 14, 15 and 16 ft. tubes, 54"; and

18 ft. tubes, 60" long. The width of grates in all cases is the same as the diameter of the boiler. Sawdust grates 6" longer than regular grates will be supplied when ordered without extra charge. Shaking grates furnished when desired at extra cost.

Manholes will be placed in shells of Boilers 1, 2, 3 and 4 only on specific order and at extra charge. All larger sizes regularly have manhole in top of shell. In Boilers up to and including size No. 10½, we place hand hole in front head beneath tubes, in larger sizes manhole in this position, unless otherwise directed.

For those desiring Boilers for higher than 100 lbs. working pressure we are prepared to furnish specifications to suit the requirements of the individual; and to make prompt deliveries, we carry material for many of the larger size Boilers for 125 lbs. and 150 lbs. working pressure. The shells of these high pressure boilers are made in circular courses, two or three in number, depending upon length of Boiler, with one sheet to each course, having the longitudinal seams butted with inside and outside covering strips triple riveted each side of the seam.



PORTABLE BOILERS. (WATER FRONT AND BOTTOM.)

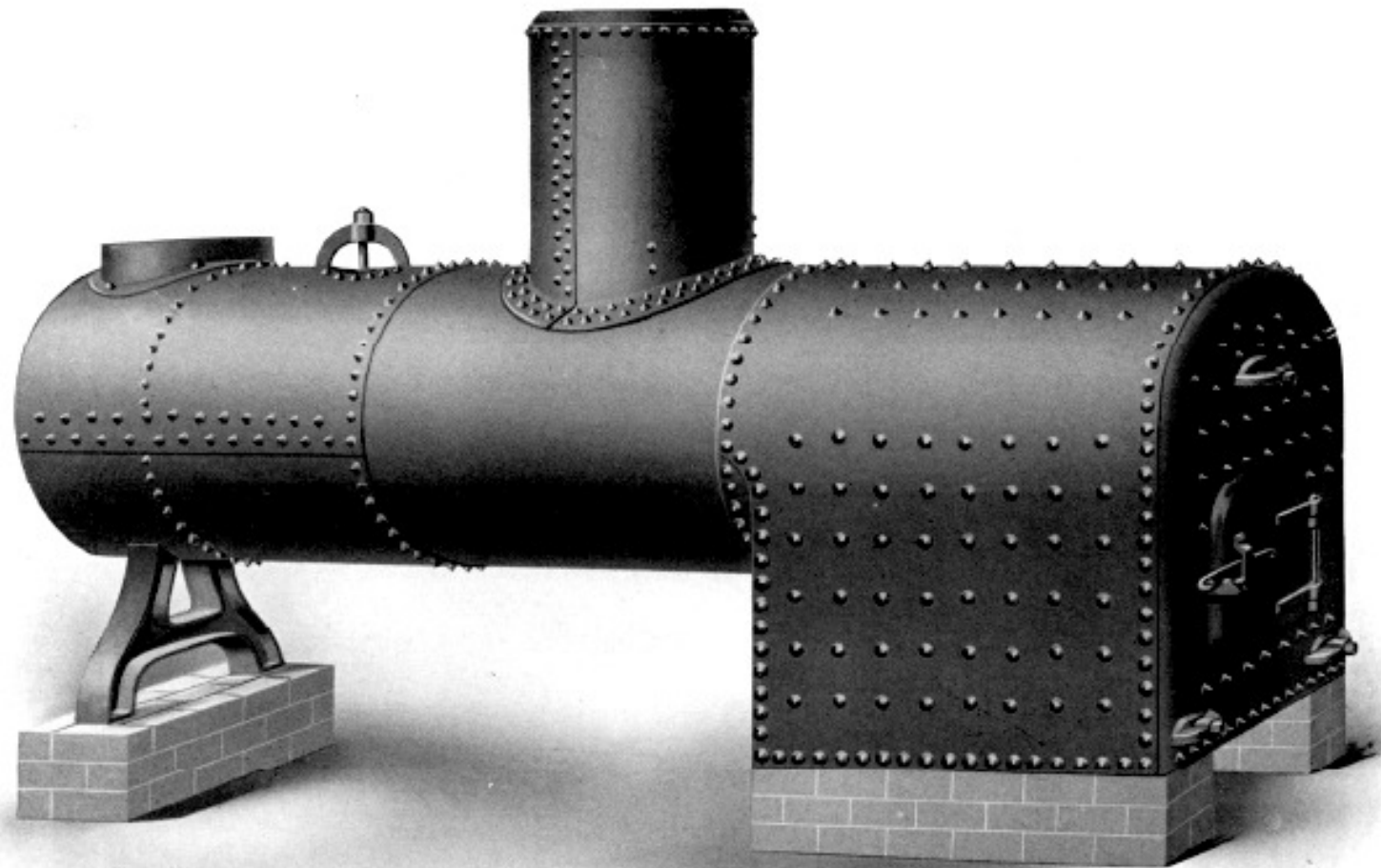
On opposite page we illustrate our Standard Portable Boiler with Water Front and Bottom. They are made of best Flange Steel throughout, and the construction is such as to make the Boiler insurable under 100 lbs. working pressure. Handholes are so placed as to give best means of cleaning out the accumulations

of foreign matter from the water spaces. A fusible plug is placed in the crown sheet as a safeguard in case of low water. The fire door has liner which is easily replaced, and the ash door, suspended at its top, has a slide damper for regulating the draft. Boilers are also mounted on skids.

Specifications.

Number of Size	0	1	2	3	4	5	6	7	8	9	10	11	12
HORSE POWER	6	8	10	12	15	20	25	30	35	40	50	60	70
Diameter of Boiler	26	28	30	32	32	34	36	36	40	40	48	48	48
Length of Furnace	34	36	38	38	44	52	52	52	52	60	60	60	72
Height of Furnace	29	32	34	38	38	38	40	40	44	44	50	50	50
Width of Furnace	21	22	24	26	26	28	30	30	34	34	42	42	42
Thickness of Shell and Outside of Fire Box ..	¼	¼	¼	¼	¼	¼	¼	½	½	½	⅝	⅝	⅝
Thickness of Furnace Plates	⅝	⅝	⅝	⅝	⅝	⅝	⅝	⅝	⅝	⅝	⅝	⅝	⅝
Thickness of Tube Plates	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜	⅜
Number of 3-inch Tubes	17	20	22	26	26	30	34	34	40	42	52	52	54
Length of Tubes	60	60	72	72	78	90	90	108	108	120	120	144	108
Diameter of Stack	12	14	14	15	15	16	18	18	20	20	22	22	24
Length of Stack	18	18	20	20	20	24	24	30	35	35	40	50	55

Fixtures and fittings consist of: Grates, Steam Gauge, Water Gauge, three Gauge Cocks, Safety Valve, Blow-off Valve, Check and Feed Valves, Whistle and Valve, Smoke Stack and Guy Wire and Injector fitted. Shaking Grates furnished, when desired, at additional cost.



