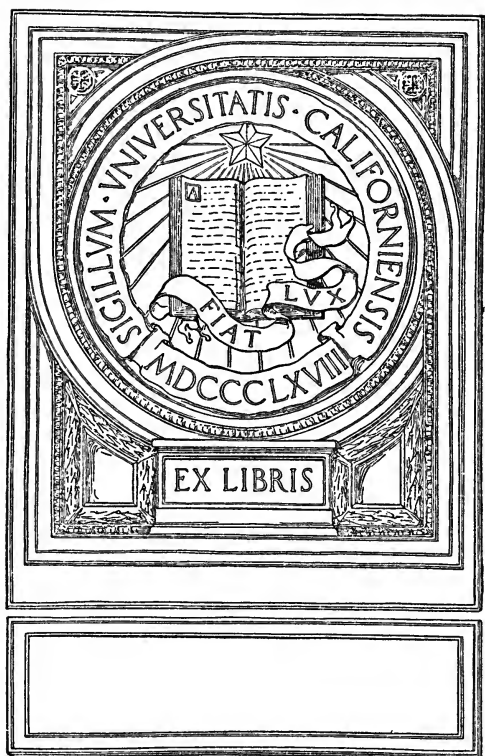


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EDGE MOOR IRON CO.
BOILERS

YC 66952



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EDGE MOOR IRON CO.,

MANUFACTURERS OF

EDGE MOOR IMPROVED GALLOWAY BOILERS,

EDGE MOOR INTERNALLY FIRED RETURN
TUBULAR BOILERS,

EDGE MOOR WATER-TUBE BOILERS.



1905

Represented by

The Tracy Engineering Co.,

1647 Page St., near Ashbury,

SAN FRANCISCO, CAL.

Gift

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STATEMENT.

THE Edge Moor Iron Company was incorporated by special act under the laws of Delaware, January 20, 1869, at which time a bridge and structural iron business was conducted.

In 1878 the Company commenced the manufacture of

GALLOWAY BOILERS.

In 1894 the manufacture of

INTERNALLY FIRED RETURN TUBULAR
BOILERS.

In 1895 the manufacture of

WATER-TUBE BOILERS.

INTRODUCTORY REMARKS.

We present in this book our Water Tube Boiler which is our principal product. It is made in three styles, Standard, with Superheating outlets, and with Superheaters, all as fully illustrated and described in the succeeding pages. It is shown with a variety of settings.

We offer our services and experience to assist you in your selection, and believe that we can advise without bias and to your best interest.

Respectfully,

EDGE MOOR IRON COMPANY.



EDGE MOOR IRON COMPANY'S PLANT.

Shops haying over one and one-quarter
acres of floor space.

EDGE MOOR IRON COMPANY'S PLANT.

THE Works and Main Office of the Company are situated at Edge Moor, Delaware, on the Delaware River.

The works are reached *via* the Maryland Division of the Pennsylvania R. R., Edge Moor Station.

FREIGHT.

Connections for freight are made by The River Front R. R.

to Pennsylvania Railroad,
to Philadelphia & Reading Railroad,
to Baltimore & Ohio Railroad.

ADDRESS.

Post-Office: Wilmington, Delaware.

Telegraph: Western Union Telegraph Company,
Postal Cable and Telegraph Company,
Cable Address: EDGE MOOR.

Lieber and A B C codes used.

Telephone: Delaware and Atlantic long distance 'Phone:
Call 838 A Wilmington.

PRODUCTS.



WE ARE EQUIPPED TO MANUFACTURE

BOILERS

AND

PRESSED STEEL FORGINGS

FOR

CAR TRUCKS,

BUCKLE PLATES FOR BRIDGES AND BUILDINGS,

EITHER SINGLE OR IN MULTIPLES.

BOWLS FOR CENTRIFUGAL MACHINES,

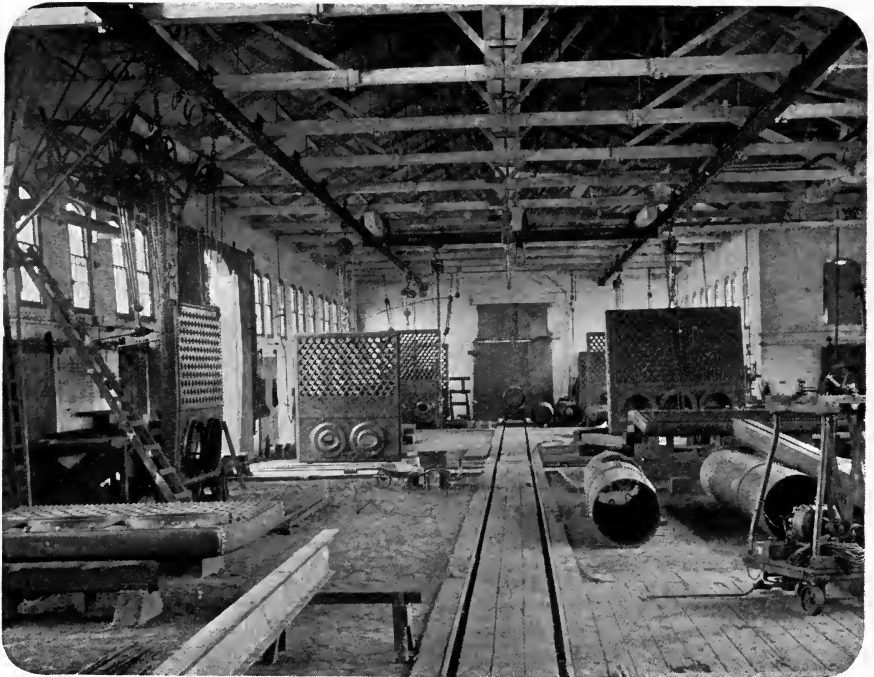
GENERAL FORGING WORK,

TANK AND OTHER PLATE WORK.

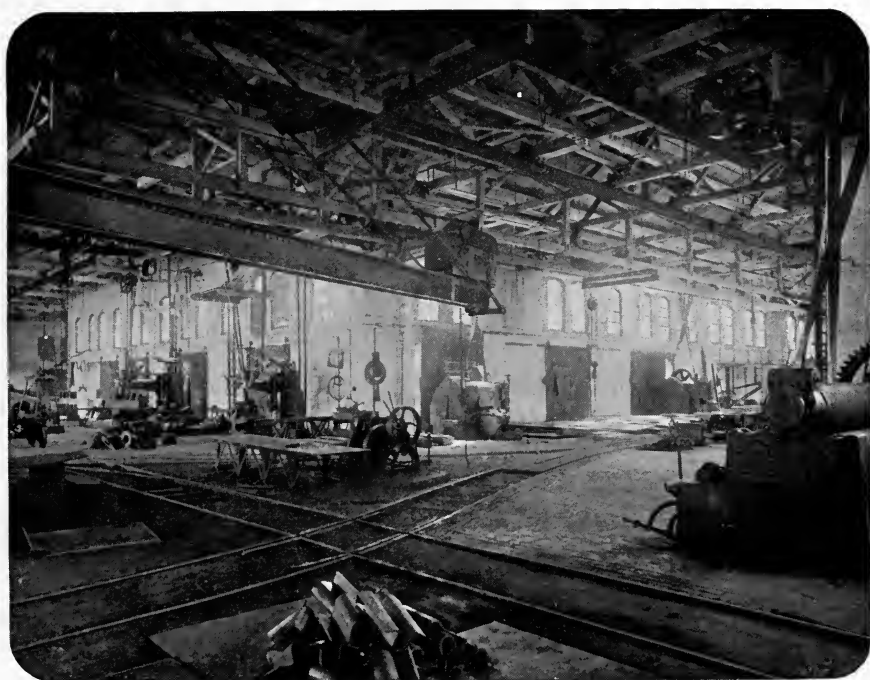
Estimates on any of the above work furnished on application.



INTERIOR VIEW OF MACHINE SHOP.



INTERIOR VIEW OF ASSEMBLING SHOP.



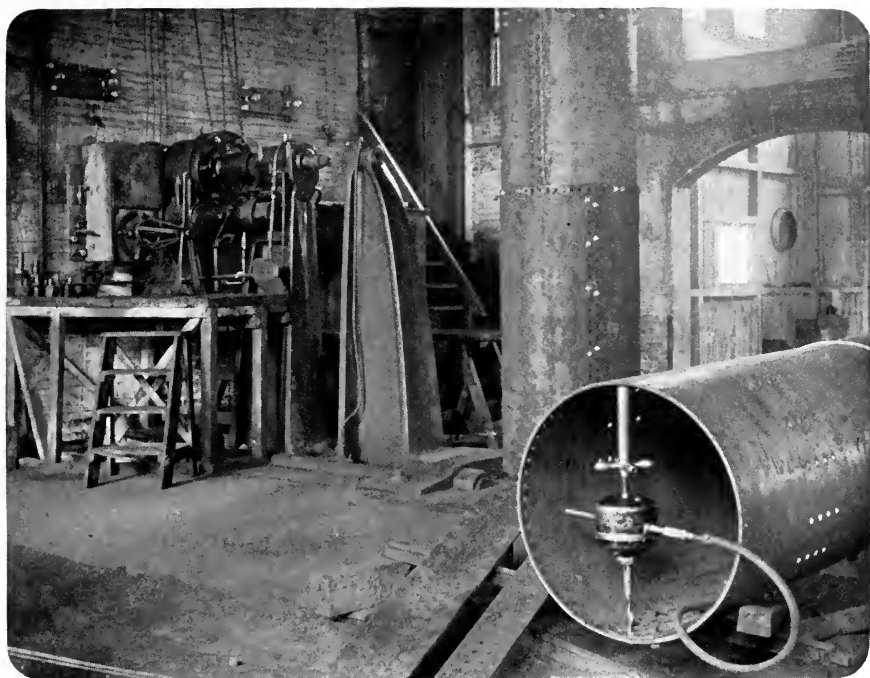
INTERIOR VIEW OF MACHINE SHOP.



WATER-TUBE BOILER HEADER,

READY FOR TESTING.

Showing tube-holes covered, and drum-holes stopped, ready for applying hydraulic pressure test.



150-TON RIVETER.

The drum in foreground is assembled for drilling butt straps in place by air drill. The drum in vertical position shows method of tacking with rivets to draw up the work to position.

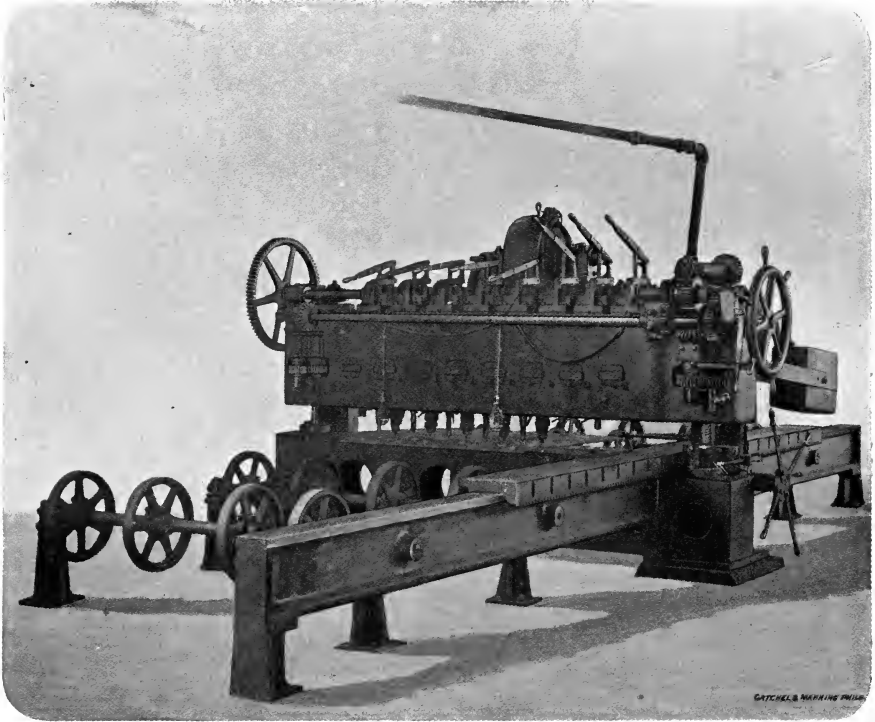


STEAM FORGING HAMMER.

Under this hammer all die forgings are manufactured.

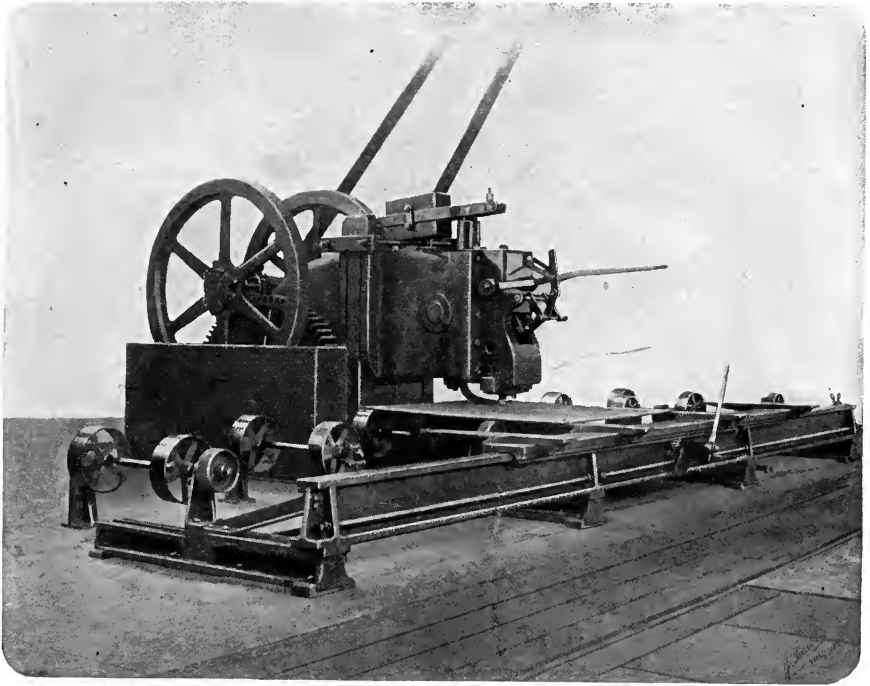


INTERIOR VIEW OF FORGING AND RIVETING SHOP.



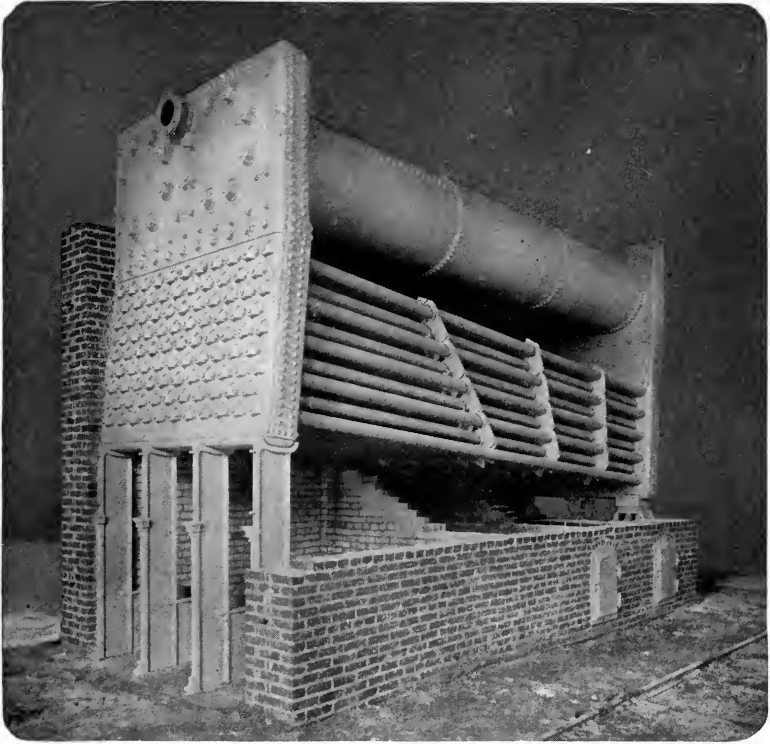
ELECTRICALLY DRIVEN 14-SPINDLE DRILL WITH SPACING TABLE.

Designed especially to bore tube-holes and face hand-holes in the header plates of the Edge Moor Water-Tube Boilers.



48''-PUNCH WITH SPACING TABLE.

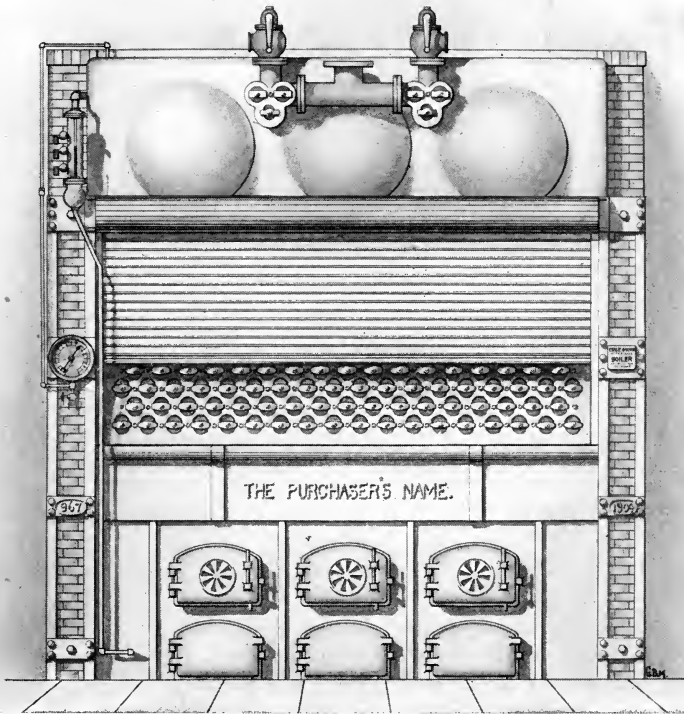
Designed especially to punch tube-holes in Galloway Tube Plates, and tube and hand-holes in the header plates of our Water-Tube Boiler.



