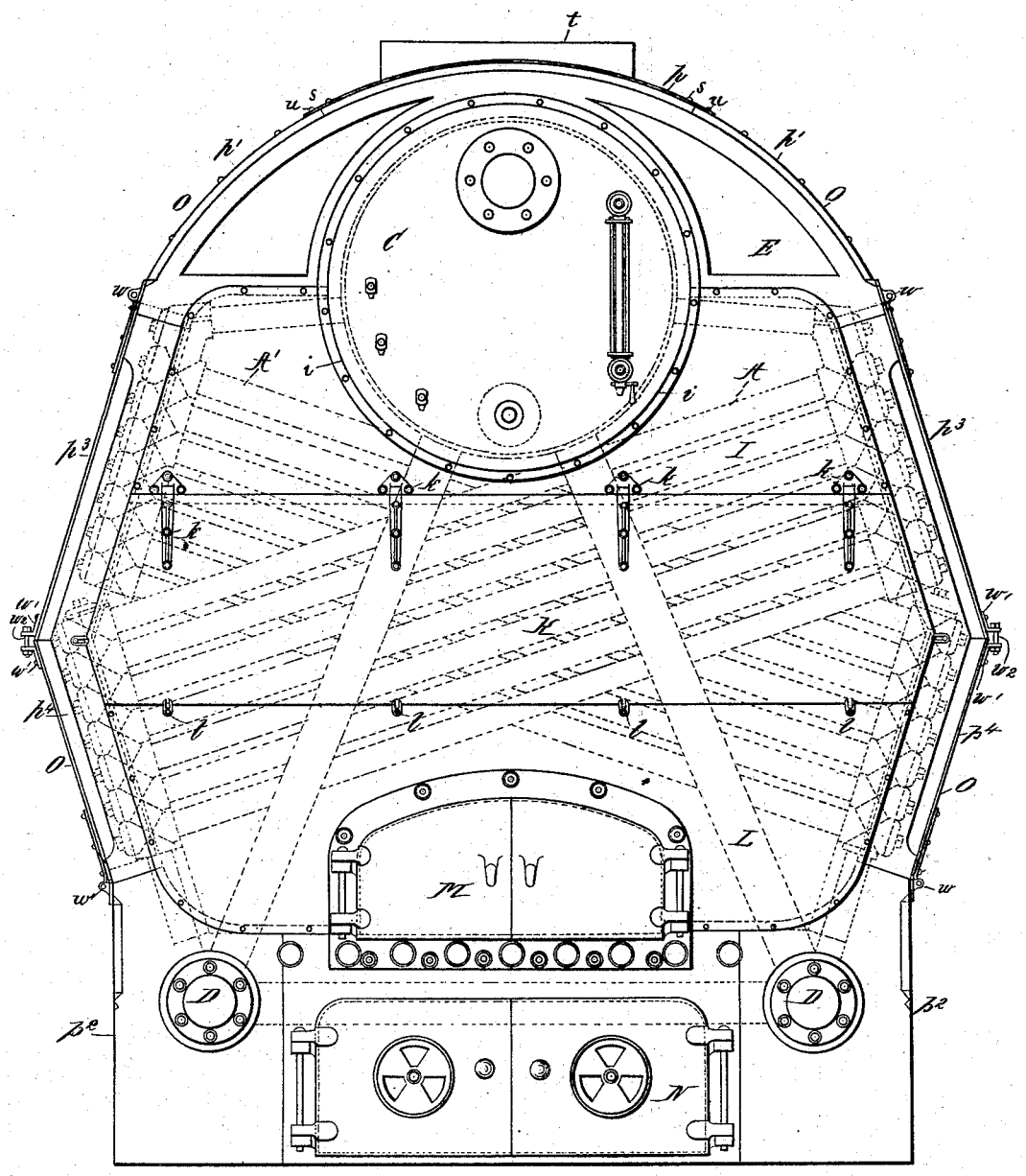
(No Model.) 4 Sheets—Sheet 1.

A. WORTHINGTON.

BOILER SETTING.

No. 524,878. Patented Aug. 21, 1894.

FIG. 1.



Witnesses,
John Buckler,
H. C. Smallwood.

Inventor.
Amasa Worthington.
By Wright, Appleton,
Attorney.

(No Model.) 4 Sheets—Sheet 2.

A. WORTHINGTON.

BOILER SETTING.