LOCOMOTIVE PORTABLE BOILERS.

ERIE ENGINE WORKS

LOCOMOTIVE PORTABLE BOILERS, WITH WATER FRONT AND OPEN BOTTOM.

The adaptability of the Locomotive Portable Boiler to many and varied conditions, as well as its efficiency, is proven by its popularity among steam users requiring both high and low pressure. The boiler per catalogue specifications is built for 100 lbs. working pressure, being tested under 150 lbs. hydrostatic pressure before shipment.

The Boiler is constructed of best quality flange steel, of 60,000 lbs. tensile strength; the braces, staybolts and wrought mud ring are of refined iron. Ample means for cleaning sediment from in-

side of Boiler are provided. A fusible plug is placed in crown sheet.

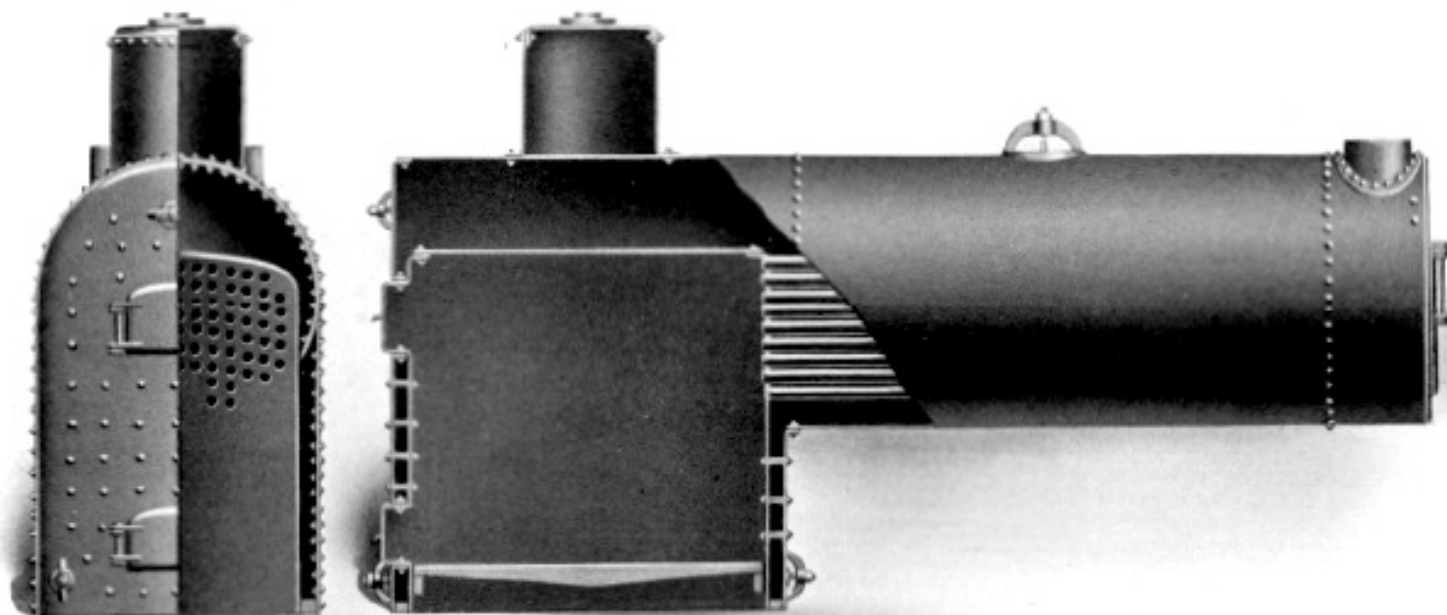
The Furnace is surrounded on all sides by water space, and the bottom of fire-box is open.

Fixtures and Fittings include: Grates; Steam Gauge; Water Gauge; three Gauge Cocks; Safety Valve; Blow-off Valve; Check and Feed Valves; Whistle and Valve; Smoke Stack and Guy Wire.

The Cast Iron Stand for smoke-box end of Boiler is supplied at additional cost when ordered.

Specifications.

Number of Size	4	5	6	7	8	9	10	11	12	13	14	15
HORSE POWER, (as usually rated)	25	30	35	40	50	60	70	80	90	100	110	125
Diameter of Boiler..... inches	40	42	44	44	48	54	56	58	58	62	64	66
Length of Furnace, inside	48	50	50	50	54	60	60	60	60	60	60	60
Width of Furnace, inside	34	36	38	38	42	48	50	52	52	56	58	60
Height of Furnace, above Grates.....	33	34	36	36	40	44	44	48	48	50	52	58
Thickness of Shell and Outside of Fire Box	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{11}{16}$	$\frac{3}{8}$	$\frac{3}{8}$
Thickness of Furnace Plate	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$
Thickness of Tube Sheets	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$
Number of 2 inch Tubes	34	40	44	44	54	60	67	76	76	90	100	108
Length of Tubes	96	96	102	120	126	132	144	144	168	168	168	180
Diameter of Dome	22	22	26	26	26	30	30	32	32	32	36	36
Height of Dome	24	24	28	28	28	34	34	36	36	40	40	40
Diameter of Stack	18	20	20	20	22	24	26	26	26	30	30	32
Length of Stack	24	24	30	36	36	36	40	40	50	50	50	50



"SPECIAL" LOCOMOTIVE PORTABLE BOILERS.
WITH EXTRA DEEP FIRE BOX AND 2-INCH TUBES.

ERIE ENGINE WORKS

“SPECIAL” LOCOMOTIVE BOILERS.