FIRST EDGE MOOR WATER-TUBE BOILER.

Tried in our shops and proved highly satisfactory in 1895.

This boiler is still in active service, and demonstrates that our boilers were designed on sound principles, and only improvements in details were necessary to make them what they are to-day.

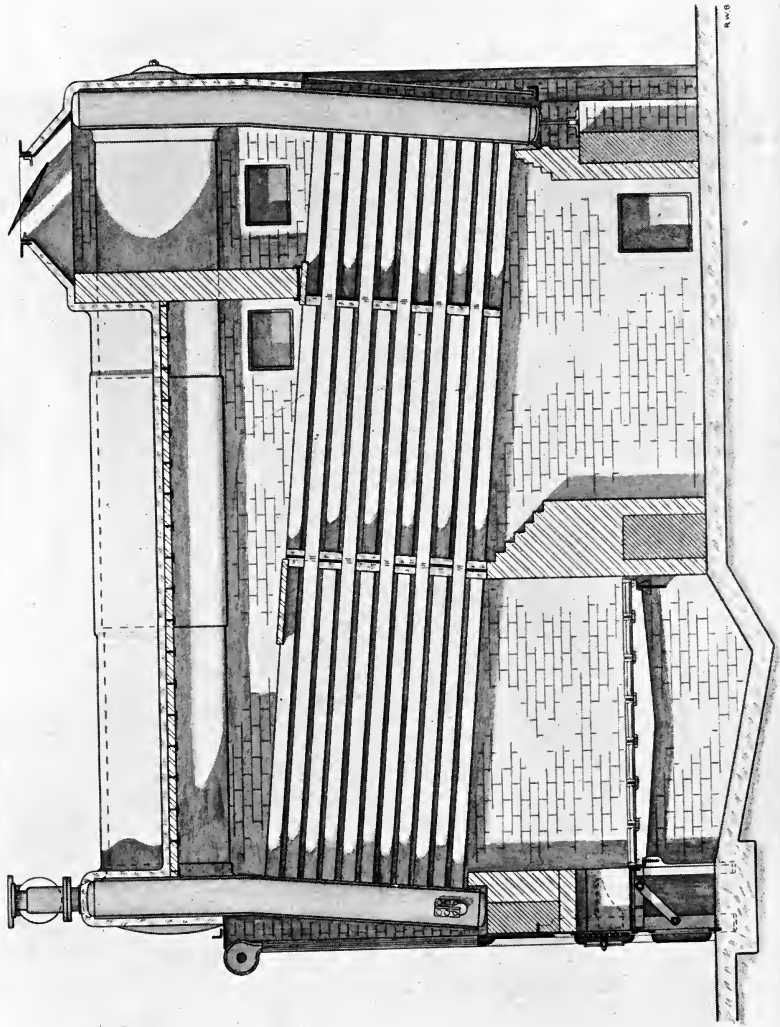


Front Elevation Three-Drum Boiler.

EDGE MOOR WATER-TUBE BOILER.

Improved under Patent, Aug. 24, 1897.

There are many water-tube boilers on the market; their merits commend them to their patrons; their faults commend them to their competitors, whose industry is such that these faults receive a public cultivation that often endangers the actual merit the boiler may possess. We believe this boiler contains all the meritorious features, and, at the same time, eliminates many of the defects of this type. It also presents several novel features, to which we desire to call your attention.



LONGITUDINAL SECTION, SHOWING SETTING OF A WATER-TUBE BOILER.
THREE-CROSS PASS. GASES OFF AT TOP.

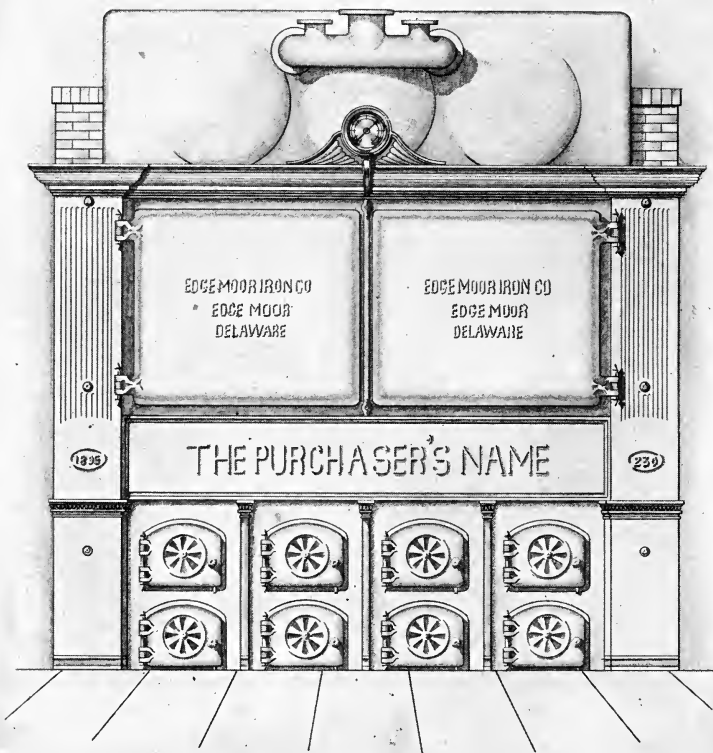
CHARACTERISTICS.

The features of this boiler can be readily seen from the illustrations.

The boiler is constructed in four sections, consisting of drums, front and back headers, and the tubes. The drums and headers are constructed entirely of flanged steel. The drums enter the headers at their full area, to which they are connected by flanges, avoiding the necessity of cutting the drums to make a connection for the headers, and creating a solid steam and water connection between all drums without the use of outside connections.

The headers are domed opposite each drum, thus avoiding large flat surfaces. The tubes are expanded into the inner side of the lower part of the headers, and opposite each tube in the outer plate of the header there is a flanged oval hole, faced and fitted like an ordinary manhole, with oval cover and dog. The cover, being on the inside of the header, is tightened in position by the boiler pressure, and each cover is independently removable. The headers are constructed with a bend between the drums and the tubes, forming an angle to allow of sufficient inclination of the tubes to insure a positive and rapid circulation.

By means of the construction of the headers, and their connections to the drums, unusually large water-areas are obtained for circulation, which reduces to a minimum the usual contraction of circulation through these parts, and avoids the unsteady water-level under forced firing so generally experienced.

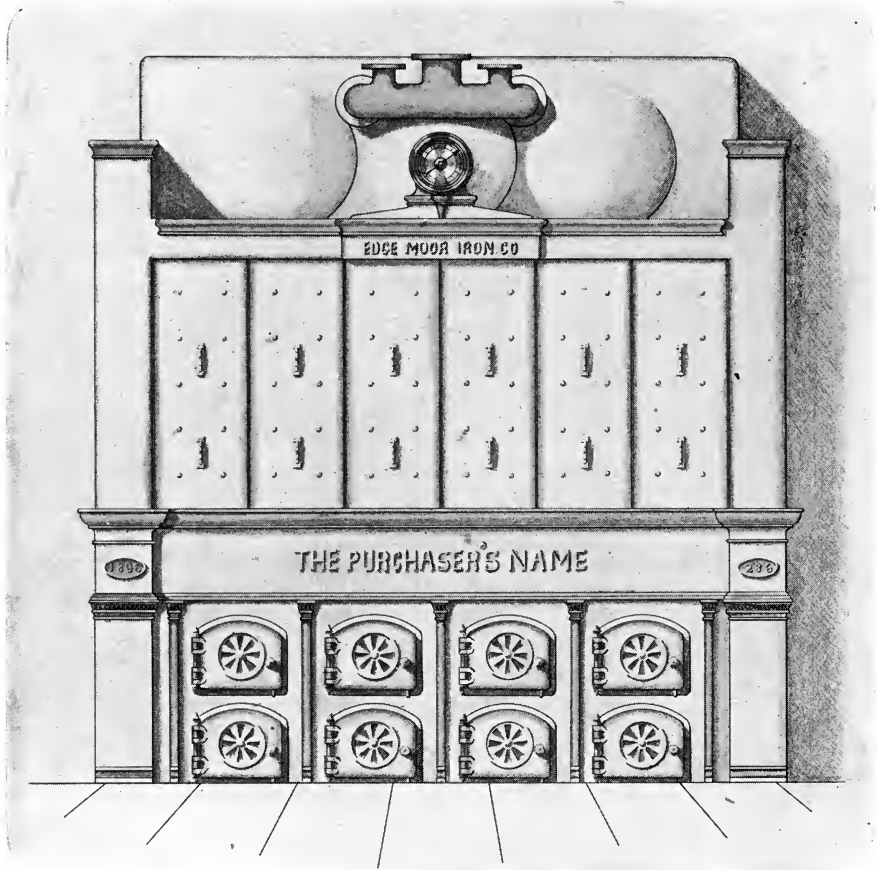


FRONT ELEVATION, EDGE MOOR WATER-TUBE BOILER.

1895.

The arrangement of the drums permits a large liberating surface and storage capacity, as well as forming a solid water-heating surface over the tubes, preventing loss by radiation, which cannot be avoided where large spaces are necessary between the drums.

In general, while possessing to the fullest extent the best elements of water-tube types of boilers, it has the maximum areas for circulation; the gases are carried in close contact with all the effective heating surface, and even in boilers of the larger sizes, when two or more drums are used, they are so connected by the front and back headers that the circulation is as free as in boilers having a single drum, thereby insuring a steady water-line, unimpeded circulation, effective heating surface, dry steam, quick response to unusual demands, and simplicity of construction with perfect accessibility to all parts.



FRONT ELEVATION, EDGE MOOR WATER-TUBE BOILER.

1896.

DESCRIPTION OF EDGE MOOR WATER-TUBE BOILER.

Our Water-Tube Boiler is on the market to meet the demand for a high-grade article, and is especially recommended for :

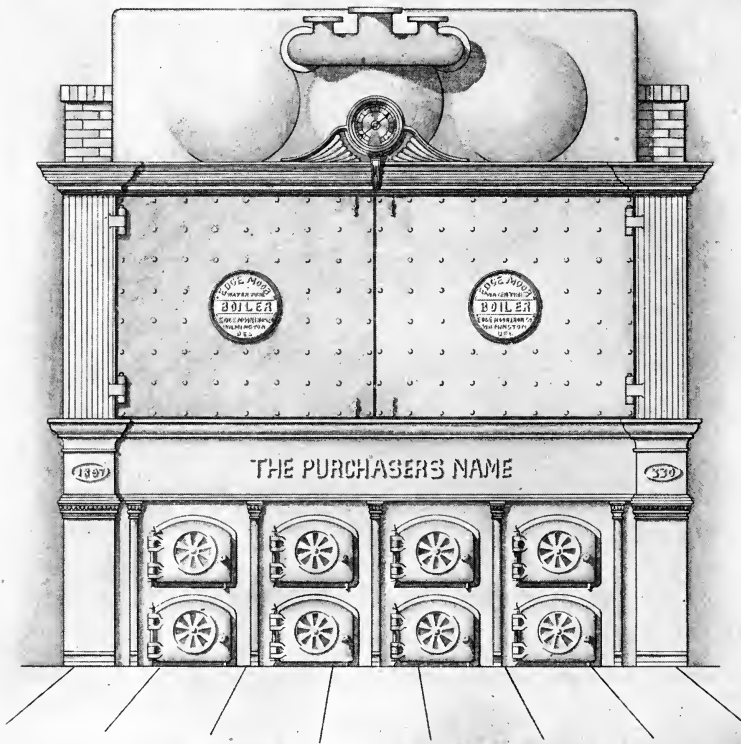
Safety, Reliability, Capacity in Space Occupied, Efficiency, Economy, Durability, Accessibility for Repairs and Inspection, Adaptability to Environments and Attachments.

These qualities are not only desirable, but necessary, in order to avoid constant annoyance and failure in a steam-power plant.

Our Boilers are designed and built to meet the varied conditions of Draft, Fuel, Space, Transportation, Furnaces, and Pressure ; in sizes from 75 to 1000 nominal Horse-power ; for working pressures up to 200 pounds.

The Areas of the path of circulation for the water are larger than in any other of the horizontal types of water-tube boilers, which allows our boilers to be readily forced to the utmost capacity of the furnaces, and makes them quick steamers under all kinds of firing.

The Large Water-Surface maintains an even water-level, while the large cubical contents of water, together with the equally large steam-space, afford abundant reservoirs for stored power.



FRONT ELEVATION, EDGE MOOR WATER-TUBE BOILER.

1897.

The Passes of Gases among tubes and around drums can be arranged either horizontally, in the direction of, or vertically across the tubes, as circumstances may recommend, and the gases may pass off to the flue, overhead or underground as best suited to local requirements.

The Water-Line is carried at the centre line of the drums; the feed-water is distributed in rear header below the water-line; the blow-off is at the bottom of the rear header; the steam outlet and pop-valves are placed upon a steam-yoke on the front header or on the rear header, as may be most convenient.

The Boiler is Supported upon columns at the front and upon expansion rollers at the rear; is set between brick walls and covered on top with non-conducting materials. The arrangements of chamber and supports can be adapted to any style of mechanical stokers or shaking grate.

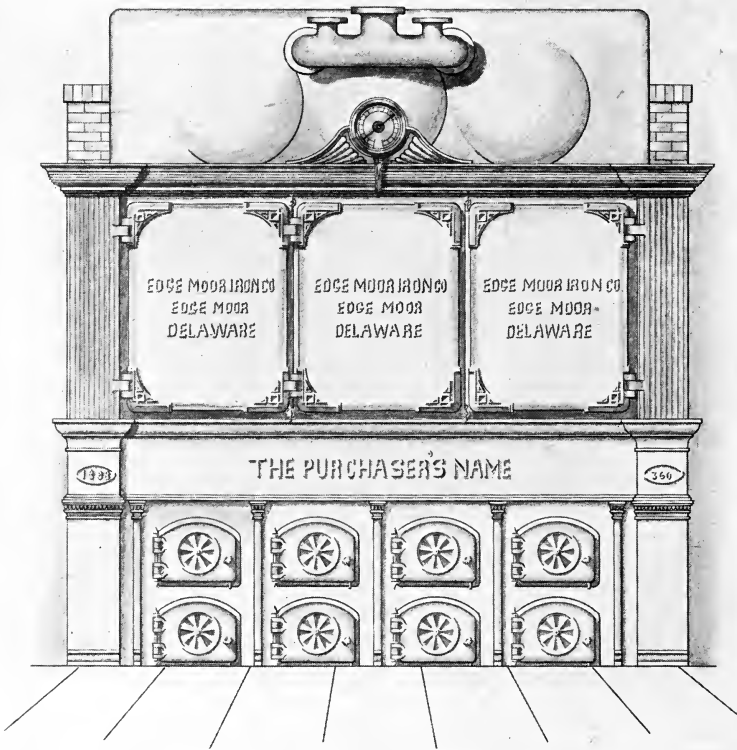
The Boiler, set as above described, is free to expand and contract without touching the brick-work of the setting. At the front and rear the small space between the headers and the brick-work is packed with asbestos to prevent the leaking of air into the boiler-chamber, but which allows of the expansion of the metal-work without detriment to the boiler or the setting.

It pays to keep a boiler clean, for soot and scale are "non-conductors" of heat. We therefore have spared nothing to provide means to this end, which insures the maintenance of economy and capacity.

The Arrangement of the Boiler is such that its contents are subdivided, thus providing the principal feature for safety embodied in sectional boilers.

The flat surfaces are particularly well stayed.

No stayed surfaces nor riveted seams are exposed to the intense heat of the direct fire from the furnace.



FRONT ELEVATION, EDGE MOOR WATER-TUBE BOILER.

1898.

The inclination of the tubes is one inch per foot, and is such as to produce rapid circulation toward the front header. The mixture of steam and water is delivered by the tubes to the liberating surface in the headers and drums.

Our Boilers may be kept clean (externally, while under fire).

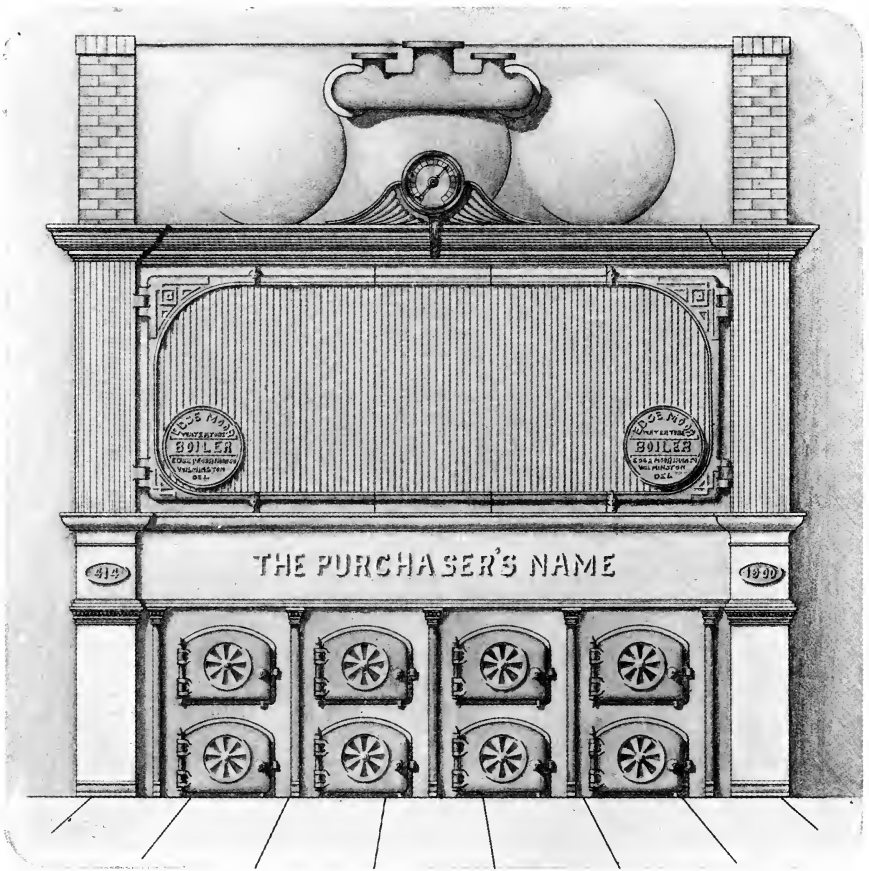
The Details of Construction that make the foregoing statement possible are as follows :

All Plates Used in the Construction of this boiler are made of open-hearth flange steel, which is purchased and tested under the Edge Moor Standard Specification, copy of which appears elsewhere in this publication. All other materials are of the best obtainable.