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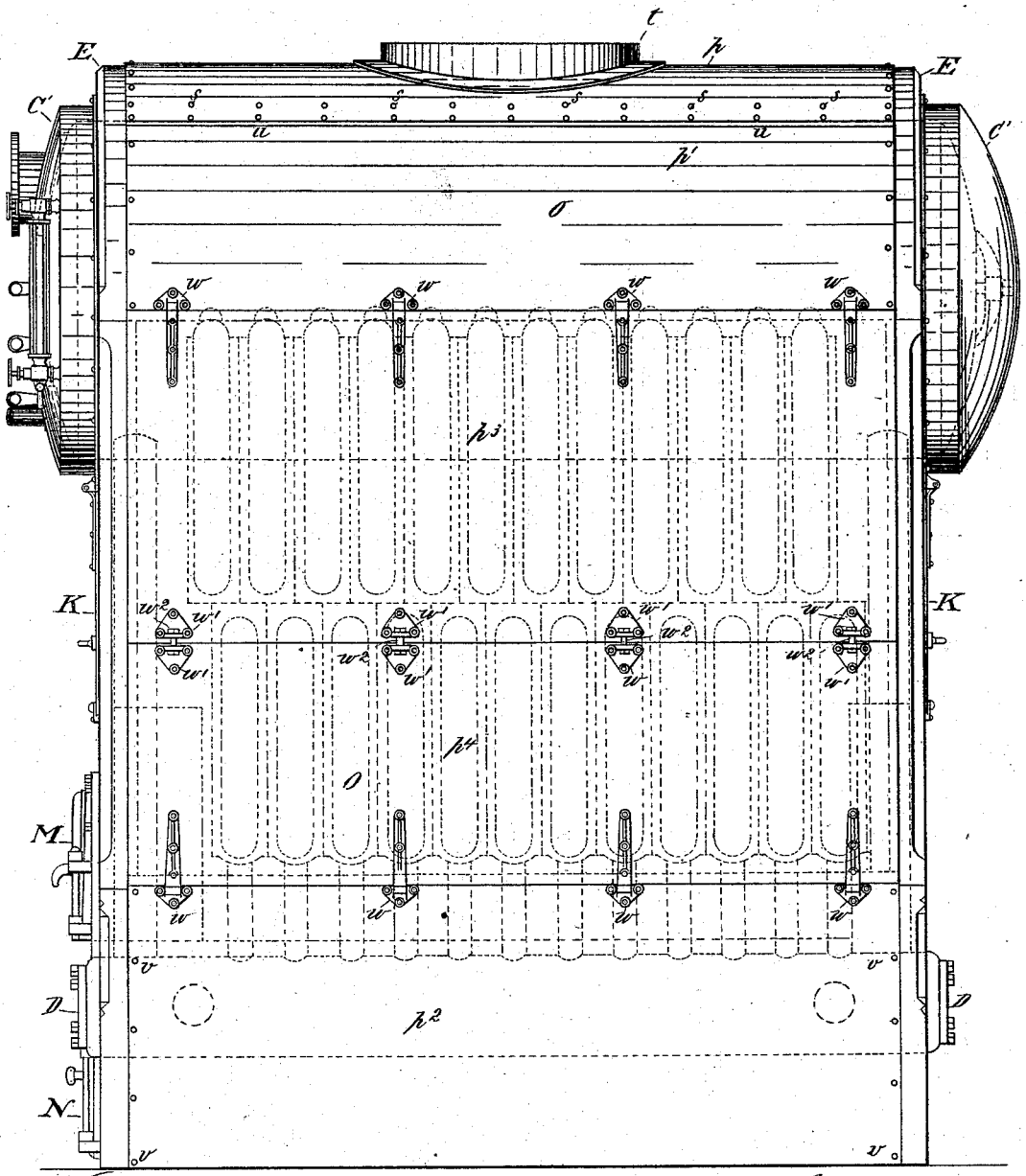
Fig. 2.



Witnesses:
John Buckler,
Ed. Shallcross.

Inventor:
Amasa Worthington.
By Wm. B. Appleton,
Attorney.

(No Model.) 4 Sheets—Sheet 3.

A. WORTHINGTON.

BOILER SETTING.

No. 524,878. Patented Aug. 21, 1894.

Fig. 3.

