THE "ECONOMIC" BOILER

(IMPROVED)

PATENT, MAY 9, 1911

ERIE CITY IRON WORKS

ERIE, PENNSYLVANIA

U. S. A.

THE "Economic" Return Tubular Boiler, the safest and in every respect the best boiler of this type, always a favorite, now better than ever.

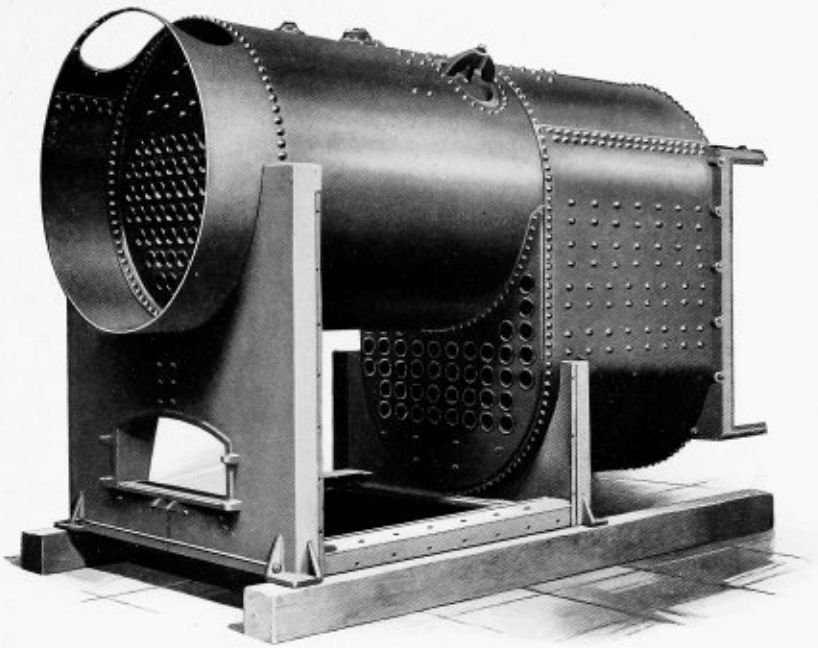
For twenty years the "Economic" boiler has been on the market and has proven a wonderful success. Modifications and changes have been made from time to time, and always for the betterment of the boiler.

The "Economic" Boiler is self-contained and readily removable from place to place. It combines with this feature the excellencies of a well-set stationary boiler, being economical of fuel, and having the essential elements for safety and durability; it occupies but little space and is a rapid steamer.

In the portable boiler, as usually made, the furnace is a great source of expense and danger; it is the most expensive part of the boiler to build, the part most liable to give out, and the most expensive to repair. The flat crown sheet, always subjected to the greatest heat, has the least water to protect it, and is the first part exposed by low water. The sides of the furnace are ready receptacles of sediment, are difficult to clean, and liable to burn out. In the "Economic" the case is reversed; the furnace is the cheapest part of the boiler to build and repair, there are no stay-bolted water sides to fill with mud and burn out, or flat crown sheets to be exposed by low water and cause *explosion and loss of life.*

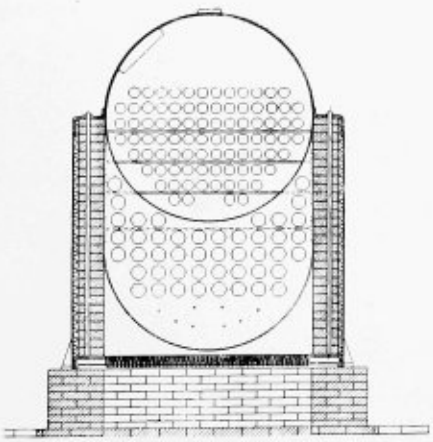
THE "ECONOMIC" BOILER IS BUILT ON A MINIMUM FACTOR OF SAFETY OF FIVE

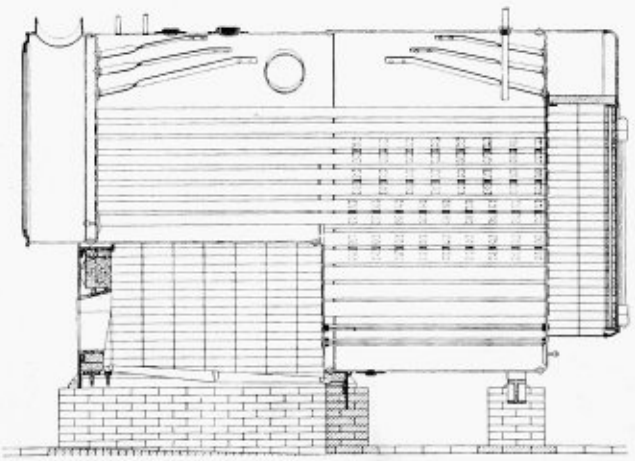
Every Boiler Is Thoroughly Tested Under Steam Before It Leaves Our Shops