The Headers are of flange quality, open-hearth steel plates, forged hot to shape between dies. Each header is composed of eight plates: top and bottom trough, two side troughs, flange plate, bulge plate, hand-hole plate, and tube plate. The headers are assembled from these plates, which are tacked together at their corners by bolts, and all rivet-holes are then drilled through these plates while in place. They are afterward taken apart and scraped free of all burrs and borings before reassembling for riveting. These plates are tapped for the stay-bolts after they have been finally assembled and riveted.

The Drums are made of flange quality, open-hearth steel, drilled to templates, rolled into cylinders, and riveted together with steel rivets.

The Drums are single-riveted circumferentially and double zigzag riveted in longitudinal seams for standard pressure. High-pressure boilers have the longitudinal seams of the drums double butt strapped. The edges of the plates are planed to a bevel for caulking, and all seams are made tight by fullering both inside and out.



FRONT ELEVATION, EDGE MOOR WATER-TUBE BOILER.

1900.

“**The U Plates**” are flange quality, open-hearth steel, forged hot to shape between dies.

The Riveting of the plates together, and of the U plates to the end sheets of the drums, is done by hydraulic riveters, each rivet being held until black.

The Tube Plates are bored for the tubes.

The Hand-Hole Plates have flanged oval hand-holes, forged opposite to each tube. These are forged hot between dies and afterward faced to provide a seat for the hand-hole covers.

The Bulge Plates are forged into domes opposite to each drum, so as to avoid large flat surfaces.

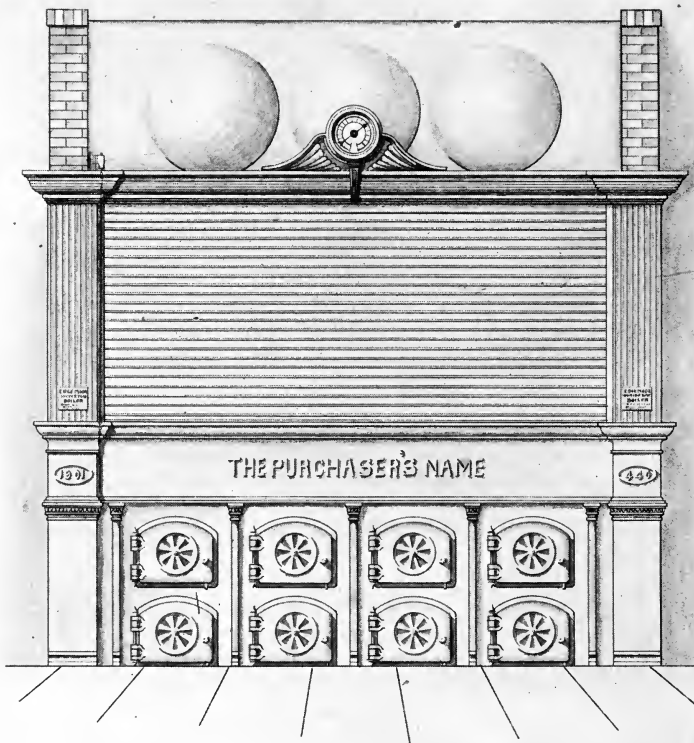
The Flange Plates have flanged openings, formed by dies while hot, to receive the drums to which they are riveted.

The Troughs are forged hot, and scarfed to fit over the ends of the top and bottom troughs. These troughs are riveted together at the corners, and form a frame to which the plates above described are riveted to form the boxes of the front and rear headers, the edges of the plates being planed to a bevel and fullered.

The Headers are braced by eight (8) $2\frac{1}{2}$ " stay-bolts in each bulge, placed on such a bolt-circle that the surfaces supported interior and exterior thereto will be in equilibrium.

These stays pass through cone-holes in the bulge plates and are provided with full hex-nut on the outer end of the bolt, and an annealed copper cone-nut just inside of the plate, which is drawn tightly into the coned hole and against the threads of the stays, thus making a perfect joint. These stays pass through the U plates, which are riveted to the drums, and are anchored to same by full hex-nut on the rear end.

The Headers are also stayed by screwed stays, which are



FRONT ELEVATION, EDGE MOOR WATER-TUBE BOILER.

1901.

riveted over at both ends. These are placed among the tubes and around the drums.

The wrought and cast **Trimnings for the Boiler-Settings** have good architectural style without sacrificing any mechanical feature.

A sliding hearth-plate is provided, which greatly facilitates cleaning of fires. When the hearth-plate is pulled forward, an opening is made through which the clinker will drop into the ash-pit, instead of out upon the floor around the fireman's feet.

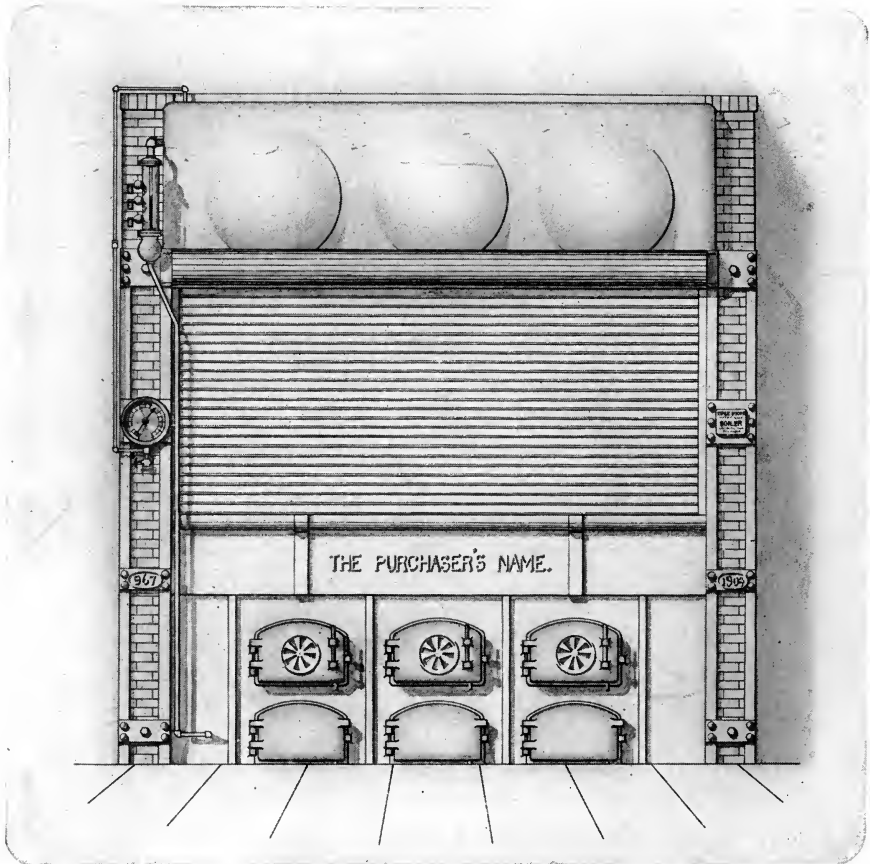
Cleaning doors and manhole doors and the necessary cleaning-out doors for the flues and tubes are provided in accordance with the requirements of the style of setting demanded by the situation.

We also furnish corner braces, tube doors, buckstays, furnace fixtures, such as grate-bars and bearers, deflector castings and damper, firing tools, wrenches, special tile, etc., as may be required.

Upon the Question of Adaptability there is much to be said in favor of our boiler. We are prepared to build them from 6 tubes wide to 30 tubes wide, with from one drum to five drums in these widths ; and from 6 to 16 tubes in height, as the capacity may require, with the tubes 18 feet long or shorter. We are thus enabled to put the maximum amount of power in any given space.

It is also a Noteworthy Fact that our boiler can be supplied with superheaters ; that the steam outlets may be placed at the front or rear, and likewise the feed inlet may be at either end of the boiler.

By reason of the box form of headers, our boilers are easily swung or supported on the corners, so that all sorts of stokers, furnaces, or shaking grates may be applied ; and as we may select any one of the four different passes of gases, it is



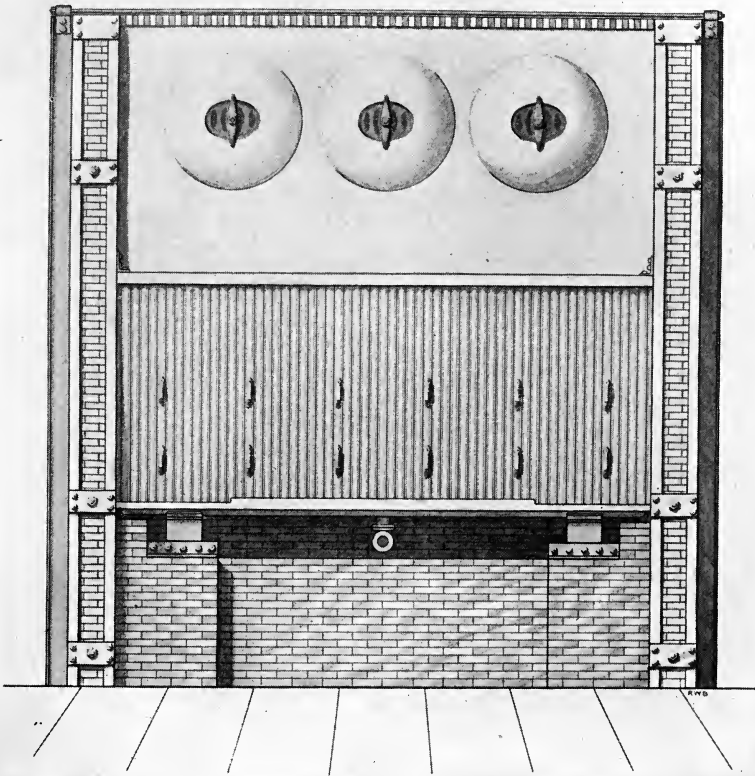
FRONT ELEVATION, EDGE MOOR WATER-TUBE BOILER.

Three drum boiler.

possible to set our boiler in continuous batteries as well as in pairs and singly.

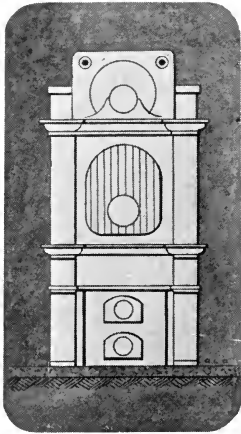
The tubes are withdrawn through the front header and require about their length of space in front of the boiler for this purpose.

In the foregoing we have touched upon those things which control especially the first five essential features mentioned at the beginning.



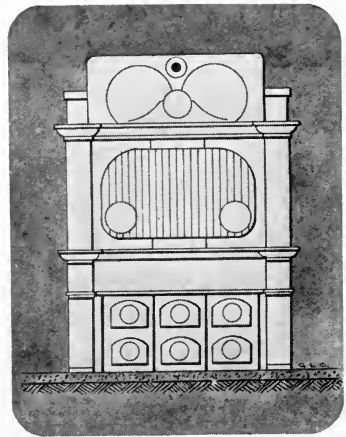
REAR ELEVATION, EDGE MOOR WATER-TUBE BOILER.

Three drum boiler.



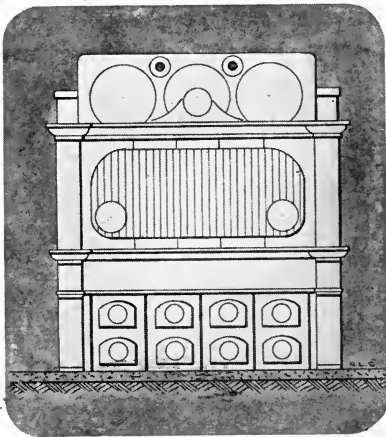
ONE DRUM WATER-TUBE BOILER.

From 75 H. P.
To 250 H. P.



TWO DRUM WATER-TUBE BOILER.

From 200 H. P.
To 400 H. P.

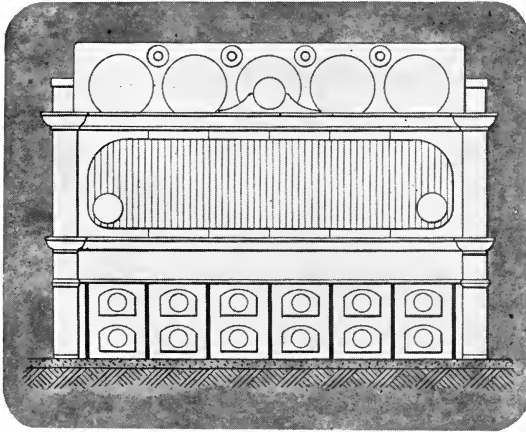
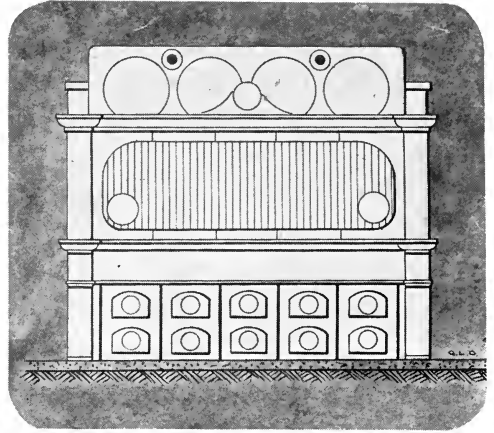


THREE DRUM WATER-TUBE
BOILER.

From 300 H. P.
To 600 H. P.

**FOUR DRUM WATER-TUBE
BOILER.**

From 500 H. P.
To 800 H. P.



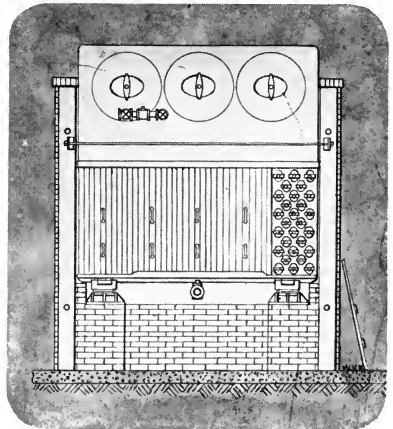
**FIVE DRUM WATER-TUBE
BOILER.**

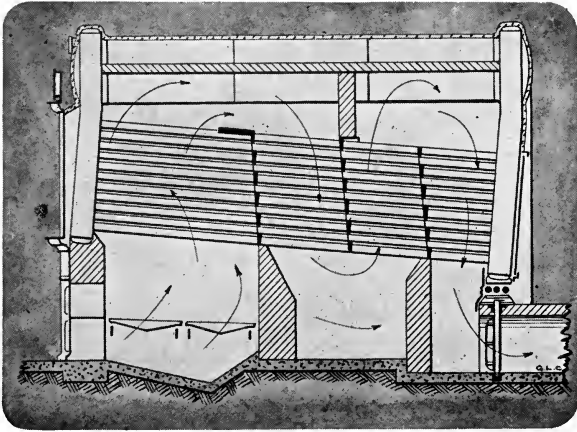
From 700 H. P.
To 1000 H. P.

THREE DRUM BOILER.

With one tube-door lifted off so that the
others may be slid to one side.

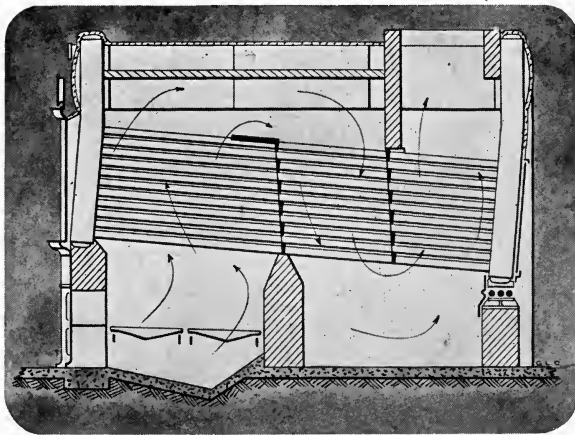
Rear view.





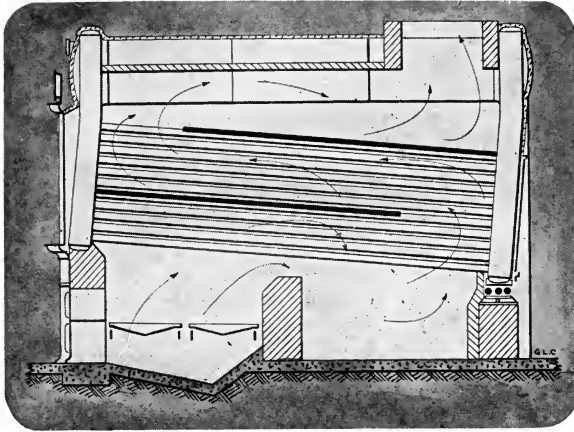
CROSS-PASS SETTING.

Gases off at the bottom.