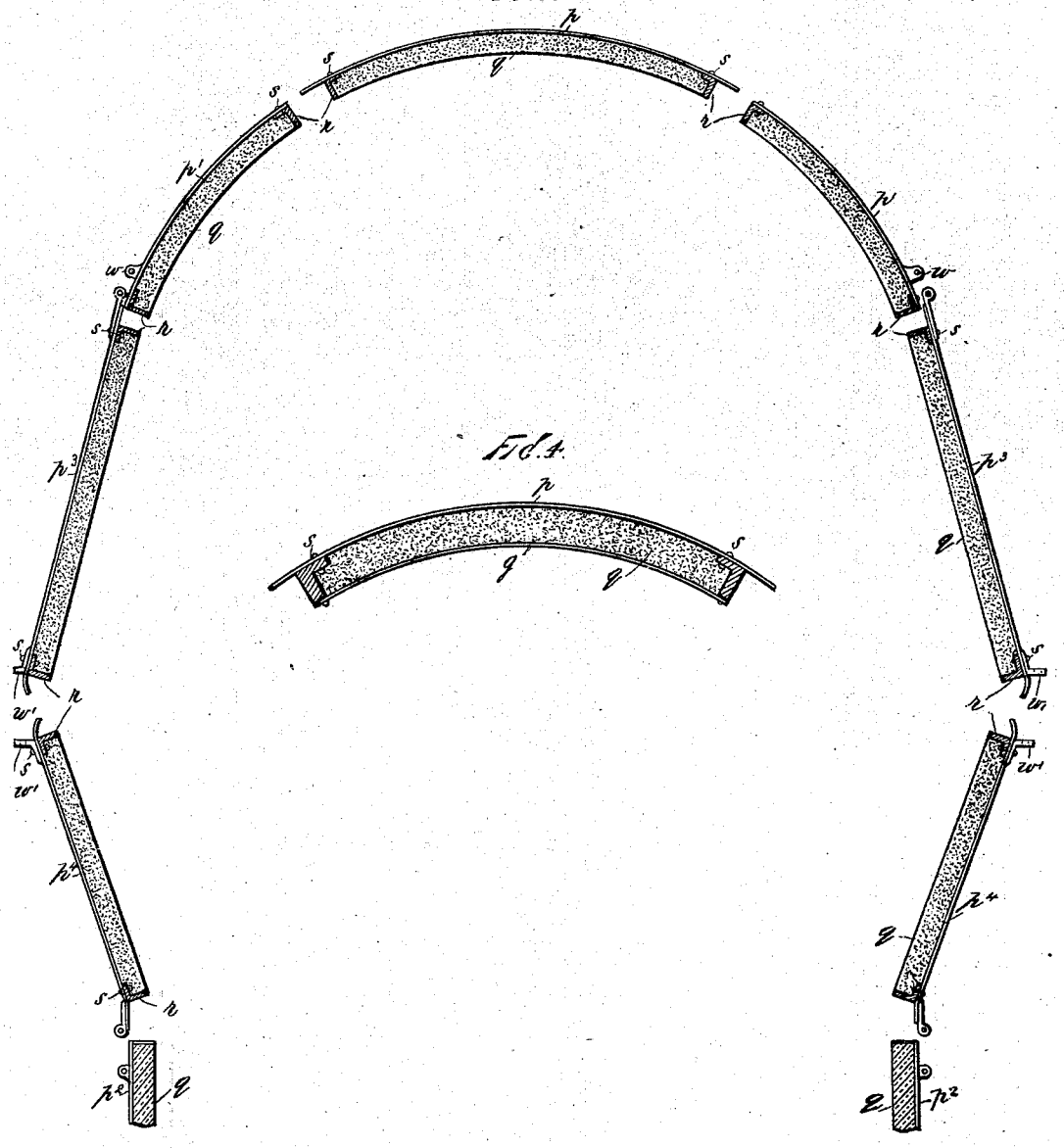


Fig. 4.

Witnesses:
John Buckler,
H. Swallow.

Inventor:
Amasa Worthington,
By Wm. S. Appleton,
Attorney.