THE front end of the boiler is cylindrical in form, and extends over the furnace, while the rear end is oval, the lower portion extending below the cylindrical part far enough to hold the short tubes leading from the furnace to the back connection.

The furnace is large, with ample grate surface, and the form of the boiler and arrangement of the tubes gives a very high degree of efficiency and economy. The products of combustion, passing through the short tubes and into the back connection, are carried by the return tubes through the upper section of the boiler to the stack.





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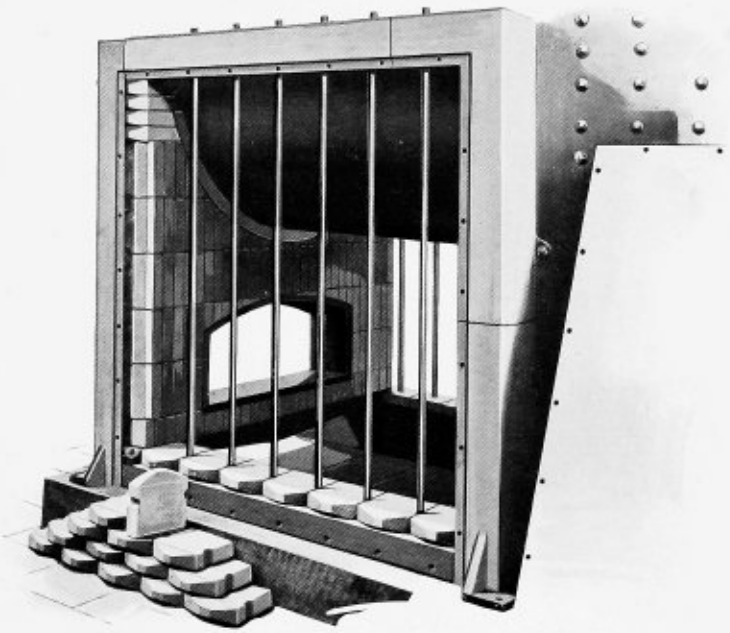
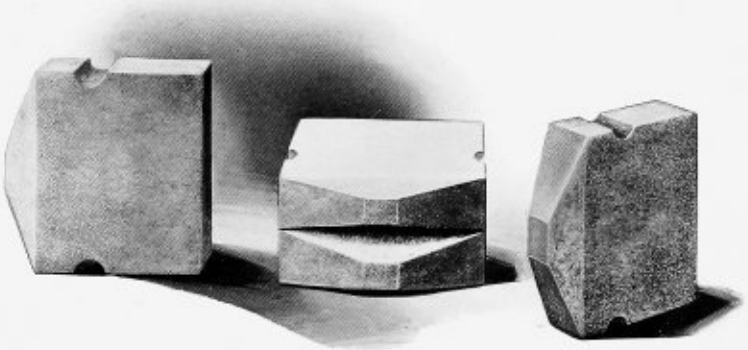


AS now built, the front and sides of the furnace are lined with *nine* inches of fire-brick. These brick, made especially for us and protected by our own patent, are made with a tapered edge, providing an *air space* on the outside wall next to the steel casing. This is a most valuable feature and will add much to the worth of the boiler.

The special brick are made 9 inches square by 2¼ inches thick, just double the size of two standard fire-brick, making it possible to replace the special brick with



two ordinary fire-brick after the boiler has been in use for a term of years, and the brick originally furnished have, in the natural course of events, become burned out, or broken by accident, which is liable to happen in the best-regulated boiler room.