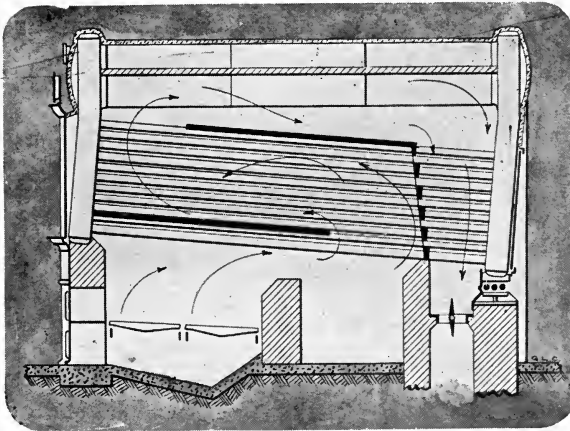
CROSS-PASS SETTING.

Gases off at the top.



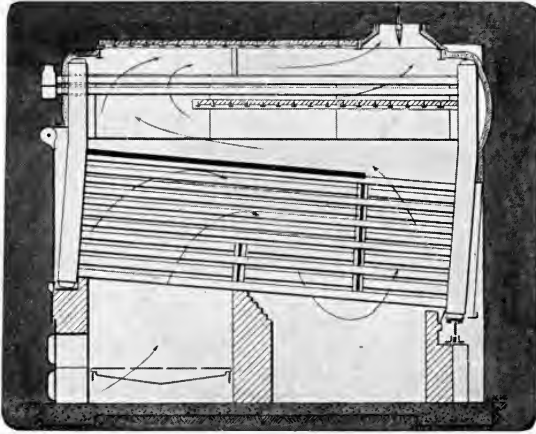
HORIZONTAL-PASS SETTING.

Gases off at the top.



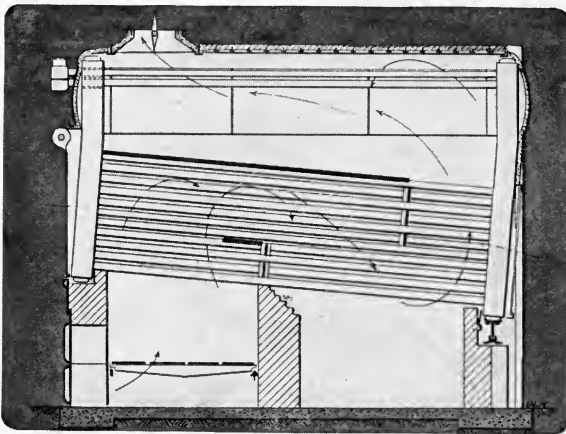
HORIZONTAL-PASS SETTING.

Gases off at the bottom.



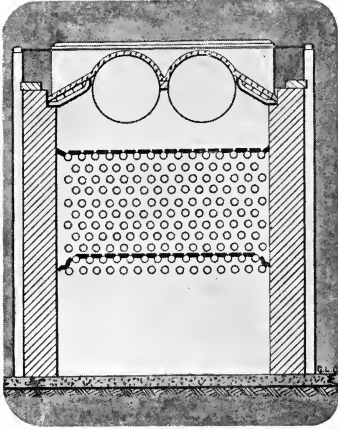
SUPERHEATING BOILER, CROSS PASS SETTING.

Gases off at top rear.



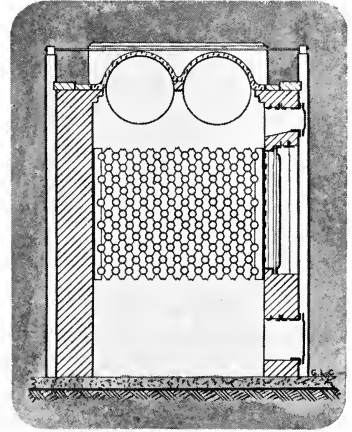
SUPERHEATING BOILER, CROSS PASS SETTING.

Gases off at top front.



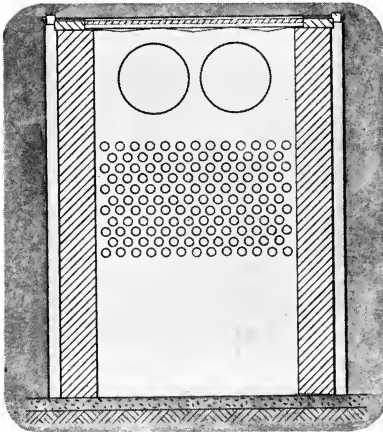
CROSS SECTION.

Showing Horizontal-Pass,
Tube Tile, and
Rafter Type of Roof.



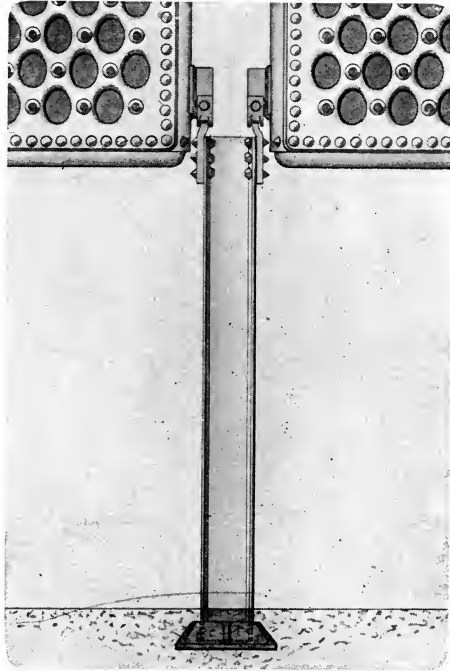
CROSS SECTION.

Showing Cross-Pass,
Deflector Castings,
and Side Cleaning Doors.
Upper half of Drums covered.

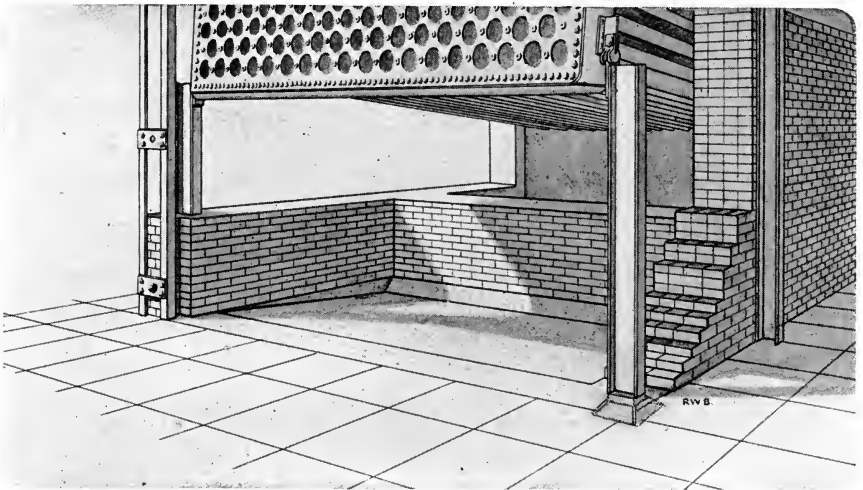


CROSS SECTION.

Showing Buckle Plate Roof,
Drums exposed to products
of combustion.

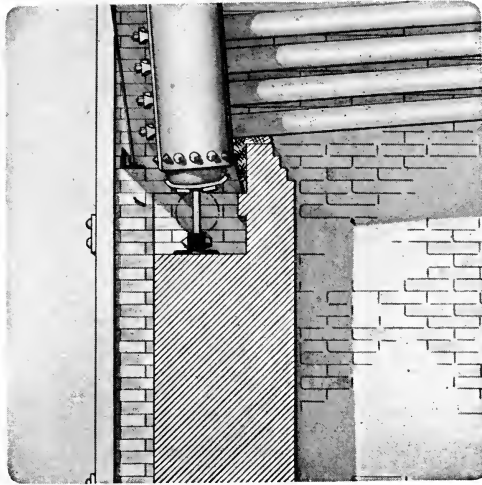


FRONT SUPPORT BETWEEN TWO BOILERS.

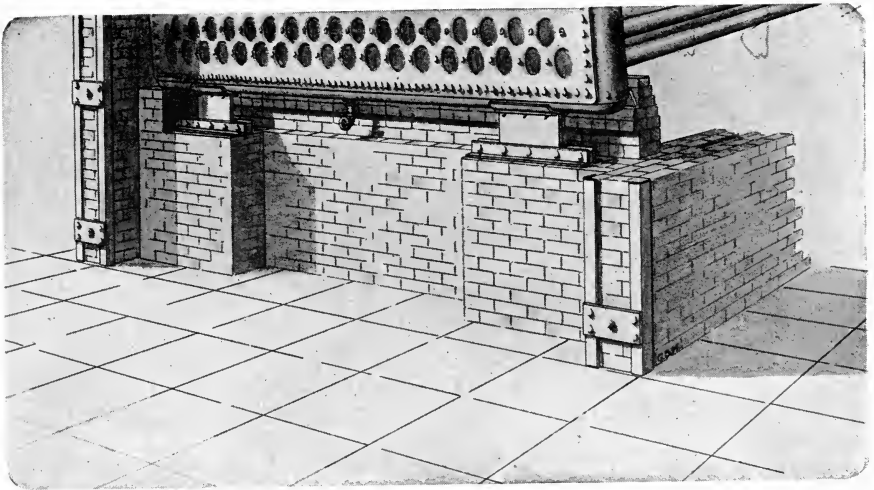


FRONT HEADER SUPPORT-COLUMNS.

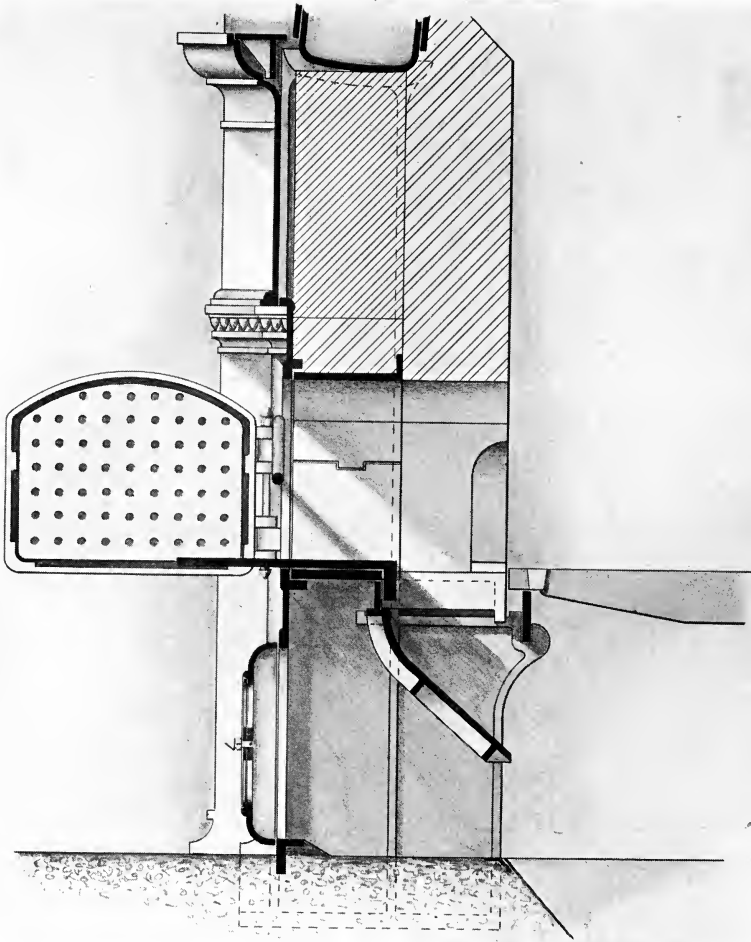
Furnished unless boiler hangs from framing.



ROLLER BEARING DETAIL.

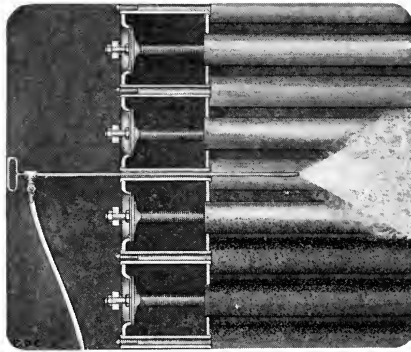


**REAR HEADER SUPPORT-ROLLERS
AND SAFETY PIERS.**



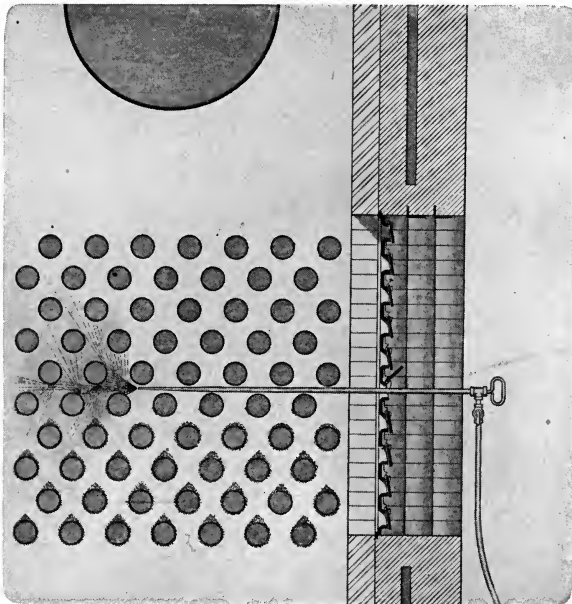
SECTION THROUGH FURNACE FRONT,

Showing Sliding Hearth Plate and Ash Slide.



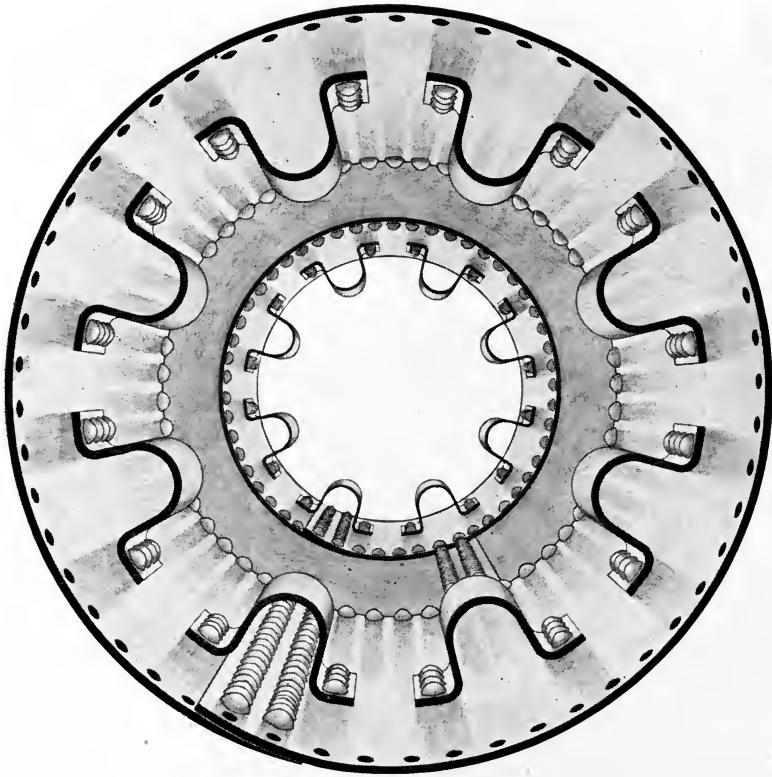
METHOD OF CLEANING OFF SOOT FROM TUBES WITH
HORIZONTAL PASS SETTING.

Boilers set in continuous battery.



METHOD OF CLEANING OFF SOOT FROM TUBES,
WITH CROSS PASS SETTING.

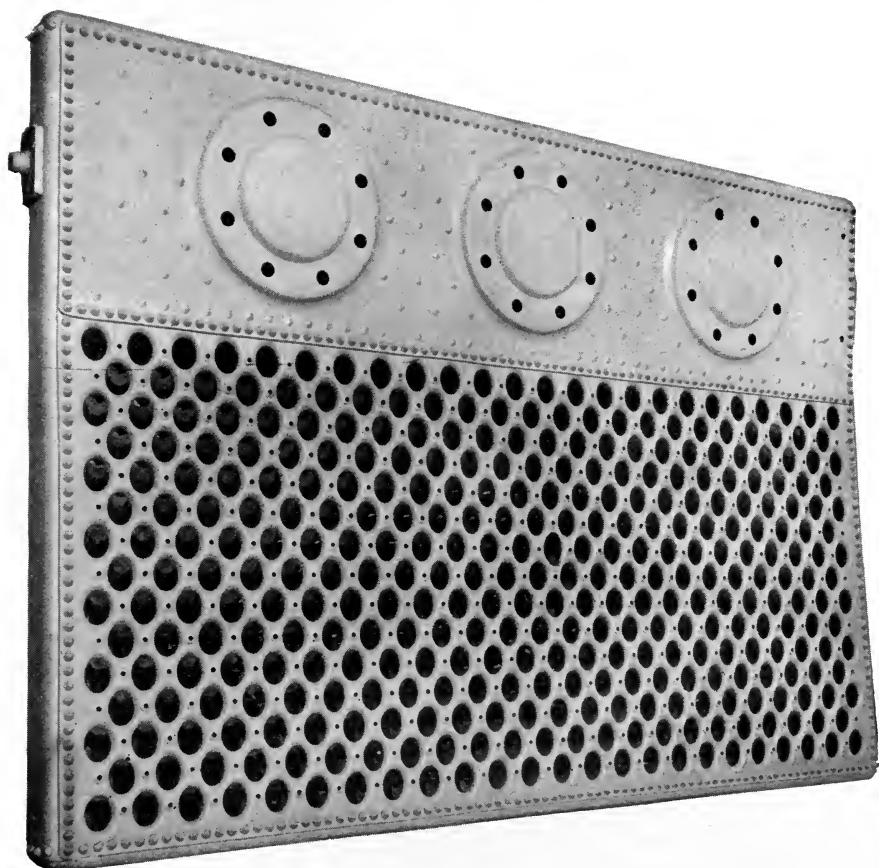
Boilers set singly or in pairs.



INTERIOR VIEW OF STANDARD DRUM.