The demand for a Portable Boiler with large steaming capacity for use with coal or fuel of light, bulky nature, such as the refuse of saw-mills and planing mills, has lead to the adoption of this type for such service. The fire box has been made in all sizes 60 inches long and 60 inches deep, with width depending upon the diameter of the Boiler, and having two fire doors. Recent experiments carefully conducted by skilled engineers, show that with the hardest firing the fire box and the first three feet of tubing evaporate nearly 75 per cent. of the total duty of a Locomotive Boiler, and this Boiler has been designed to take every advantage of this fact. The deep fire box and large grate surface give large capacity for fuel, while the adoption of 2-inch tubes of proper length insures

great economy. The water-space surrounding the fire is three inches, the bottom ring being of wrought iron. The horse power rating is based upon natural draft. The use of forced draft will increase the capacity 25 to 50 per cent. These Boilers are built of homogeneous steel, of 60,000 lbs. tensile strength.

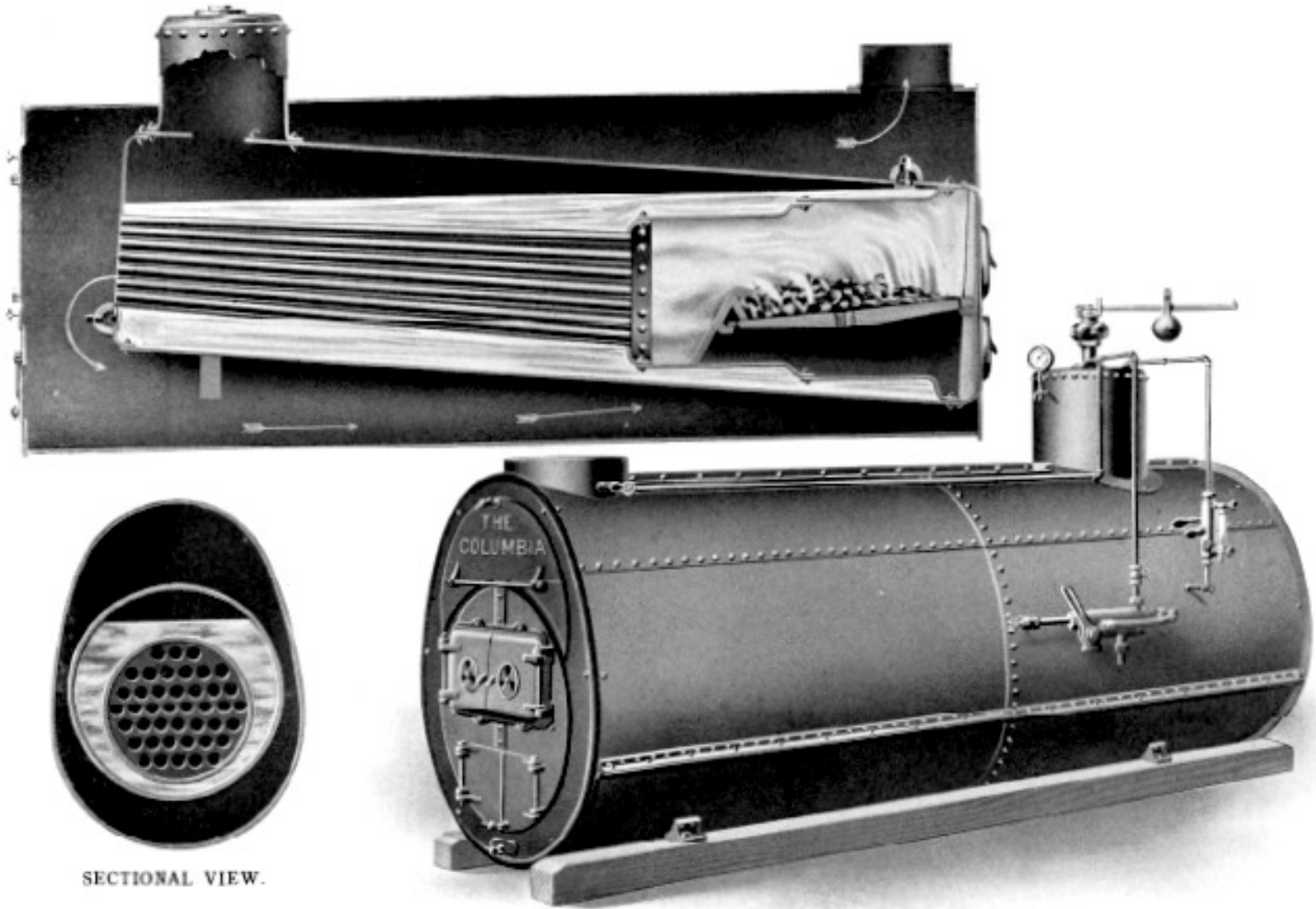
Fixtures comprise: Grates, Stack and Guys. Fittings are Safety Valve, Steam Gauge, Water Gauge, Gauge Cocks, Blow off, Feed and Check Valves, Whistle and piping for same.

The leg under smoke box supplied when ordered. The furnace end is generally set upon walled ash pit in the same manner as other locomotive portables.

Specifications.

Number of Size	7	8	9	10	11	12	13	14
HORSE POWER	30	35	40	42	45	50	55	60
Diameter of Boiler .. inches	40	40	42	42	44	44	48	48
Length of Furnace "	60	60	60	60	60	60	60	60
Width of Furnace "	33	33	35	35	37	37	41	41
Height of Furnace "	60	60	60	60	60	60	60	60
Number of 2-inch Tubes ..	72	72	88	88	88	88	100	100
Length of 2-inch Tubes .. feet	7	8	7	8	8	10	8	10
Thickness of Shell and Outside of Fire Box .. inches	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$
Thickness of Furnace Plates "	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$
Thickness of Tube Plates "	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Diameter of Dome "	24	24	24	24	24	24	24	24
Height of Dome "	24	24	24	24	24	24	24	24
Diameter of Stack "	18	18	20	20	20	20	22	22
Length of Stack feet	30	35	30	35	35	40	35	40
Length, over all "	14	15	14	15	15	17	15	17

ERIE ENGINE WORKS



SECTIONAL VIEW.

THE "COLUMBIA" COMPOUND BOILER.

ERIE ENGINE WORKS

"COLUMBIA" COMPOUND BOILERS.

The extraordinary performance of the "Columbia" Boiler, when cased in a portable setting of sheet steel, is so analogous to that of a compound steam engine that we feel warranted in adopting the term "Compound" as descriptive of its performance. As may be seen by the sectional cut, the hot gases are passed through the furnace and tubes of the Boiler, and are then utilized again by being more slowly drawn through the hot air chamber or casing surrounding the Boiler, passing to the chimney at such a low temperature as to give quick evidence of the saving thereby effected.