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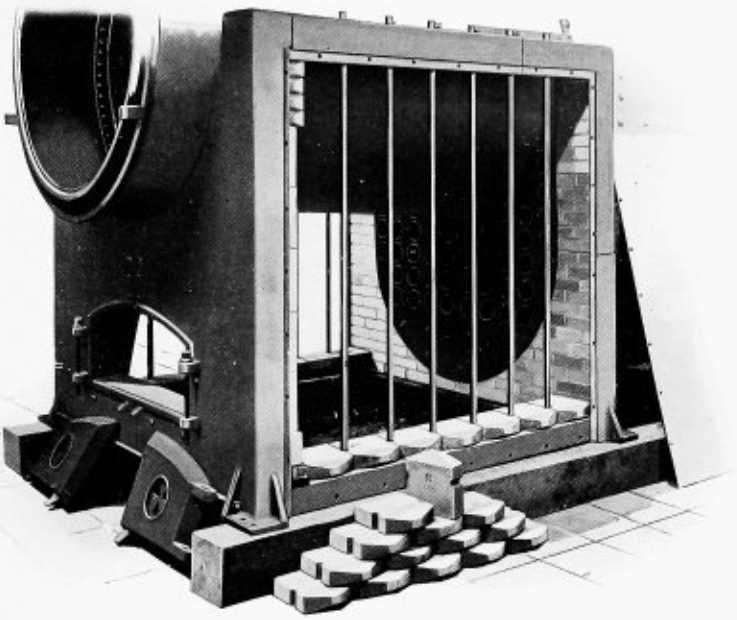
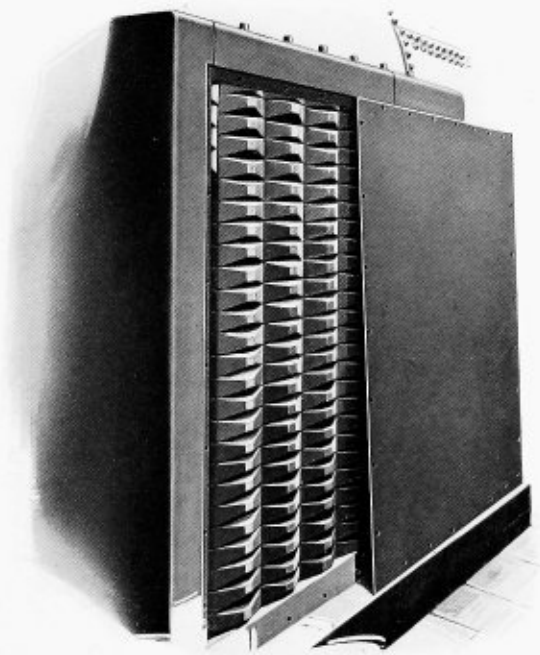


FOR greater safety in shipping, the brick are held by rods which engage in the grooves on the side and hold the brick firmly in position.

The boiler can be shipped complete, with grates and fire-brick in place.

WHEN the boiler is fired up and in service, the brick lining on all sides of the furnace becomes exceedingly hot and produces far better combustion of the fuel than can be had in any boiler built with a water space around the sides and bottom of the furnace.

The air space provided for by the tapered brick prevents the excessive radiation of heat from the outside furnace walls and warping of the casing plates.