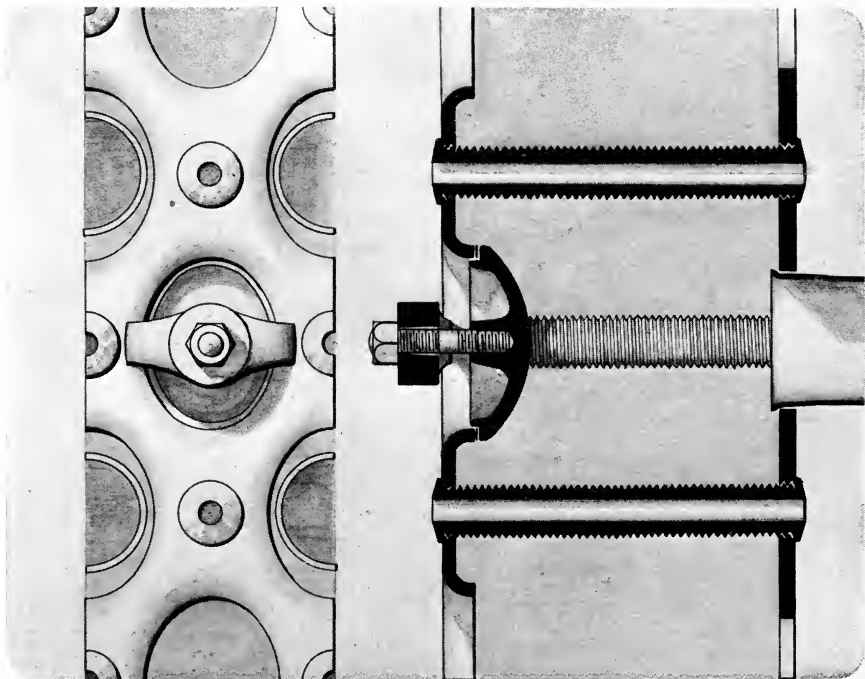
Shown in section, pages 50-51.

Showing seams at the bottom, and U plate at each end.



FRONT HEADER.

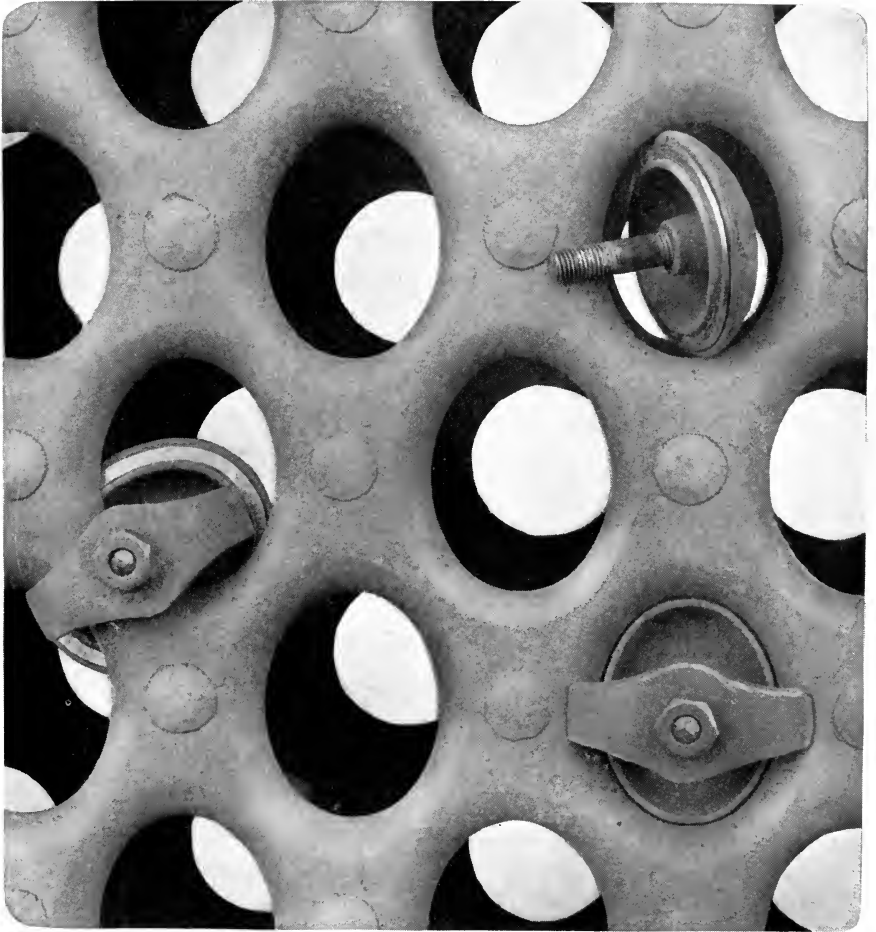
Showing the forged plates forming the header and the manner of riveting. This illustration shows trunnions riveted to the side of header for overhead suspension, the eight stay bolt holes on each bulged surface for the header stays (illustrated pages 50-51), and hollow stay bolts between each flanged hand hole on the face of the boiler.



DETAIL OF HEADER CONSTRUCTION.

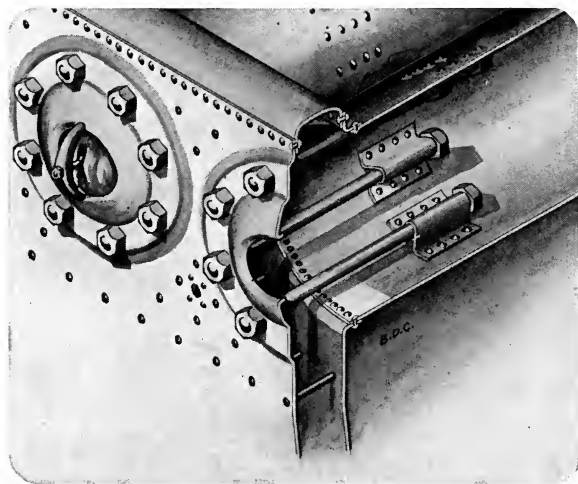
Opposite each of the 4" tubes (which are expanded into the tube plates) is an oval flanged hand-hole, which is faced to afford a seat for the oval hand-hole cover.

The covers and dogs are the only cast-iron used in the pressure part of our Water-Tube Boiler. These are under compression, for which cast-iron is particularly adapted. The plates of the header are fastened together by screwed stays riveted over. The tubes are expanded and their ends flared by a special roller expander.



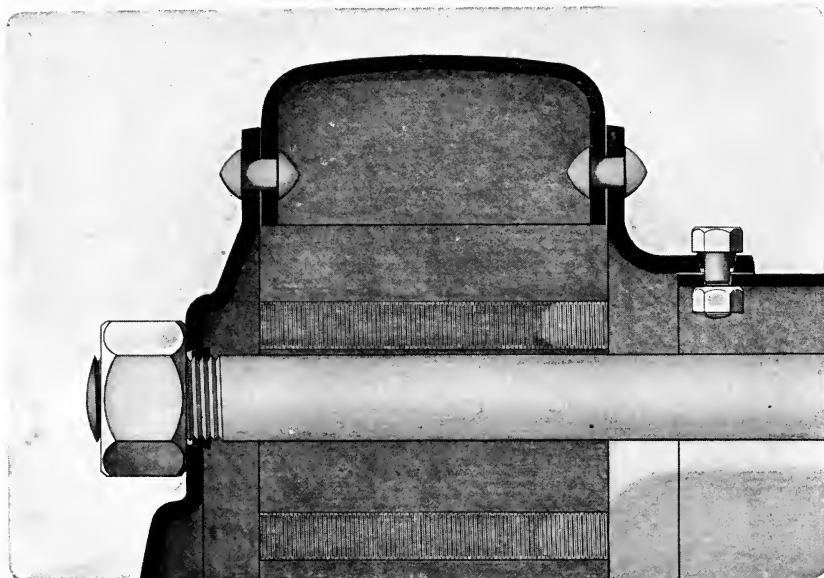
EXTERIOR VIEW OF HAND-HOLE PLATE OF HEADER.

Showing solid stays, and illustrating that each hand-hole
cover is independently removable.

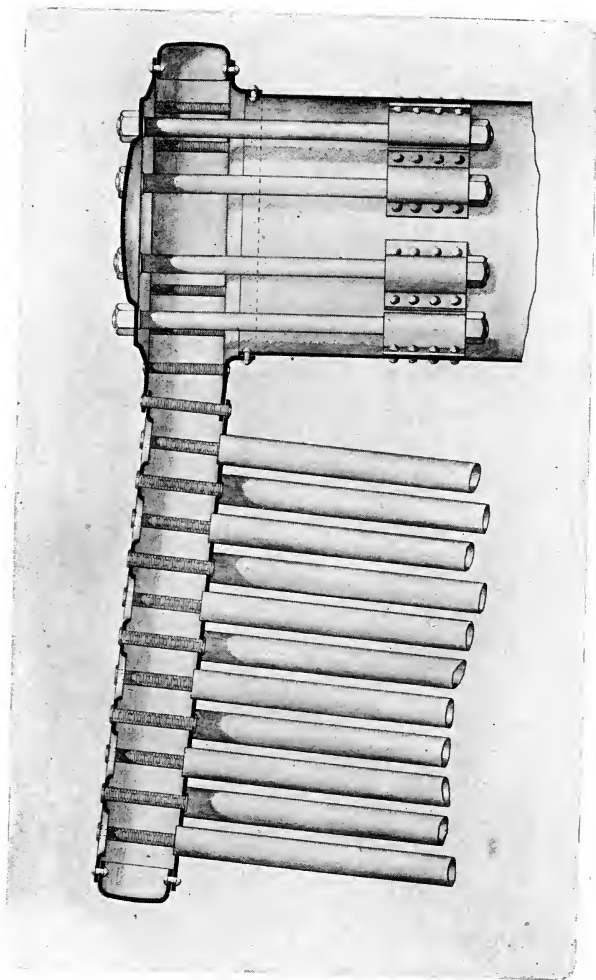


ISOMETRICAL SECTIONAL VIEW OF REAR HEADER AND CONNECTION TO DRUMS.

Showing bulge stays and U plates.



DETAIL OF CONNECTION OF BULGE STAY AND DRUM TO BOILER HEADER.

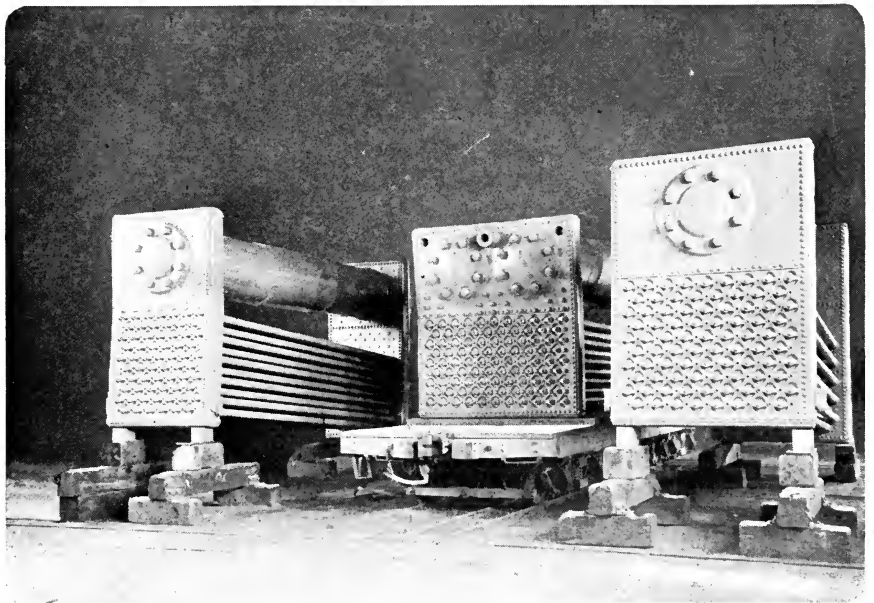
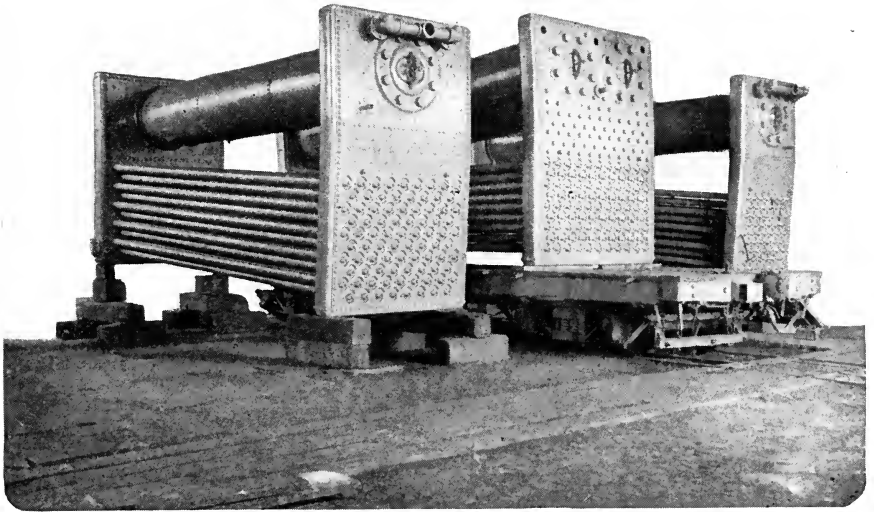


SECTION THROUGH FRONT HEADER.

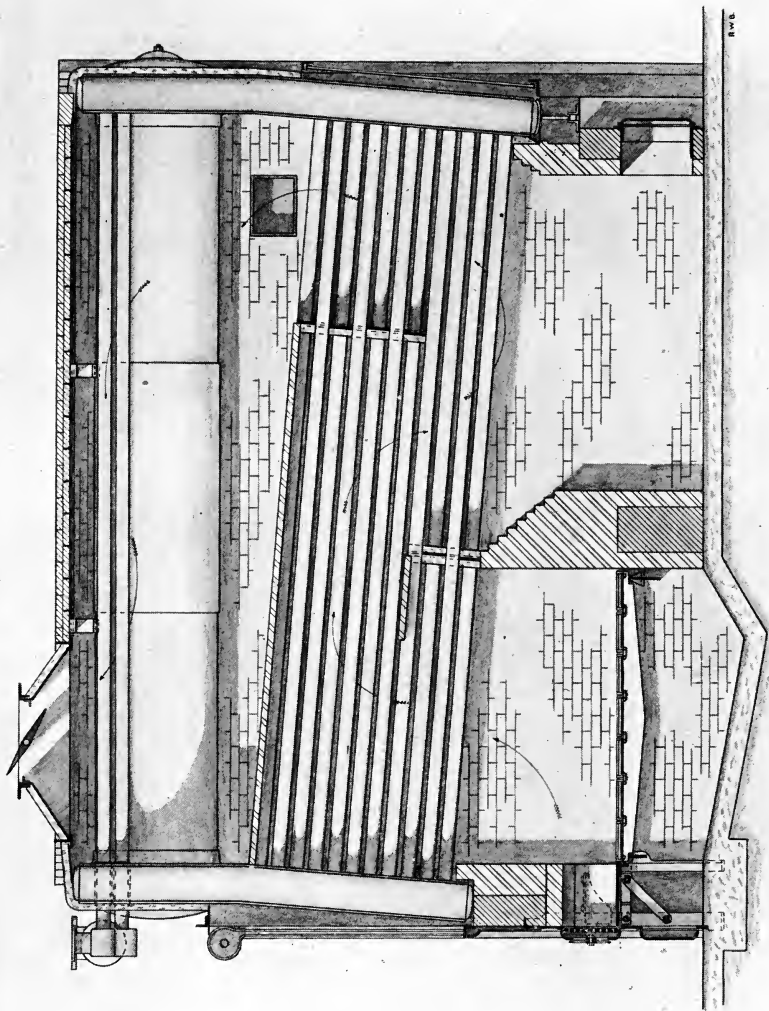
Showing relation of drums to tubes. Drum horizontal tubes inclined one inch per foot.



SHIPMENT OF TWO 700 HORSE-POWER SUPERHEATING BOILERS.



ONE AND TWO-DRUM WATER-TUBE BOILERS.



LONGITUDINAL SECTION, SHOWING SETTING OF A WATER-TUBE BOILER
WITH SUPERHEATING OUTLETS.

Gases off at front, top.

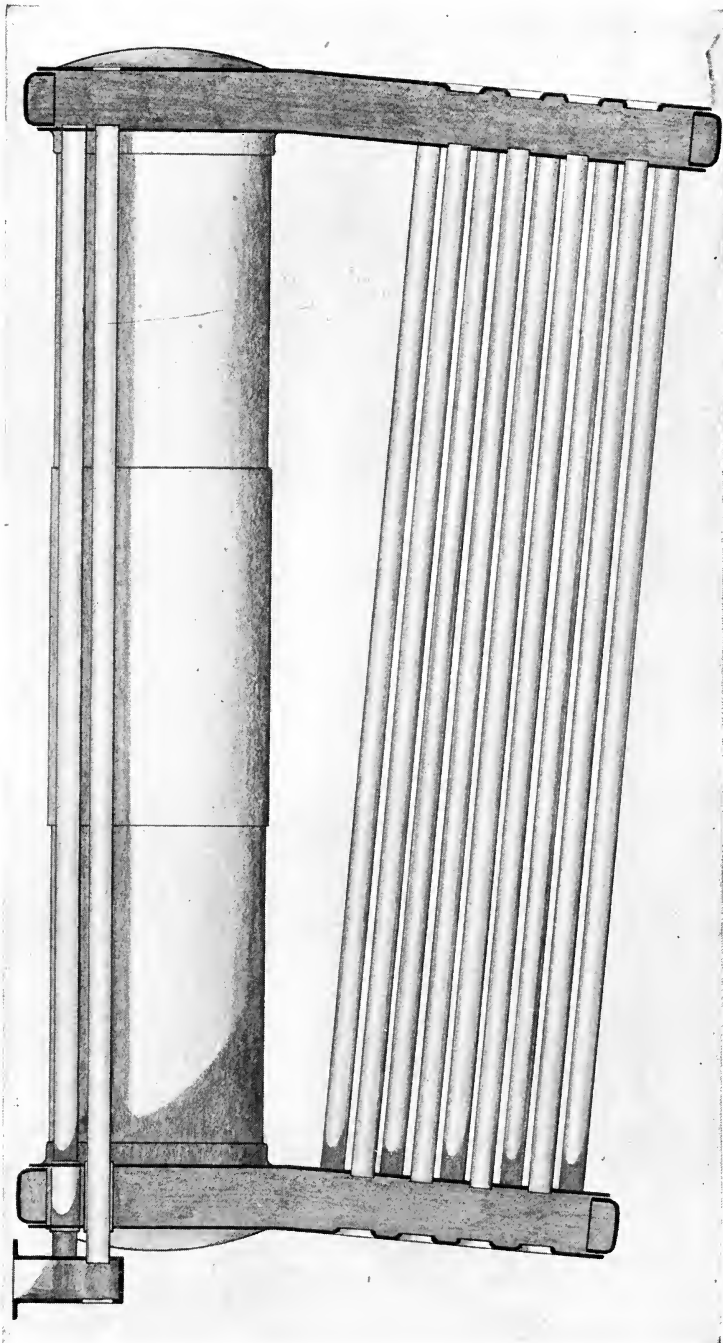
EDGE MOOR SUPERHEATING WATER-TUBE BOILERS.