The attempts hitherto made by boiler-makers to attain economy in a portable form of Boiler have mostly been in the line of using return tubes and in creasing the heating surface, thus increasing also the weight of the Boiler per horse power and rendering it cumbersome, while in this Boiler we utilize the hitherto unused portion of the Portable Boiler, the outside, and in addition to economize the heat as to make it manifestly superior in every respect to other so-called economical portables now on the market.

This is accomplished without the use of fire-brick in lining up the furnace, so frequently a source of trouble, rendering this part of the boiler a constant nuisance and annoyance to the user.

By the peculiar form of the casing the main volume of hot gases passes under and along the sides of the boiler below the water line.

A small portion of the current passes over the steam space, and while the amount of this is not enough to be detrimental to the metal of the Boiler, there is a sufficient jacket of hot gas at this point to insure dry steam at all times. When the gases reach the chimney all available heat is extracted. Heat costs money.

The construction of the Boiler is so self-evident from the cut that we will not take room to enlarge upon it, except to say that the casing is sectional, can be readily taken apart to inspect or repair the Boiler within; and it is provided with convenient doors for cleaning out.

For ordinary purposes the cleaning doors at each end are ample.

As will suggest itself to the practical mechanic, this Boiler is an excellent spark preventer.

Stacking grates furnished, when desired, at additional cost.

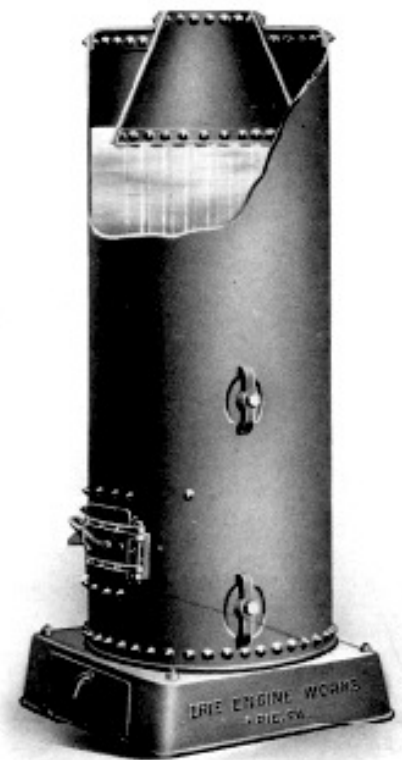
Specifications.

Number of Size	3½	4½	5½	6½	7½	8½	9½	10½
HORSE POWER.....	12	15	20	25	30	40	45	50
Diameter of Boiler	29	32	32	36	40	42	44	48
Length of Boiler	118	112	124	139	152	168	170	182
Number of Tubes	19	30	30	35	43	40	47	54
Diameter of Tubes	2½	2½	2½	2½	2½	3	3	3
Length of Tubes	75	69	75	90	90	108	108	108
Length of Furnace.....	45	45	51	51	66	66	66	78
Dome	16 x 16	18 x 18	18 x 18	20 x 20	22 x 22	22 x 22	26 x 26	28 x 28
Length of Casing	132	126	138	155	168	188	188	202
Width of Casing	37	40	40	46	50	52	54	60
Height of Casing	45	48	48	55	61	64	66	72
Height to Top of Dome	60	66	66	72	82	86	90	100
Diameter of Stack	16	18	18	20	22	24	24	26
Height of Stack	40	40	40	40	50	50	50	60

Fixtures comprise: Grates, Safety Valve, Steam Gauge, Whistle and Pipe, Gauge Cocks, Blow-off Valve, Feed Valve, Check Valve, Stand Pipe and Water Gauge piped. Smoke Stack and Guys, and Injector fitted.



FULL LENGTH TUBES.



SUBMERGED TUBES

VERTICAL BOILERS.

ERIE ENGINE WORKS

VERTICAL BOILERS.

Our Vertical Boilers are made of open hearth homogeneous flange steel plates, with wrought iron door rings and with ogee flanges forming the connection of the fire box to the shell.—We do not use cast iron rings.—The longitudinal seams of Boilers 36 inches in diameter and larger, are double riveted. Boilers 24, 30 and 36 inches in diameter have two hand holes in the water leg around fire box, and larger sizes have three, with the same number at the level of the crown sheet.

Fixtures and fittings comprise: Base, Grates, Hood, Steam Gauge, Water Gauge, Safety Valve, Blow-off Valve, Check Valve and Stop Valve for feed.

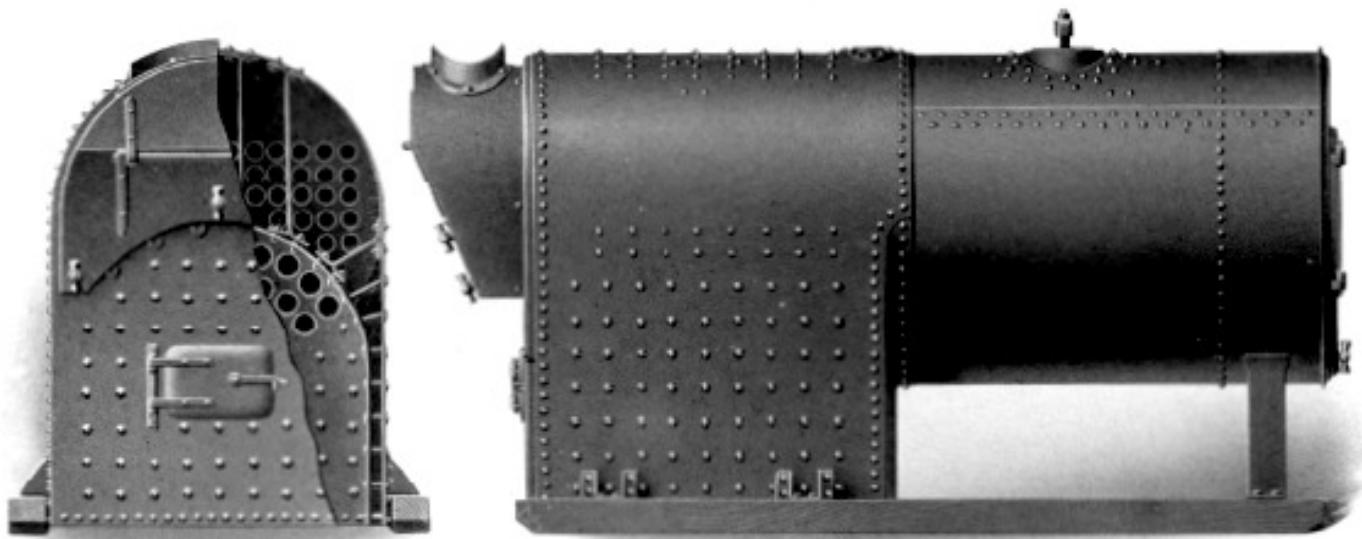
At slight additional cost we will furnish the Patent Hood shown in cut page 27, in place of regular, its advantages are given on page 28.