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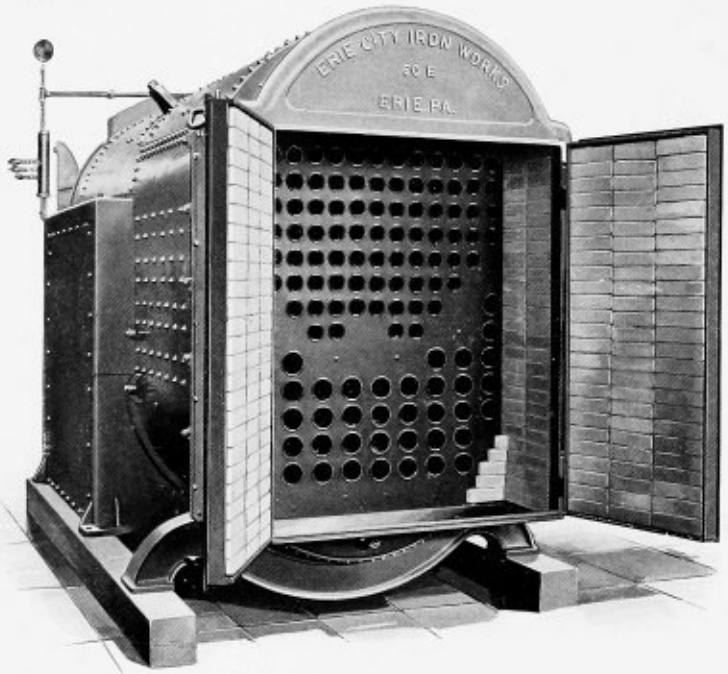
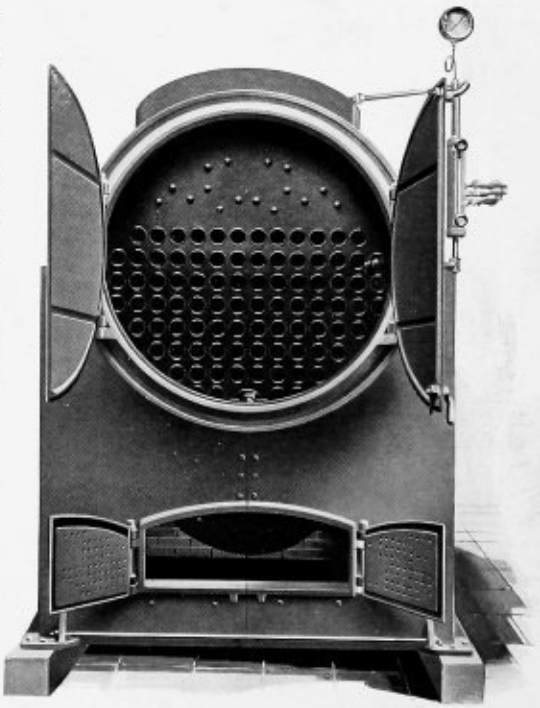


FIRE-BRICK LINING IN REAR COMBUSTION CHAMBER

THE rear Combustion Chamber is lined with fire-brick and attains a very high degree of temperature, greatly increasing the efficiency of the boiler by insuring better combustion of the gases passing through the lower series of tubes and coming in contact with the fire-brick lining.

The brick forming this lining are securely held in place by rods supported at top and bottom by the cast-iron frame.



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WE use in the construction of this boiler best "Flange" open-hearth homogeneous steel plate of 60,000 pounds tensile strength per square inch, having 30,000 pounds elastic limit, and capable of showing under test an elongation of 25 per cent. and a reduction of area of 45 to 50 per cent. before fracture takes place. This steel may be bent back upon itself and closed down solid without fracture, either cold or after heating red-hot and cooling in water, and it will not blister. The plates are rolled to *full thickness on the edge.*

The tubes and rivets are mild steel and conform to standard specifications. Boilers, 36″ diameter and larger, have longitudinal seam of shell double riveted. The rivet holes are punched and reamed and the rivets driven by machinery.

The boiler is thoroughly braced and stayed throughout, and all rivets and braces are carefully calculated for the pressure they are to bear.

Every boiler is tested and inspected before shipment by a responsible Steam Boiler Inspection and Insurance Company at 150 pounds hydrostatic pressure per square inch, and the purchaser can have a certificate of inspection and policy of insurance for one year issued by the Insurance Company. This policy is payable to the purchaser, and will be in force and valid wherever the boiler is located.

SPECIFICATIONS

Number of Size,	2	3	4	5	6	7	7½	8	9	10	11	12	13	14	15	16
Horse Power, as usually rated.	**10**	**12**	**15**	**20**	**25**	**30**	**35**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**125**	**150**
Diameter of Boiler, in inches	**28**	**28**	**30**	**30**	**36**	**36**	**40**	**40**	**44**	**50**	**54**	**54**	**60**	**60**	**60**	**66**
Length of Grates, "	36	36	36	42	42	42	48	48	48	60	60	60	60	66	72	78
Number of 3-inch Tubes,	16	16	21	21	30	30	38	38	52	64	78	78	88	88	88	112
Length 3-inch tubes used, in feet	**6**	**7**	**7**	**8½**	**8**	**9**	**9**	**10**	**9½**	**9½**	**9**	**10**	**9½**	**11**	**14**	**12½**
Number of 4-inch Tubes,	10	10	12	12	18	18	20	20	26	32	42	42	46	46	46	63
Length 4-inch Tubes used in inches	34	46	43	55	49	61	52	64	58	54	48	60	54	66	96	75
Thickness of Shell, "	**No. 4**	**No. 4**	¼	¼	¼	¼	9/32	9/32	5/16	5/16	11/32	11/32	⅜	⅜	⅜	13/32
Thickness of Front and Rear Tube Sheets, "	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½	½
Thickness of Round Front Tube Sheet, "	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	7/16	7/16	7/16	7/16	7/16	7/16
Diameter of Stack, "	12	12	14	14	18	18	20	20	22	24	28	28	30	30	30	34
Length of Stack, in feet	**30**	**35**	**35**	**40**	**40**	**45**	**45**	**50**	**50**	**50**	**45**	**50**	**50**	**60**	**60**	**70**
Length Boiler, over all, feet, about	9½	10½	10½	12	11½	12½	13	14	13½	13½	13	13½	13½	15½	18	17
Width Boiler, over all, feet, "	4	4	4	4	4½	4½	5	5	5½	6	6½	6½	7	7	7	7½
Height Boiler, over all, feet, "	5½	5½	5½	5½	6¼	6¼	6½	6¼	7½	8¼	9	9	9½	9½	9½	10½
Weight of Boiler, about	7200	7500	9000	9800	10100	11600	12800	14300	16100	20000	22300	23500	25600	27700	31500	34000
Weight of Fixtures, "	700	750	750	1000	1100	1200	1500	1700	1900	2100	2300	2400	2700	3000	3200	3600
Weight Boiler and Fixtures, "	7900	8250	9750	10800	11200	12800	14300	16000	18000	22100	24600	25900	28300	30700	34700	37600