Improved under patents, Aug. 24, 1897-Aug. 20, 1901.

A superheater that is designed as a part of a boiler must obtain its heat from the gases of combustion; its location depends upon the degree of superheat required.

If properly utilized, there is sufficient heat in the waste products of combustion, after they have passed through the boiler-setting, to furnish a considerable degree of superheat to the outgoing steam, and, by the use of these products, to increase the efficiency of the boiler by turning to account that which would otherwise be lost. The superheating tubes of such a device are located in the coolest portion of the boiler-chamber, where there is no danger from overheating and where there are no precautions required for the preservation of the superheater, or extra care required to operate the boiler.

If a high degree of superheat is required, the superheating tubes must be located in the path of combustion before they have completely passed through the boiler-setting, and where the gases have a high temperature. When these high temperatures exist, the tubes of the superheaters must be cooled at all times, either by the passage through them of the steam from the boiler, or by being flooded with water, should it be necessary, for any cause, to shut off this flow of steam. The tubes must be flooded when the boiler is started, before the junction-valve is



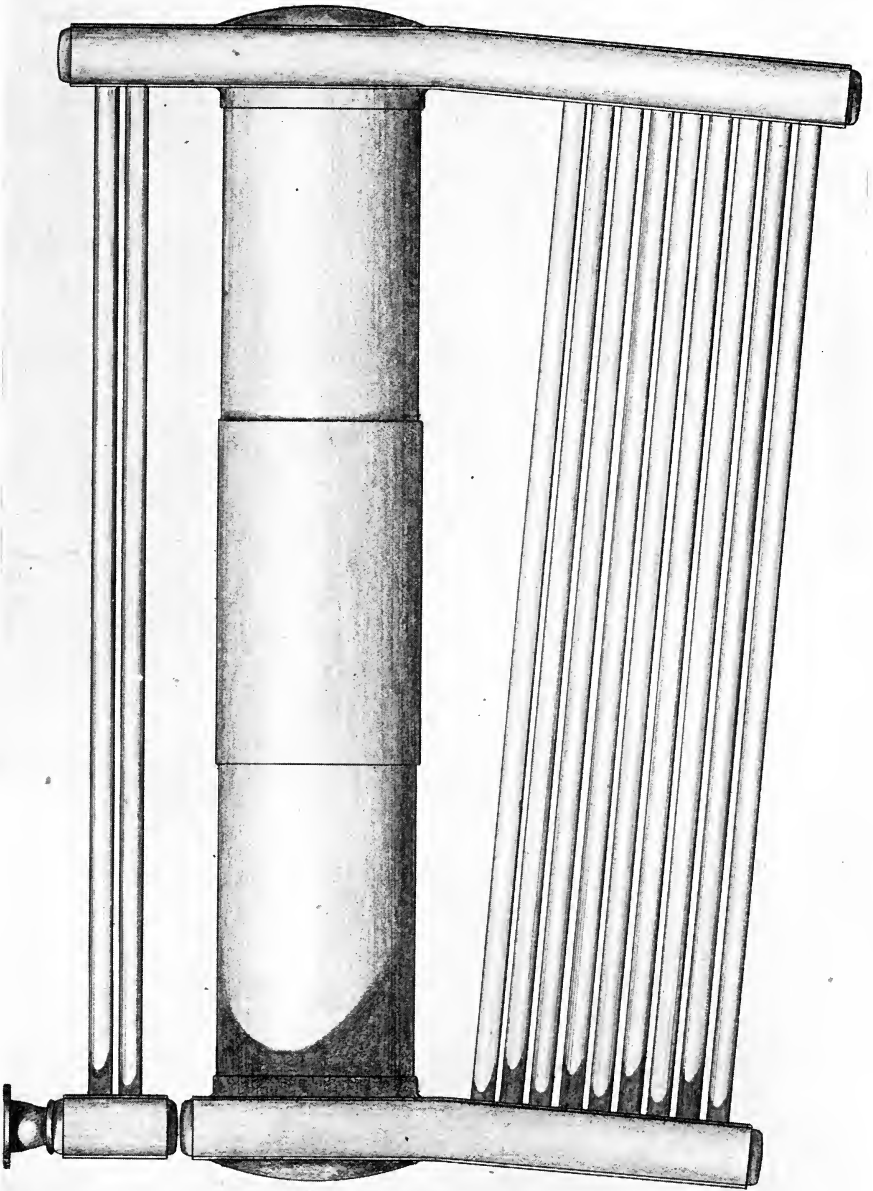
LONGITUDINAL SECTION OF A WATER-TUBE BOILER WITH SUPERHEATING OUTLET.

opened, and immediately after it is closed. These precautions are necessary to prevent the tubes from being burned out by the high temperatures of the gases to which they are exposed, and, while such a superheater can be operated successfully, it is always in danger of injury or destruction by carelessness or want of intelligence of the man in charge.

A British firm that manufactures both styles of superheaters, the flooding and non-flooding types, plainly states its preference for the type that does not need flooding, and will guarantee this type, but refuses to assume any responsibility for the other. We agree with them that it is better to avoid the types of superheaters which require to be flooded, because the precautions required to protect them can so readily be neglected, also because it seems reasonable that any superheater that requires to be alternately flooded with water and exposed to high temperature must have a series of deposits baked fast to its heating surface, which would not only decrease its efficiency, but is likely to encroach to a risky degree on the danger-line.

We also believe that when the higher temperatures of superheat are desired, the superheater should not be located in the boiler-setting, but that a separate furnace should be employed, so that the required heat may be applied to the tubes after the steam is passing through the superheater, or that may be quickly directed from the tubes, should circumstances compel the closing of the steam-valve.

We have designed our superheating outlet and superheater so as to utilize the heat of the outgoing gases from the boiler. The heat to which it is exposed renders it unnecessary to flood the tubes at any time for their protection, nor does it require any precautions to operate



LONGITUDINAL SECTION, TWO-ROW SUPERHEATING WATER-TUBE BOILER.

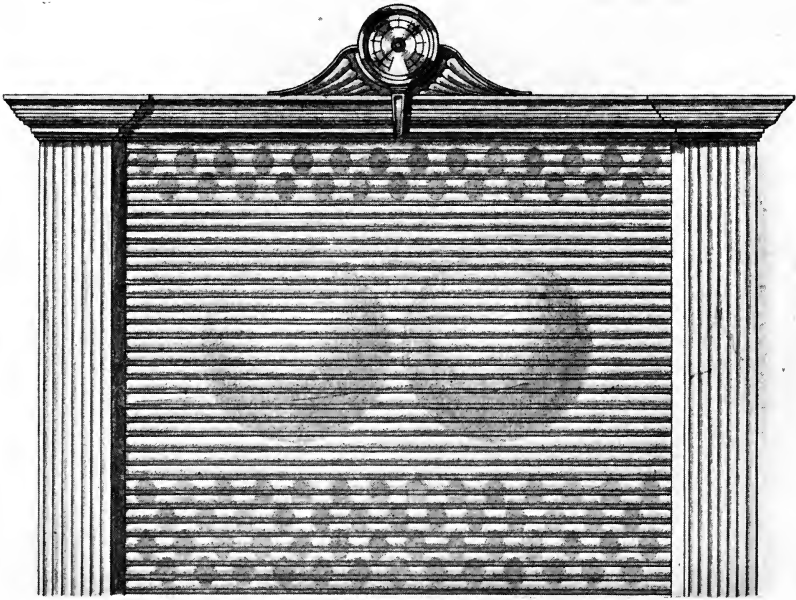
it other than the customary care required to fire any ordinary boiler. It will furnish sufficient superheat to eliminate all entrainment at the boiler. It meets the demand for dry steam at the engine, which is very different from the commercially dry steam at the boiler, as this contains from one to three per cent. of water in entrainment, to which must be added what will be condensed in the steam-mains, prior to its use at the engine.

The illustrations which follow describe our superheater and superheating outlet better than we can in words, and show how it can be applied to boilers of different sizes, also to water-tube boilers of types other than those we manufacture. Its design is so simple and it is so absolutely free from strains due to expansion, that we feel confident it will receive favorable consideration. We have designed the constituent parts of our superheater so that such of them as are likely to need renewing can be replaced by commercial articles.

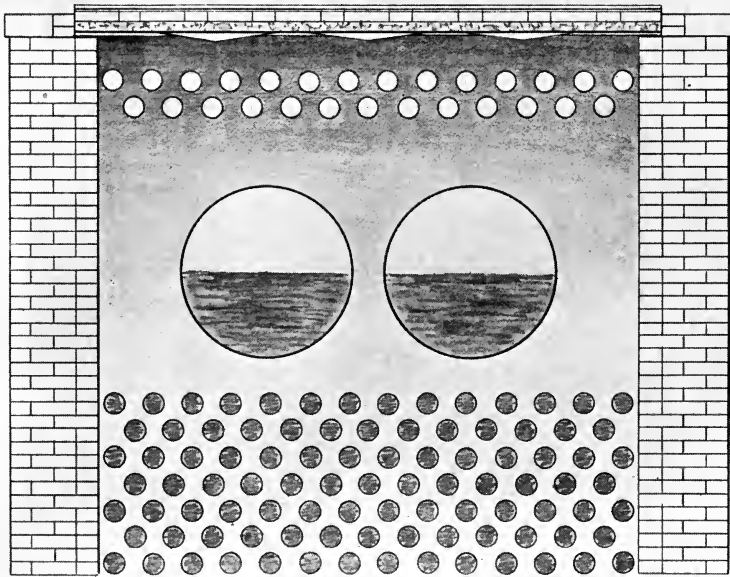
The sleeves in the header, through which the tubes pass, are of commercial size; the tubes are straight, and, should they need replacing, can be purchased from any maker, without the trouble even of a sketch to specify requirements.

We have built superheating boilers that have been doing good service for a period of years and have not called for repairs since their installation, and we attribute this gratifying fact to the simplicity of its design and to the care used to eliminate all elements of self-destruction. We provide holes for a soot-blower, so that the fireman can keep the tubes clean and can clean them from soot even while the boiler is in service, a precaution which enables the heating surface to be kept clean and its efficiency maintained.

TWO-ROW SUPERHEATING WATER-TUBE BOILER.



FRONT OF BOILER.

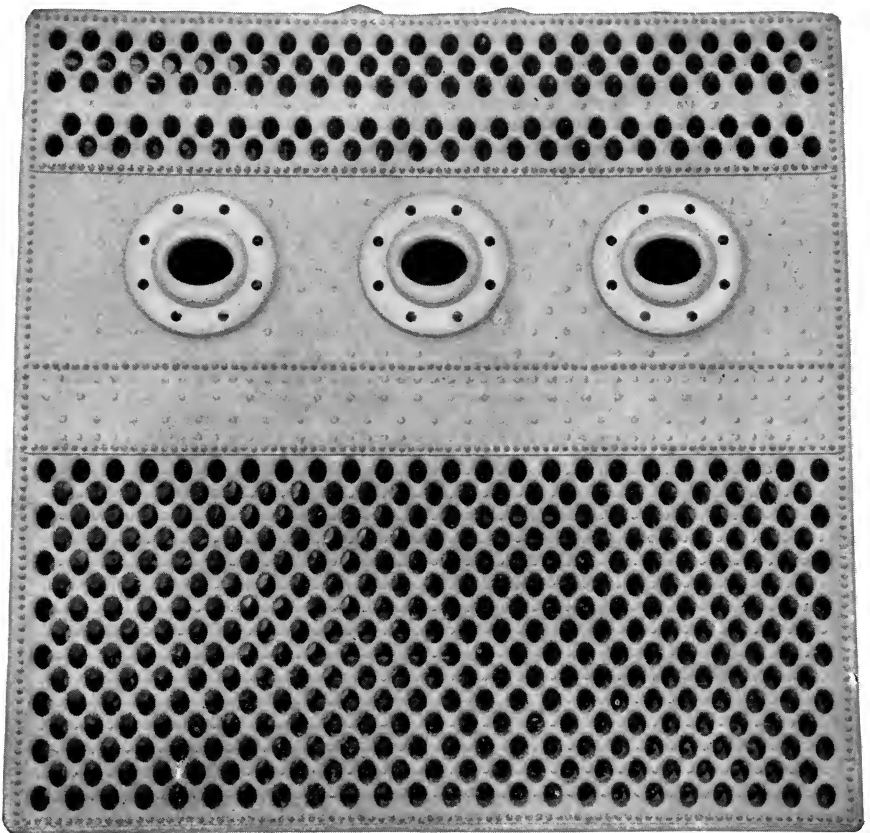


SECTION THROUGH BOILER SETTING.

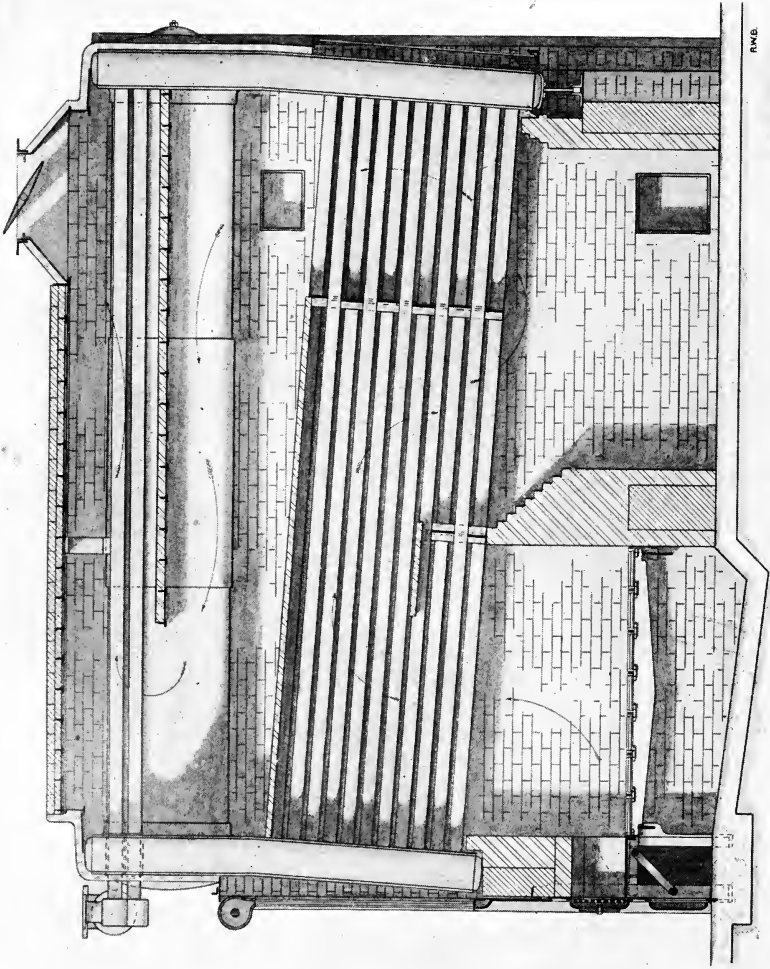
The Edge Moor Superheater is so simple in construction, and is so located and provided for in the matter of expansion and cleaning, that it probably will live as long as the boiler.

The Edge Moor Superheating Steam Outlet for Water-Tube Boilers will superheat from 10 degrees to 20 degrees.

The Edge Moor Superheating Water-Tube Boiler can have its heating surface varied to suit the requirements of the demand for superheated steam.



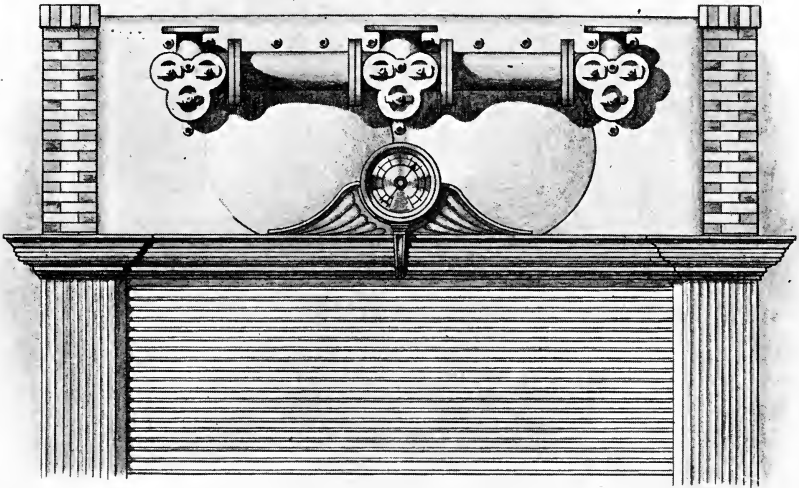
REAR HEADER SUPERHEATING BOILER.