Specifications of Vertical Boilers, with Full Length Tubes.

Number of Size	A	B	C	0	1	2	3	4	5	6	7	8	9	10
Horse Power, (as usually rated)	4	5	6	6	8	10	12	15	20	25	30	40	50	60
Diameter of Boiler inches	24	24	24	30	30	30	36	36	36	42	42	48	48	54
Height of Boiler "	48	60	72	57	66	72	72	84	100	84	100	102	120	108
Diameter of Furnace "	20	20	20	25	25	25	31	31	31	37	37	43	43	48
Height of Furnace "	24	24	24	27	27	27	27	27	27	27	27	30	30	30
Thickness of Shell "	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$
Thickness of Furnace Plate "	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Thickness of Heads "	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Length of Tubes "	24	36	48	30	39	45	45	57	73	57	73	72	90	78
Number of 2-inch Tubes "	31	31	31	49	51	53	68	68	68	109	109	149	149	201
Diameter of Stack required inches	10	10	10	12	12	12	16	16	16	20	20	22	22	24

Specifications of Vertical Boilers, with Submerged Tubes.

Number of Size	A	B	C	0	1	2	3	4	5	6	7	8	9	10
Horse Power, (as usually rated)	4	5	6	6	8	10	12	15	20	25	30	40	50	60
Diameter of Boiler inches	24	24	24	30	30	30	36	36	36	42	42	48	48	54
Height of Boiler "	66	72	78	69	75	81	75	84	96	90	96	108	120	114
Diameter of Furnace "	20	20	20	25	25	25	31	31	31	37	37	43	43	48
Height of Furnace "	24	24	24	27	27	27	27	27	27	27	27	27	27	30
Height of Chamber "	15	15	15	18	18	18	18	18	18	24	24	30	30	30
Thickness of Shell "	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$
Thickness of Heads "	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Thickness of Furnace and Chamber "	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$
Length of Tubes "	27	33	39	24	30	36	30	39	51	39	45	48	63	54
Number of 2-inch Tubes "	28	28	28	49	51	53	68	68	68	109	109	149	149	201
Diameter of Stack required inches	10	10	10	12	12	12	16	16	16	20	20	22	22	24



RETURN FLUE PORTABLE BOILERS

ERIE ENGINE WORKS

RETURN FLUE PORTABLE BOILERS.

The Return Flue Portable Boiler is an excellent Boiler for power or steam heating purposes, because of its economy in the consumption of fuel.

Note that the furnace is entirely surrounded by water on the four sides and top, with the very important result that the greater part of the heat developed in furnace is transferred to the water. Note also that the bottom of water leg is closed by a wrought iron ring.

As with other types of internally fired Boilers, this does not require an expensive brick arch to complete it.

The steel used in this Boiler is of best flange quality and of 60,000 pounds tensile strength. Other materials, as well as the design, are such as to make the Boiler acceptable to the leading

insurance companies for 100 lbs. steam pressure. At additional charge, we are prepared to furnish this Boiler for higher pressure.

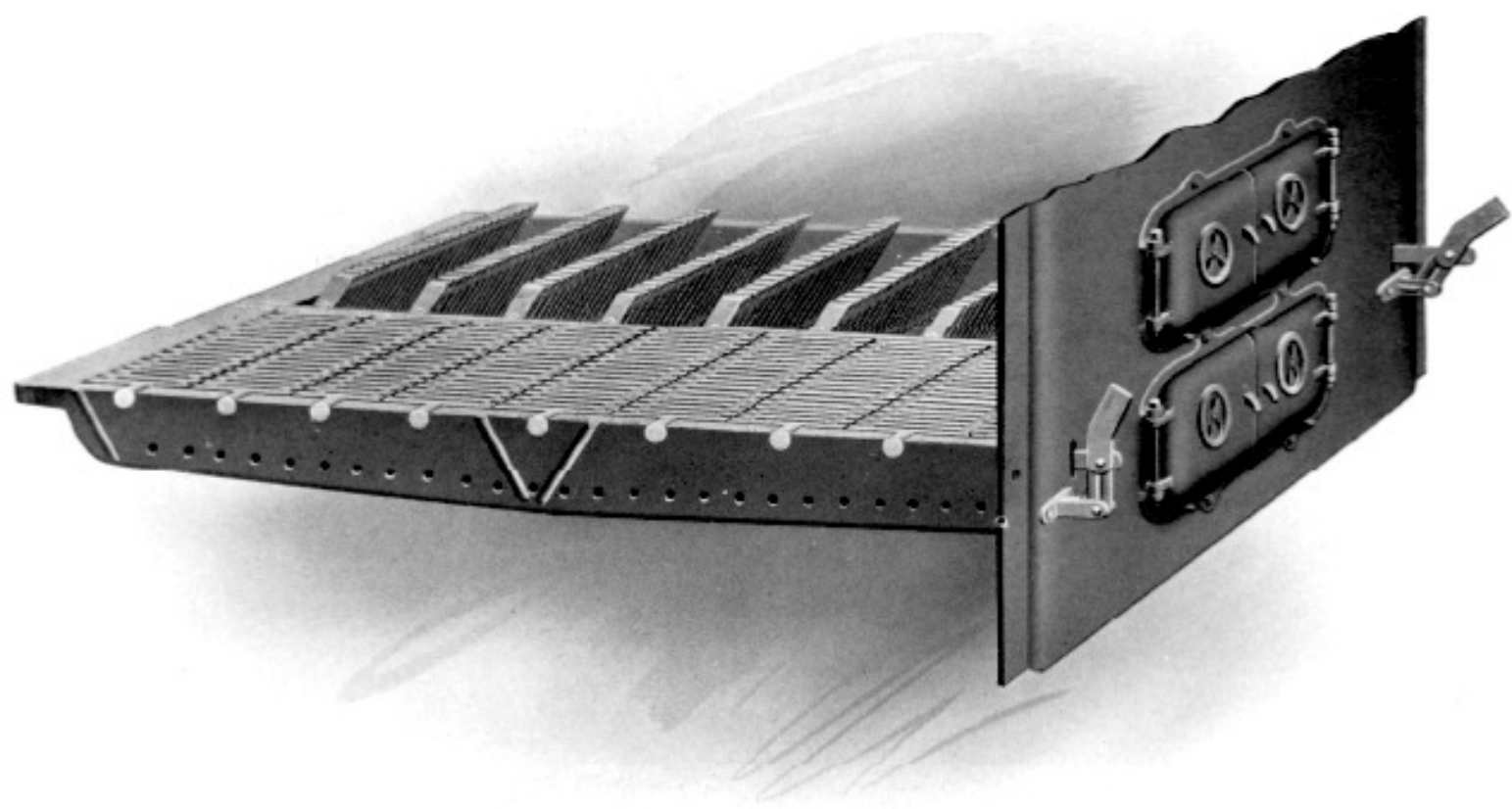
Handholes are placed in convenient positions for removing deposits from inside of Boiler, and a fusible plug is placed in top of furnace sheet as a safeguard in case of low water.