FIXTURES

With a boiler ordered "complete" the following fixtures are furnished:

Grates, Water Gauge, fitted with Stand Pipe, Safety Valve, Check Valve,
Steam Gauge, Gauge Cocks, Blow-off Valve, Stop Valve,
Smoke Stack and Guys.

All Smoke Stacks up to and including 28-inch diameter are made of No. 16 gauge; larger sizes of No. 14; if heavier is required, a proprotionate charge will be made.

Number 9 boiler and larger sizes only have man-hole. All steam openings, two inches and larger, are reinforced.

WHEN SO ORDERED, WE FURNISH SHAKING GRATES IN PLACE OF THE REGULAR STRAIGHT GRATES, AT AN ADDITIONAL CHARGE

Every Boiler Is Thoroughly Tested Under Steam Before It Leaves Our Shops

THE "ECONOMIC" BOILER, originally designed as a generator of steam for power plants, is very extensively used for that purpose, and on account of its large factor of safety, its economy in fuel, and the small amount of floor space required, is admirably adapted to Steam and Hot Water Heating. The boiler is thoroughly well made throughout and has

IT IS SAFE

NO WATER SIDES WITH STAY BOLTS

to accumulate sediment and scale, and cause leaks and untold trouble.

IT IS ECONOMICAL

In the case of the ordinary brick-set boiler, there is an appreciable amount of cold air which finds its way through the furnace walls above the grate surface, chilling the fire and reducing the efficiency of the boiler, but in the "Economic" the steel casing enclosing the side walls prevents to a large degree this leakage of cold air and insures

A MARKED ECONOMY IN FUEL

The unique design of the boiler and its compact form, combining, as it does, the good points of both the stationary arched boiler and the "portable" boiler, insures a favorable reception in the engineering world.

The boiler is self-contained, shipped on wooden skids for convenience in transportation, and is all ready for steam and water-pipe connections as soon as it is placed on the foundation, and, should necessity demand, the pipe connections can be broken and the boiler removed intact to a new location with but little trouble and expense, which would not be possible in the case of a boiler requiring independent brick walls.

IT IS COMPACT

If there is any service anywhere which demands the best design, the best material, and the best of workmanship, it is the steam boiler placed in the basement of a business block, a public building, an apartment house, or a home, any place where life and property are at stake. The element of safety should be the very first consideration; after that, the question of economy in fuel and of floor space required may claim attention. With this thought in mind, and basing our judgment on the life-history of the "Economic" Boiler from the steel mills where the plates and tubes are rolled and the rivets and the braces forged, down through the shops where the several parts are fabricated and assembled, to the testing blocks, and onto the cars for shipment, which history we know so well, and having in mind the enthusiastic testimonials which have come to us unsolicited from those who have had practical experience in the use of the boiler, we unhesitatingly recommend the "Economic" for either Steam or Hot-Water Heating Service as the best and most satisfactory boiler of its type on the market.

THE "ECONOMIC" COMMENDED AND RECOMMENDED

TESTS PROVE IT—EXPERIENCE CONFIRMS IT

ASHBY PRINTING CO.—ERIE AND PITTSBURGH