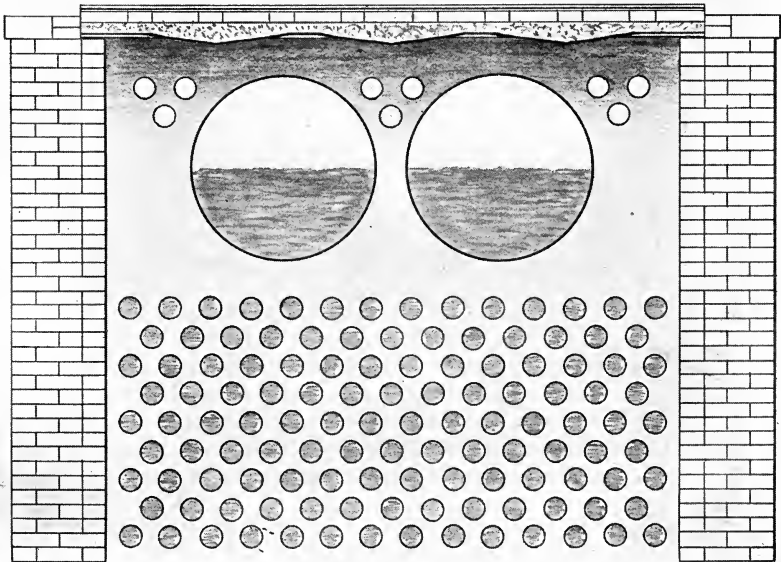
LONGITUDINAL SECTION, SHOWING SETTING OF A WATER TUBE BOILER
WITH SUPERHEATING OUTLETS.

Gases off rear, top.

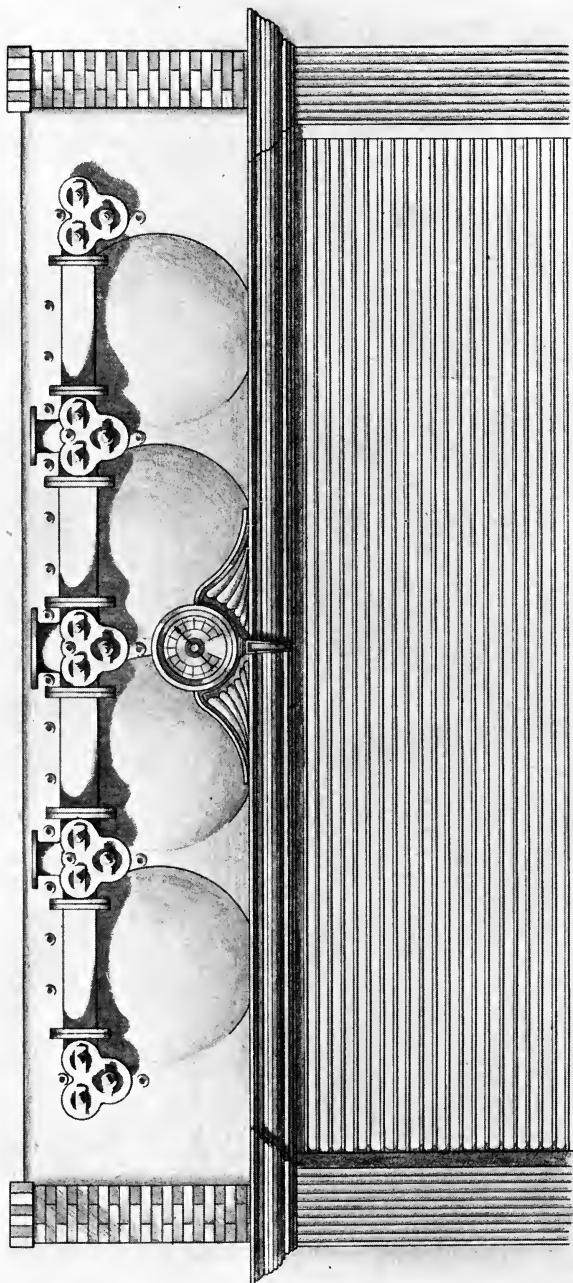
NINE-TUBE SUPERHEATING STEAM OUTLET.



FRONT OF BOILER.

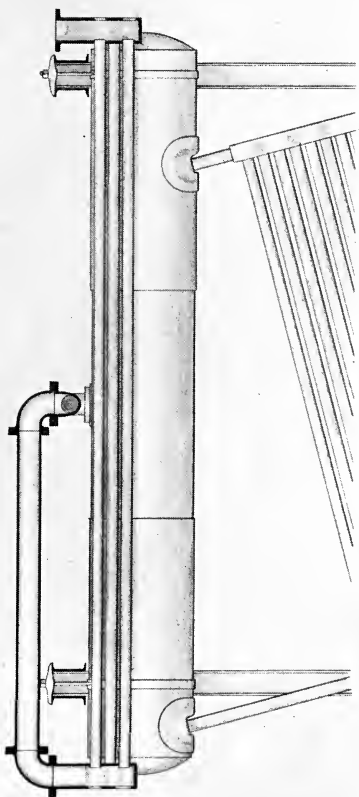
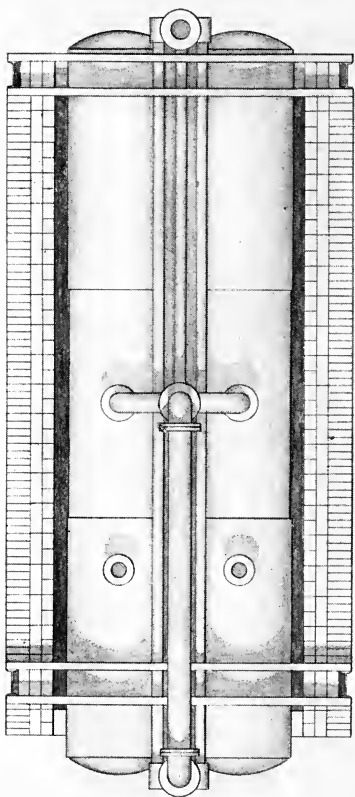
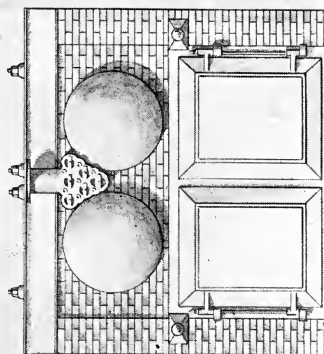
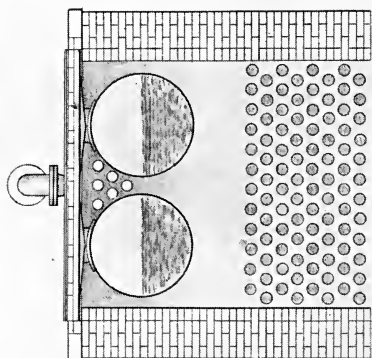


SECTION THROUGH BOILER SETTING.



FIFTEEN-TUBE SUPERHEATING STEAM OUTLET.

Four-Drum Water-Tube Boiler.



EDGE MOOR SUPERHEATER ATTACHED TO A WATER-TUBE BOILER.

SHOP PRACTICE.

The ability of a boiler-shop to turn out first-class work depends upon the quality of material, the methods and care used in construction, and the tools and workmen by which it is constructed.

Our shops are well equipped with machinery adapted to our business. Many of our tools are built especially for the manufacture of our boilers, and we employ skilled workmen.

Our methods of work are as follows:

All holes are punched smaller than the diameter of the rivet to be driven, than the diameter of the boiler-tube to be used, or the size of hole to be flanged; these holes are then drilled, bored, or forged to the size required by the construction. The holes for the tubes and hand-hole plates are punched and bored by machines with spacing tables, thus insuring accurate spacing from centre to centre of tubes.

Holes for rivets in headers are drilled while plates are "tacked" together by bolts, the drills being guided by small punched holes in the upper plate only. Plates are taken apart after drilling, scraped free of all burrs and chips, and reassembled for riveting.

Shells are rolled into cylinders and assembled for riveting, and the plates and butt straps are punched $\frac{1}{8}$ " scant, and drilled in place $\frac{1}{16}$ " larger than the rivet.

The foregoing construction insures true holes, as the smaller hole in the upper plate acts as a template for the lower plate, and the holes in both plates must match with absolute accuracy, thus avoiding all necessity for the use of a drift-pin, which so often produces injurious strains that materialize only after the boiler has been placed in service.

Stay-bolt rods are straightened before threading, and after being threaded are sawed to required lengths.

Caulking edges of plates are beveled after the rivet-holes in the plates are drilled, so that the lap from the centre of the rivet to the edge of the beveled plate is proportioned for the most effective caulking.

All rivets are power-driven, either by an hydraulic riveter or by a pneumatic hammer. Rivets are soft steel, driven hot, and finished black.

Forgings for boilers are made at a cherry heat, under steam hammers, special care being exercised in finishing them true to size during the shrinkage period.

After forging, shrinkage forms are used in the flanged openings, to prevent distortion while cooling.

All seams are fullered by pneumatic tools until tight.

All boilers and boiler headers are tested to the required hydraulic pressure before leaving the shop. The exterior parts of all boilers are oiled before shipment.

All small and delicate parts are boxed.

EDGE MOOR IRON COMPANY.

GENERAL SPECIFICATIONS FOR BOILER STEEL.

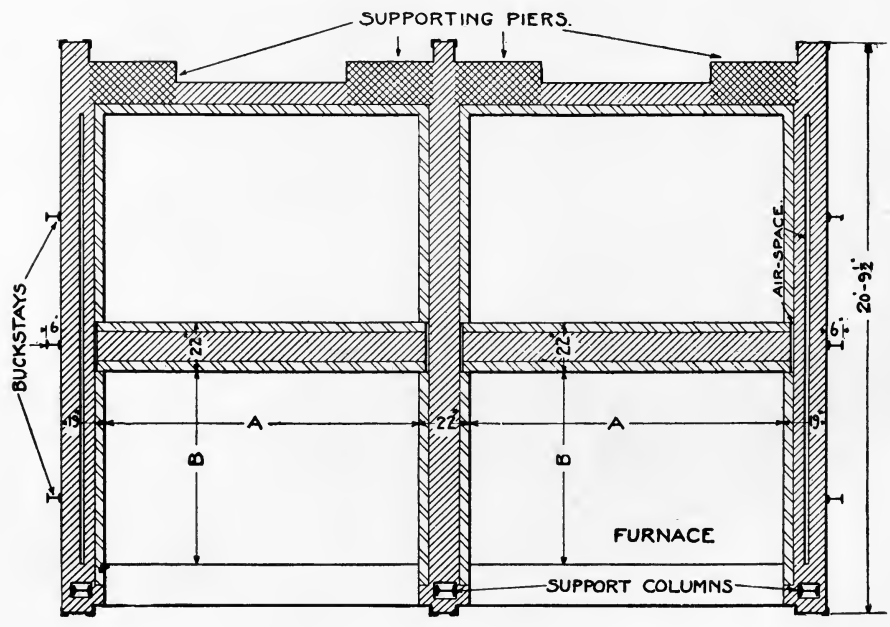
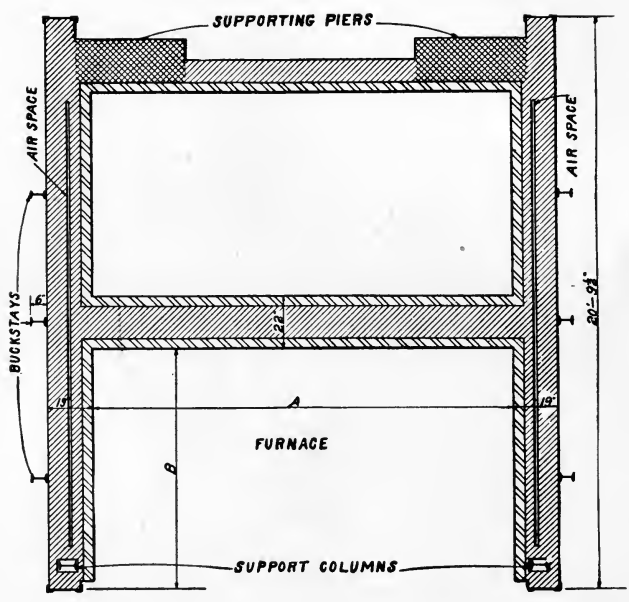
All plates used in the construction of the boilers must be made from homogeneous open-hearth steel, stamped showing brand of steel and name of makers; must be free from flaws and cracks, and must have a workmanlike finish.

All plates must have an ultimate tensile strength of not more than 63,000 nor less than 55,000 pounds per square inch; an elastic limit of not less than 30,000 pounds per square inch, an elongation of not less than 25 per cent. in a length of 8", with a reduction of area of not less than 50 per cent.

The strips cut from the plates for testing purposes must be stamped on the shearing-lines in two places on each strip, thus: —○—; also number the test-strip the same as the plate from which it is cut, this numbering, both for strip and plate, to be stamped and also painted with white paint to facilitate the identification of the test-piece with the plate. The test-piece to be $2\frac{1}{2}$ " wide and 16" in length, and the stamp to be within 3" of the end of the plate.

Specimens must stand the following bending test: When cut lengthwise from the plate, will bend cold 180 degrees over a diameter of two thicknesses of the plate without sign of fracture, and when cut crosswise of the plate will bend cold 90 degrees over a diameter equal to five thicknesses of the plate without sign of fracture.

Quenching bend test: The test-pieces after having been heated red hot and quenched in water at 60° Fahr., must bend cold without crack or flaw to a curve having a radius equal to one-half its thickness. It is conditioned that every plate shall be so marked as to afford easy identification. It is not necessary to stamp the sheets with the grade and guaranteed ultimate, as the physical properties of the steel are covered by the certifications of tension-tests furnished by independent inspectors. It is provided, however, that each plate shall be plainly marked in white lead with its size and commercial order-number—that is, our order to the mill, and in addition it shall be stamped with its heat—or blow-number, and a white-lead circle drawn around such stamp in order to locate it easily. As many of the plates have large circles cut out of the centre, all marking and stamping must be done in the corners within three inches of either edge, except in the case of the $\frac{3}{8}$ " plates, which we desire marked and stamped in the middle because in these plates the centre is left intact and the corners are cut off. In each parcel of plates of any considerable number, not less than ten to twelve tests shall be made, and must cover a minimum of three tension-tests for each heat or blow.



TABLE

Giving range of nominal Horse-Power for different widths of
furnace chamber.

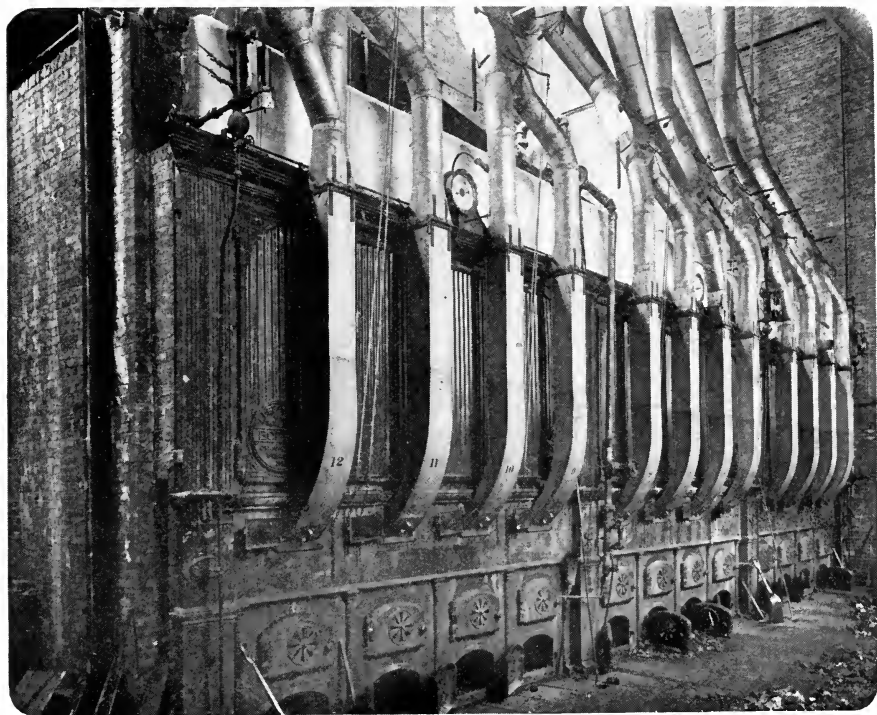
A.	HORSE-POWER.
3' 9''	70 to 150
4' 5''	80 to 175
5' ½''	90 to 200
5' 8''	100 to 230
6' 4''	110 to 275
6' 11 ½''	125 to 300
7' 7 ½''	150 to 325
8' 3''	175 to 350
8' 10 ½''	200 to 400
9' 6 ½''	215 to 415
10' 2''	230 to 450
10' 9 ½''	289 to 500
11' 5 ½''	309 to 600
12' 1''	315 to 625
12' 9''	325 to 650
13' 4 ½''	350 to 700
14' 0''	375 to 750
14' 8''	385 to 800
15' 3 ½''	400 to 825
15' 11 ½''	415 to 875
16' 7''	425 to 900

B varies from 5' to 7', as required by the nature of the coal and capacity desired.

Height of boiler setting ranges from 11' 10'' to 17' 2'', varying with the number of rows of tubes.



DEERING HARVESTING CO.,
CHICAGO, ILL.



DEERING HARVESTING CO.,

CHICAGO, ILL.

Water-Tube Boilers.