Regularly the Boiler is mounted on skids and is not provided with dome. If the latter is desired, it will be furnished at additional cost.

Fixtures and fittings consist of: Grates, Steam Gauge, Water Gauge, three Gauge Cocks, Safety Valve, Blow-off Valve, Check and Feed Valves, Whistle and Valve, Smoke Stack and Guy Wire and Injector fitted. Shaking Grates furnished, when desired, at additional cost.

Specifications.

Number of Size.....	7	9	10	11	12	13	14	15
HORSE POWER.....	30	40	50	60	70	80	90	100
Diameter of Boiler.....inches	48	54	56	60	60	66	72	72
Length of Furnace....."	42	52	54	60	60	66	66	66
Height of Furnace....."	45	48	49	51	51	54	57	57
Width of Furnace....."	42	48	50	54	54	60	66	66
Thickness of Shell....."	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$
Thickness of Furnace Plates....."	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{5}{16}$
Thickness of Tube Plates....."	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{7}{16}$	$\frac{7}{16}$
Number of 3-inch Tubes.....	34	40	50	56	56	66	80	80
Number of 4-inch Tubes.....	18	20	27	32	32	37	46	46
Length of 3-inch Tubes.....inches	108	114	114	114	132	138	144	168
Length of 4-inch Tubes....."	62	58	56	50	68	68	74	98
Diameter of Stack....."	18	20	22	24	24	26	28	28
Length of Stack.....feet	45	50	50	50	60	60	60	60



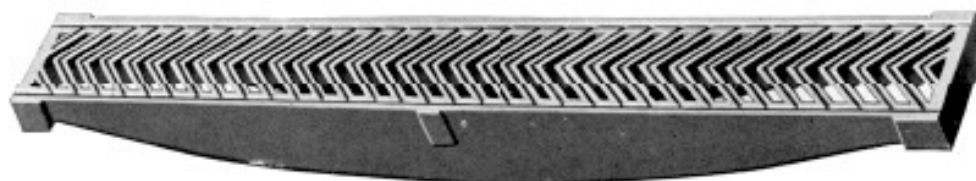
THE "ERIE" SHAKING AND DUMPING GRATE.

These Grates are constructed to burn all kinds of coal economically, being proportioned strong and with sufficient air space to give perfect combustion. Easily operated and durable. We can supply them to fit any size furnace and at very low cost.

FURNACE GRATES.



¹
STANDARD PATTERN — FOR COAL OR WOOD.



²
TUPPER PATTERN — FOR COAL OR WOOD.



³
FLAT PATTERN — FOR SAWDUST.



⁴
OVAL PATTERN — FOR SAWDUST.

We have new patterns of improved proportions for all lengths of each style shown above.

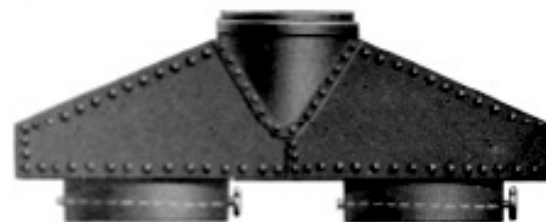
SMOKE CONNECTIONS.

These are made in so many different forms that we have contented ourselves with illustrating those in most general demand. We prefer ordinarily, the styles showing the Smoke Box above the Boilers. They rest upon the extension of the shell and will sup-

port a heavy stack readily. Dampers are also conveniently arranged. The weight bears a direct ratio to cost, and we supply them of numbers 14, 12 or 10 steel as agreed. Our drawings show connections for but two Boilers. More may be included as desired.



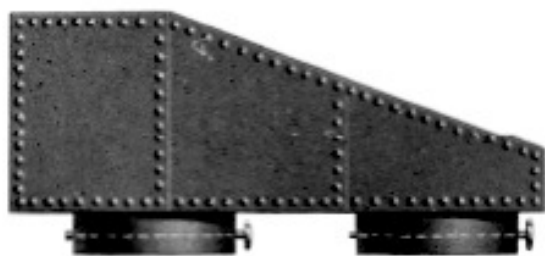
STYLE "A"
Yoke Pattern for Two Boilers.



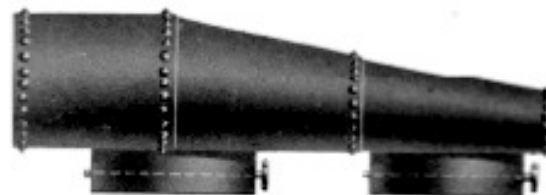
STYLE "A"
Box Pattern for Two or more Boilers.