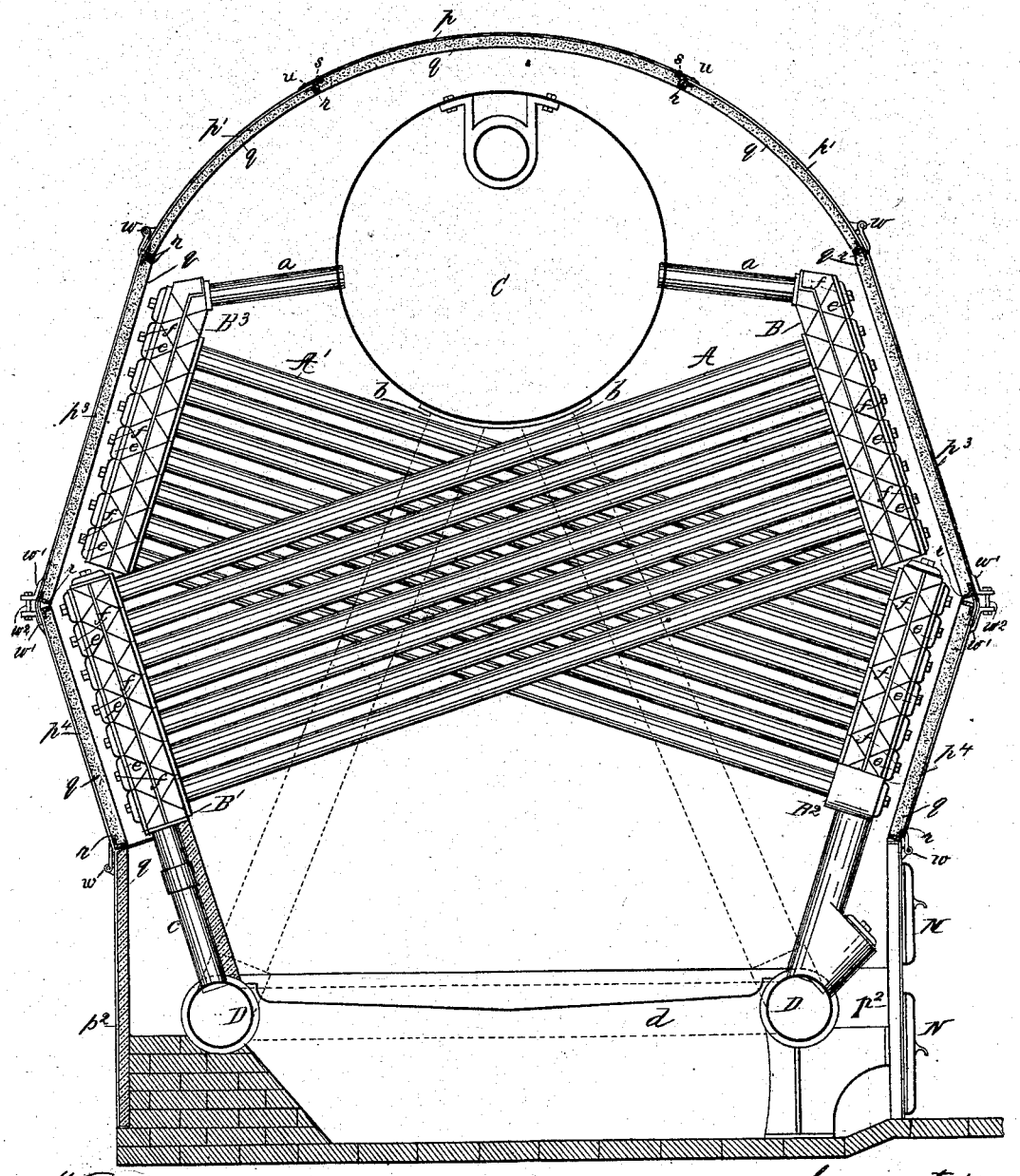
(No Model.) 4 Sheets—Sheet 4.

A. WORTHINGTON.

BOILER SETTING.

No. 524,878. Patented Aug. 21, 1894.

Fig. 5.



Witnesses:
John Buckler,
H. S. Smallwood.

Inventor:
Amasa Worthington
By Wm. F. Appleton,
Attorney.

UNITED STATES PATENT OFFICE.

AMASA WORTHINGTON, OF BROOKLYN, NEW YORK.

BOILER-SETTING.

SPECIFICATION forming part of Letters Patent No. 524,878, dated August 21, 1894.

Application filed June 2, 1893. Serial No. 476,404. (No model.)

To all whom it may concern:

Be it known that I, AMASA WORTHINGTON, a citizen of the United States, and a resident of the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Boiler-Settings, of which the following is a specification.

My invention, while applicable to the setting of boilers generally, is designed more especially for use in connection with sectional steam boilers of the cross tubular class, as represented, for instance, in Letters Patent of the United States, No. 424,528, which were granted to me April 1, 1890, to which reference may be had.