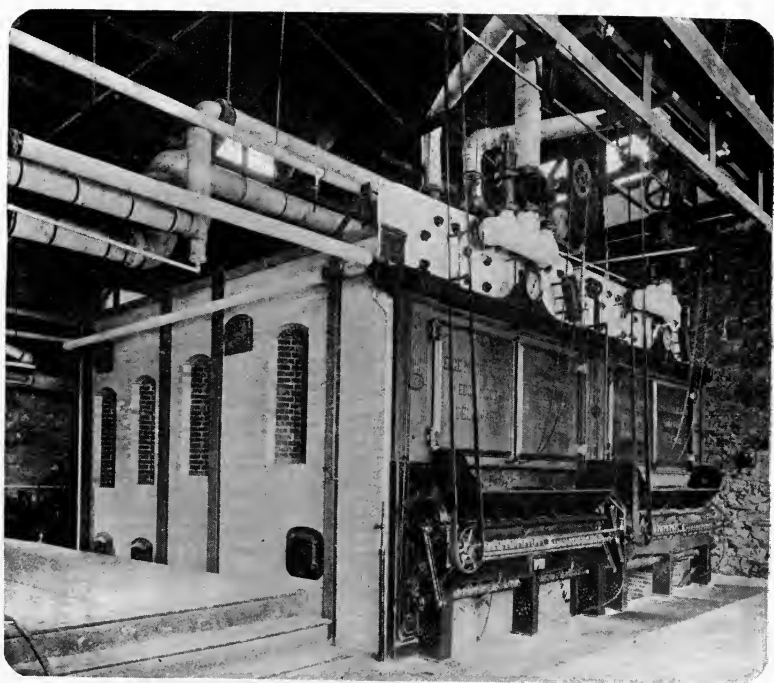
MONTROSE PUMPING STATION,
ALLEGHENY, PA.



**MONTROSE PUMPING STATION,
ALLEGHENY, PA.
Water-Tube Boilers.**



OVERBROOK FARMS,
PHILADELPHIA, PA.



OVERBROOK FARMS,

PHILADELPHIA, PA.

Water-Tube Boilers.



EDISON ELECTRIC LIGHT CO.,
SANSOM STREET STATION, PHILADELPHIA, PA.

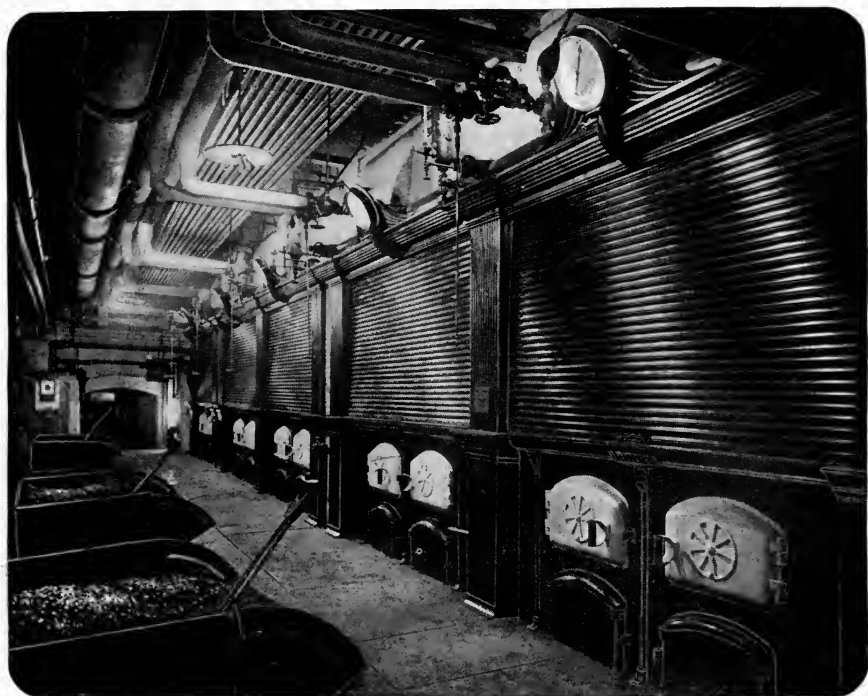


EDISON ELECTRIC LIGHT CO.,
SANSOM STREET STATION, PHILADELPHIA, PA.

Superheating Water-Tube Boilers.



DREXEL OFFICE BUILDING,
PHILADELPHIA, PA.
Independence Hall in the foreground.



DREXEL OFFICE BUILDING,
PHILADELPHIA, PA.



DIAMOND STATE STEEL COMPANY,
WILMINGTON, DEL.



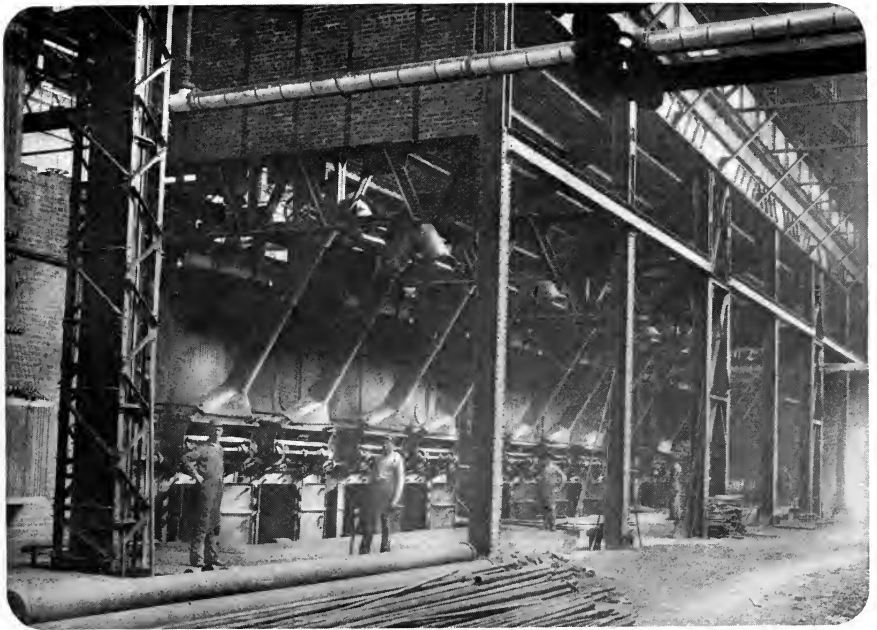
DIAMOND STATE STEEL COMPANY,

WILMINGTON, DEL.

Water-Tube Boilers.



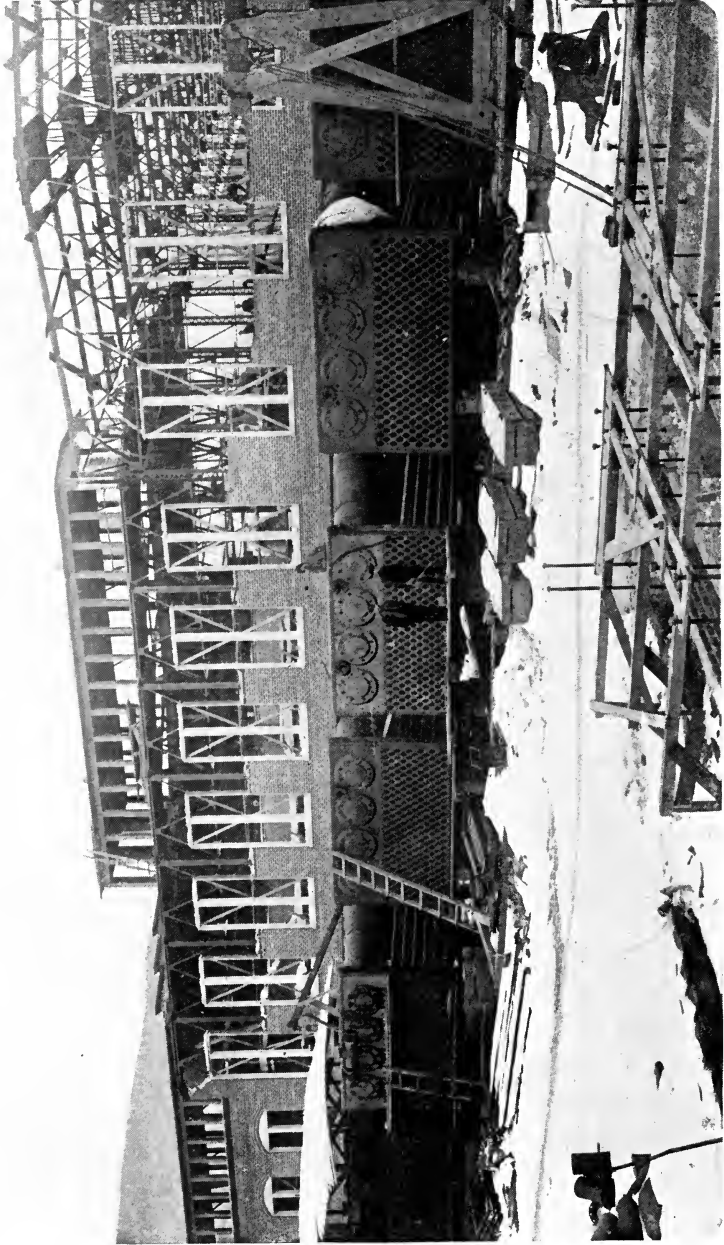
WEST VIRGINIA PULP AND PAPER CO.,
COVINGTON, VA.



WEST VIRGINIA PULP AND PAPER CO.,

COVINGTON, VA.

Water-Tube Boilers.

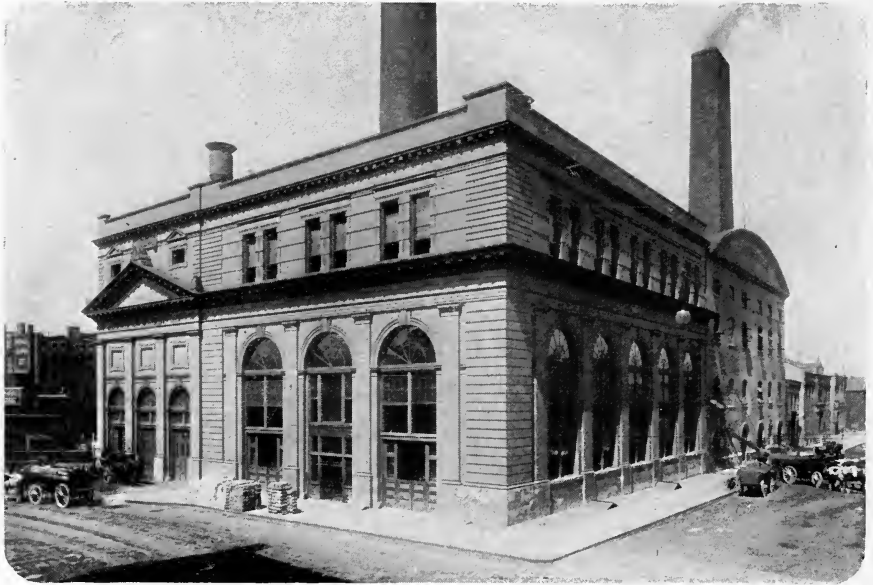


WEST VIRGINIA PULP AND PAPER COMPANY,

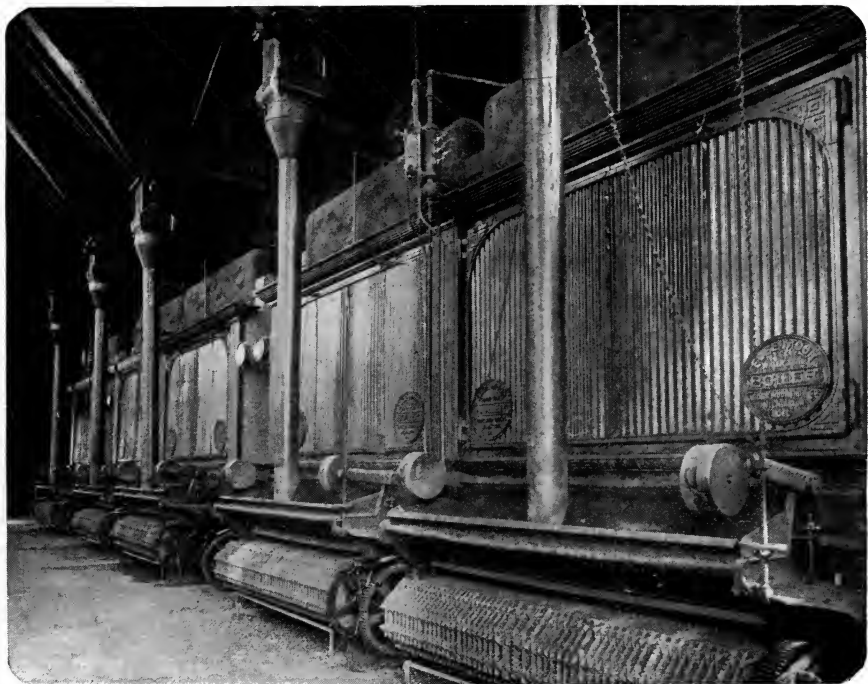
Battery of 6-4 Drum Edge Moor Water-Tube Boilers in course of erection.



JESSUP & MOORE PAPER COMPANY,
ROCKLAND MILLS, WILMINGTON, DEL.



THE MILWAUKEE ELECTRIC RAILWAY AND LIGHT COMPANY,
MILWAUKEE, WISCONSIN.



THE MILWAUKEE ELECTRIC RAILWAY AND LIGHT COMPANY,
MILWAUKEE, WISCONSIN.

New Power-House, battery of Water-Tube Boilers of 600 H. P. units.

The Following Parties are among the Users of the Boilers of our Manufacture.

NAMES.	ADDRESSES.
Montrose Pumping Station	Allegheny, Pa.
“ “ “	“ “
Yonkers Railroad Co.	Yonkers, N. Y.
Richmond Street & Interurban Railway Co.	Richmond, Ind.
Mechan & Sons	Glasgow, Scotland.
Manufacturers' Natural Gas Co.	Frankton, Ind.
“ “ “ “	“ “
Herron Hill Pumping Station	Pittsburg, Pa.
Chicago Sugar Refining Co.	Chicago, Ill.
Rockford Sugar Refining Co.	Rockford, Ill.
Chicago Edison Company	Chicago, Ill.
United States Sugar Refining Co.	Waukegan, Ill.
Millbourne Mills Co.	Philadelphia, Pa.
“ “ “	“ “
New Orleans & Carrollton Railway Co.	New Orleans, La.
“ “ “ “	“ “ “ “
Union Depot Power Plant	Columbus, Ohio.
Stephen Girard Building	Philadelphia, Pa.
“ “ “	“ “
English Hotel & Theatre Co.	Indianapolis, Ind.
Hudson Building	New York City, N. Y.
Nelson Morris & Co.	St. Joseph, Mo.
Cincinnati Edison Co.	Cincinnati, Ohio.
“ “ “	“ “
The Milwaukee Electric Railway & Light Co.	Oneida St., Milwaukee, Wis.
“ “ “ “ “ “ “	Commerce St., “ “
“ “ “ “ “ “ “	“ “ “ “
“ “ “ “ “ “ “	“ “ “ “
“ “ “ “ “ “ “	Broadway Plant, “ “
“ “ “ “ “ “ “	Sycamore St., “ “
Germantown Steam Heat Co.	Germantown, Pa.

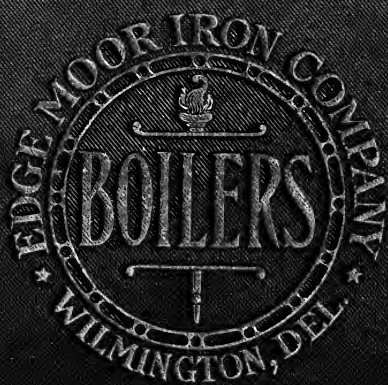
NAMES.	ADDRESSES.
Philadelphia & West Chester Traction Co.	Llanerch, Pa.
“ “ “ “ “ “	“ “
“ “ “ “ “ “	Ridley Creek, Pa.
New York Telephone Building	New York City, N. Y.
Terre Haute & Indianapolis Railway Co.	Terre Haute, Ind.
H. O. Wilbur & Sons	Philadelphia, Pa.
Sperry Flour Co.	Los Angeles, Cal.
“ “ “	Tacoma, Washington.
Pacific Electric Railway Co.	Los Angeles, Cal.
Huntington Building	Los Angeles, Cal.
Great Northern Railway Co.	West Superior, Wis.
“ “ “ “ Dale Street Shops	St. Paul, Minn.
City of Minneapolis, North East Pumping Station, Minneapolis, Minn.	
Penna. Railroad, Maryland Div., Shellpot Shops, Wilmington, Del.	
“ “ “ “ “ “ “ “	
“ “ Baltimore Tunnel	Baltimore, Md.
Philadelphia & Reading Railway Co.	Philadelphia, Pa.
Southwark Foundry & Machine Co.	Philadelphia, Pa.
Diamond Drill & Machine Co.	Birdsboro, Pa.
Rosenfeld Building	Baltimore, Md.
Belvedere Hotel	Baltimore, Md.
Suburban Gas Co.	Chester, Pa.
Drexel Building	Philadelphia, Pa.
Betts Machine Co.	Wilmington, Del.
Chicago & Milwaukee Electric Railway Co.	Highwood, Ill.
Electric Company of America, for Atlantic Electric	
Light & Power Co.	Atlantic City, N. J.
Electric Company of America, for Marion Light &	
Heating Co.	Marion, Ind.
Electric Company of America, for Wheeling Elec-	
trical Co.	Wheeling, West Va.
F. Wesel Manufacturing Co.	Brooklyn, N. Y.
H. W. Butterworth & Sons Co.	Philadelphia, Pa.
C. A. Gambrill Manufacturing Co.	Orange Grove, Md.
Jos. Bancroft & Sons Co.	Wilmington, Del.
Pfister & Vogel Leather Co., Bay View Tannery.	Milwaukee, Wis.
“ “ “ “ “ “ “ “	“ “ “ “
“ “ “ “ “ “ “ “	“ “ “ “
Union Electric Light & Power Co.	St. Louis, Mo.
William Sellers & Co., Incorporated	Philadelphia, Pa.
Philadelphia Grain Elevator Co.	Philadelphia, Pa.
East Indian Railway Co.	Calcutta, India.

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