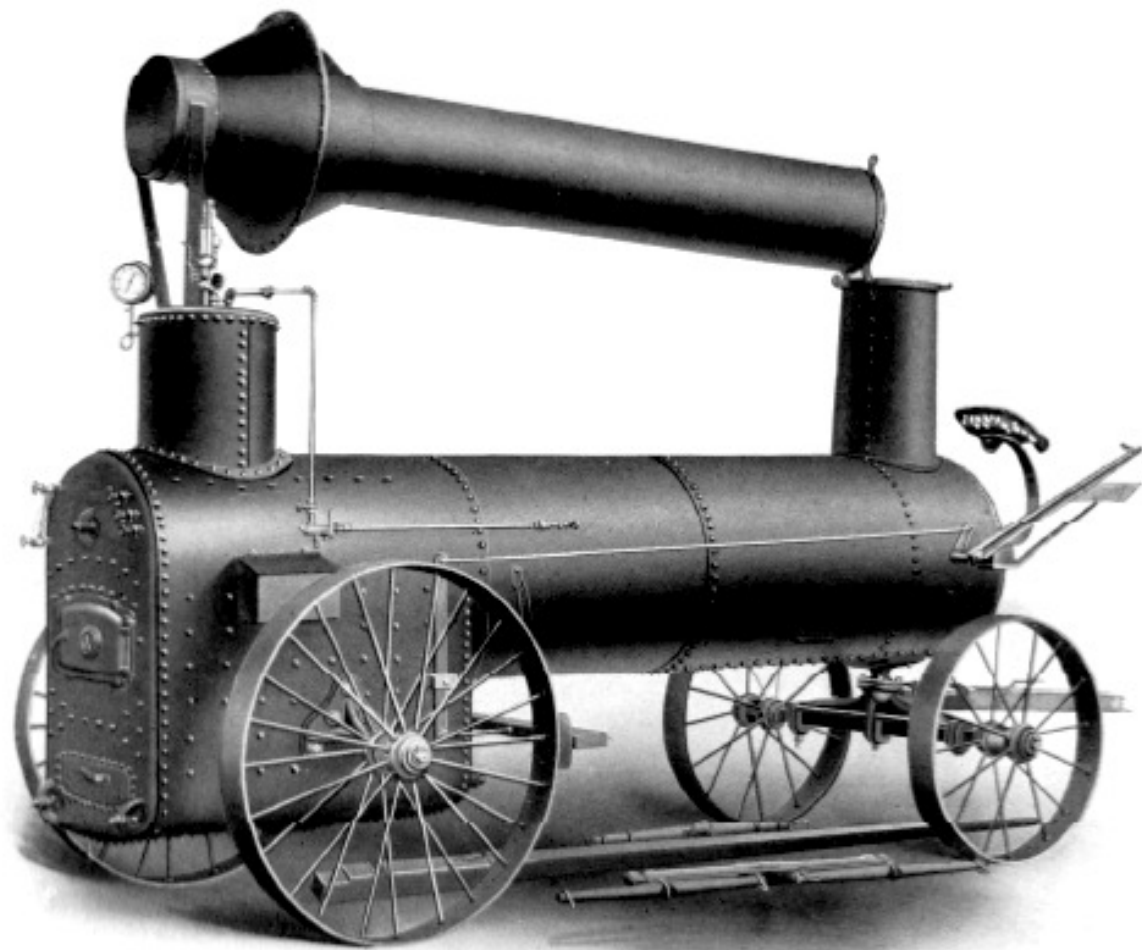
STYLE "C"
For Two Boilers.



STYLE "B"
Box Pattern for Two or more Boilers.

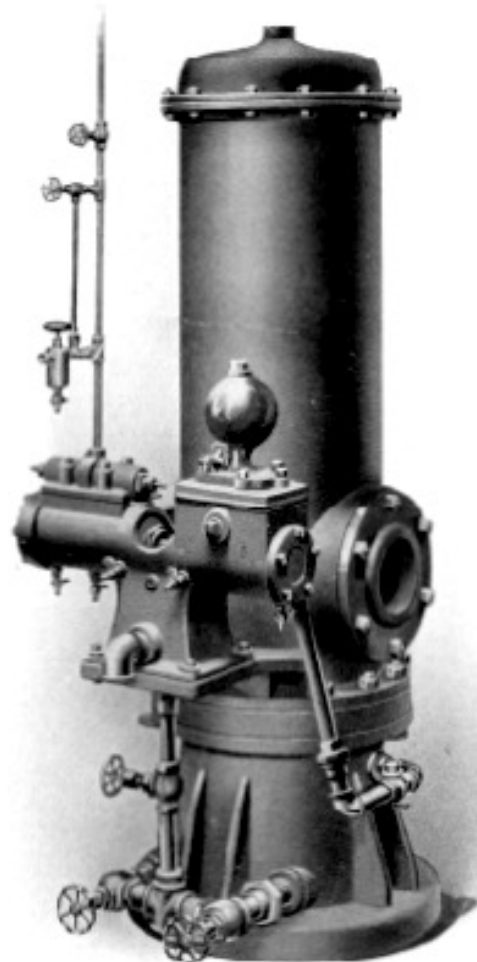
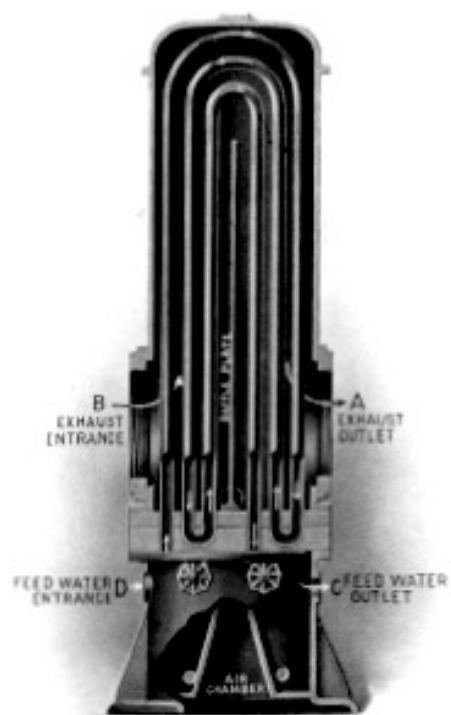


STYLE "B"
Round Pattern for Two or more Boilers.



PORTABLE BOILER ON WHEELS.

Complete specifications on page 35.



ERIE ENGINE WORKS

THE HARDWICK FEED WATER HEATER is a most excellent type of the bent tube Heater which has become so common in recent years. It combines to a marked degree the essential qualities of great efficiency and low cost, being made of cast iron shell, plates and base, and with seamless drawn brass tubing of sufficient weight to withstand a hydraulic test of 400 pounds.

By the cut you will notice that our method of circulation practically makes a continuous coil of the tubes, the water taking a course through a sufficient number at one time so that the combined area of the tubes equals the area of the feed pipe.

This gives to the Heater an advantage over other makes and allows us to guarantee the temperature of the feed water to be

within two degrees of the temperature of the steam in the shell.

There is an air chamber between the hot and cold water chambers which prevents the cold water entering the Heater from cooling the hot water on the way to the boiler.

The settling chambers are provided with hand-holes so that all sediment can be removed at any time.

This Heater can be connected with the exhaust and feed entering from either side most convenient under your conditions.

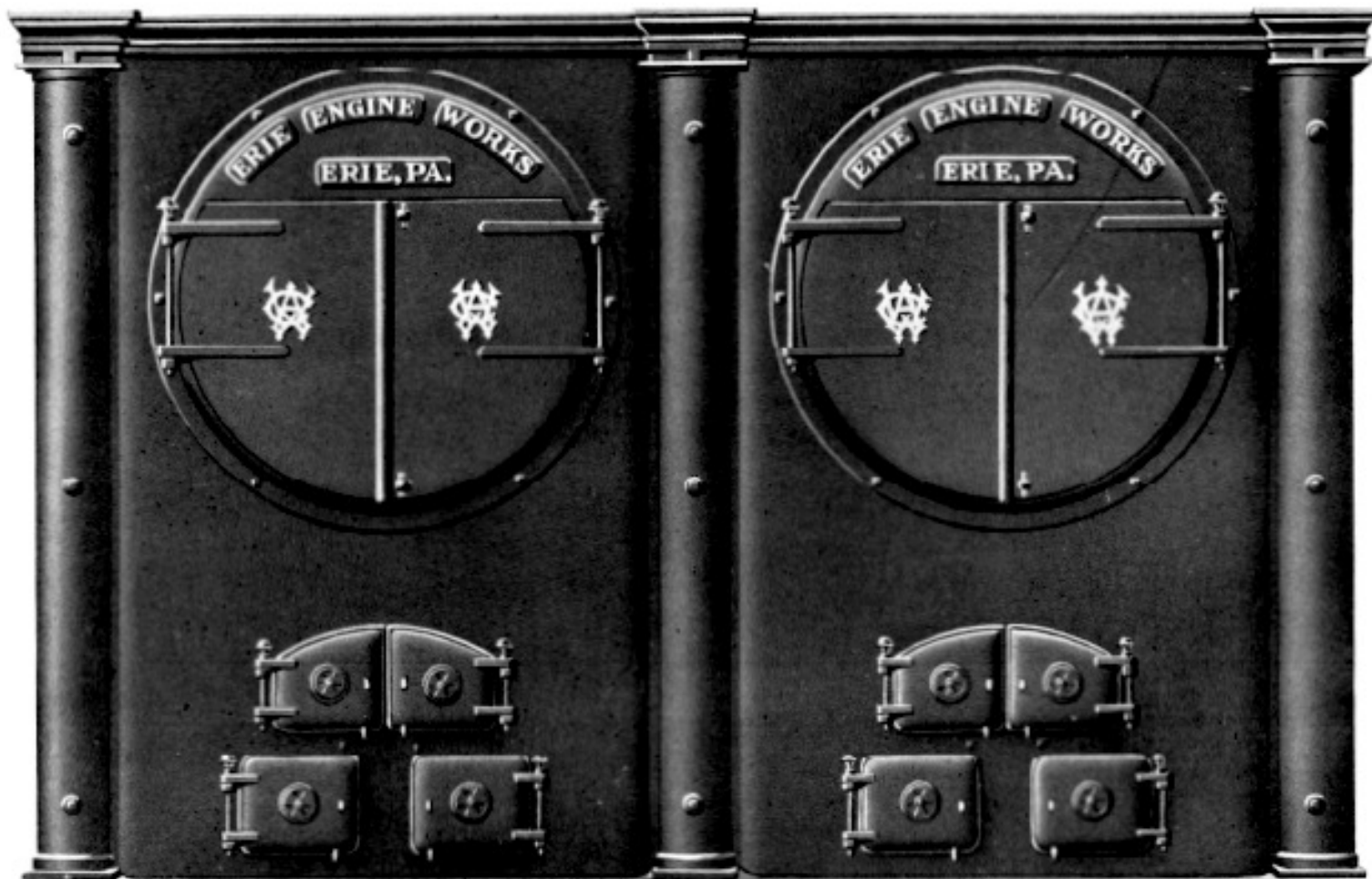
We have been building this Heater for the past twelve years, and the duplicate orders we are daily receiving convince us that we are meeting the demand for a Heater of this style.

Specifications of Hardwick Feed Water Heaters

Horse Power.	CODE WORD.	Total Height. Ft. In.	Largest Dia. Inches.	Dia. of Shell. Inches.	Size of Exhaust Pipe. Inches.	Size of Feed Pipe. Inches.	Approx. Shipping Weight. Pounds.
30	Cab	3 9	19 1/2	12 3/4	3	1	560
40	Camera	3 9	19 1/2	12 3/4	3 1/2	1	570
50	Camel	3 9	19 1/2	12 3/4	4	1	580
60	Canoe	4 2	19 1/2	12 3/4	4 1/2	1 1/4	625
80	Castle	5 0	19 1/2	12 3/4	5	1 1/4	700
100	Castor	5 10	19 1/2	12 3/4	5 or 6	1 1/4	750
125	Cave	4 8	23	15 1/4	6	1 1/2	1,000
150	Celery	5 4	23	15 1/4	8	1 1/2	1,075
175	Cheese	5 10	23	15 1/4	8	1 1/2	1,125
200	Churn	6 5 1/2	23	15 1/4	8	1 1/2	1,200
225	Class	7 1/2	23	15 1/4	8	1 1/2	1,250
300	Clay	6 5	28	18	8	2	1,600
350	Claw	7 1	28	18	10	2	1,650
400	Clock	7 9	28	18	10	2	1,700
450	Coke	8 5	28	18	10	2	1,850
500	Collar	9 0	28	18	10	2	1,900

When writing for prices give Horse Power of Engine and Boiler and size of Exhaust Pipe on Engine.

ERIE ENGINE WORKS



FULL FRONTS SHOWING COLUMNS COVERING ENTIRE BRICK WORK.

Page Fifty-two

These columns can be furnished with Single Fronts when desired, and charged extra for.