In the setting of boilers, as heretofore practiced, it has been the custom to inclose the boiler and form the fire-box or furnace in a brick-work structure, which extended up the sides of these parts, and, in most instances, over the top thereof, its dimensions being such as to not only form the fire-box or furnace and envelop the boiler, but likewise permit of the proper circulation of heated gases and the products of combustion through and around the parts to be heated. This particular mode of setting, while efficient with boilers of the cylindrical and other equivalent forms, has been found objectionable in practice when used in connection with boilers of the sectional water tube class, principally because of the fact that the removal of the tubes, as is frequently required in consequence of their rupture and for other causes, necessitates the tearing away and demolition of the portions of the brick-work structure at the points where the tube is to be removed, and its replacement after the insertion of a new tube in place of the one withdrawn. Further than this, the great amount of space required, when the masonry structure is employed, is also objectionable, especially when applied in connection with a sectional cross tubular boiler, since, in order to withdraw a tube from the latter, some considerable space is required at the side thereof, amounting to nearly the length of the tube withdrawn, which space is not always convenient to provide without making the boiler room of an inordinate size.

The object of my invention is, to overcome these defects, and to provide a setting for boilers, which, while occupying but little more space than what is actually demanded to receive the boiler itself, shall provide means for the ready removal of the tubes when required, without necessitating in any way the tearing down or demolition of any part of the setting, while at the same time reducing the cost of the setting to the minimum.

To these ends, the invention consists in a boiler setting composed of independent panels or sections, preferably though not necessarily of metal, united to form a structure, in which the boiler is not only supported and inclosed, but a fire-box or furnace therefor provided.

It likewise consists in certain minor combinations and arrangements of parts entering into the structure of the setting, all as will hereinafter more fully appear.

Referring to the accompanying drawings, which form a part of this specification, Figure 1. is a front elevation of a boiler of a well known form, with a boiler setting, constructed in accordance with my invention, applied in connection therewith; Fig. 2, a side view of such parts looking from the right in Fig. 1; Fig. 3, a transverse sectional detail of the side casings; Fig. 4, a similar transverse sectional detail of a slightly modified form thereof, and Fig. 5, a transverse sectional elevation of a boiler, of a slightly modified construction, with a setting, made in accordance with my invention, applied in connection therewith.

In all the figures, like letters of reference are employed to designate corresponding parts.

A A′ indicate a plurality of series of water tubes, the alternate series of which are inclined in opposite directions, and B B′ B^2 B^3 the headers in which the ends of the respective tubes are secured.

Located above the water tubes A A′, is a steam and water drum, C, to which are connected by tubes, *a a*, the upper ends of the headers B B^3, while below such water tubes, and connected with the steam and water drum C, by the tubes *b b*, are the water drums D D, which are similarly connected to the lower ends of the headers B′ B^2 by the tubes *c c*. These water drums D D are likewise connected by the tubes *d d*, and, like the steam and water drum C, extend throughout the entire length of the boiler.

Formed in the side of the headers B B′ B^2 B^3, in line with both the water tubes A A′ and the tubes *a a*, are apertures to permit of the ready removal of the tubes when required, and these apertures are closed at all other times by covers, *e e*, and bolts, *f f*, as shown.

The parts, as thus far described, form no part of my present invention, but are here referred to for the purpose of illustration, and are or may be the same as the corresponding parts shown and described in the Letters Patent above mentioned, to which reference may be had, and require no further description herein.

E E indicate the end-frames of the boiler setting, which, in my preferred form of construction, serve not only to close in the ends of the setting, but also as means for supporting the boiler therein. In the manufacture of these end-frames, cast-metal, is deemed preferable, although it is obvious that terra-cotta, soapstone, and other analogous material which may be made in plate or sheet form, may be employed, and these are so shaped as to make them conform in their outline to the general cross-section of the boiler in connection with which they are to be used, and to the ends of the fire-box or furnace of which they are to form a part. When employed in connection with a cross-tubular boiler of the class shown in the drawings, I preferably, though not necessarily, construct them in open skeleton form, with the inner or central portions removed, and provide them with suitable openings in their bases for the reception of the ends of the water drums D D, which rest therein, whereby to afford a firm support for the boiler in the boiler setting.

In the example of the invention shown in the drawings wherein is employed the open skeleton construction, the upper edges of the central openings in the end-frames E E are made to conform to the upper semi-circumference of the steam and water drum C, which protrudes therethrough; while extending across such openings beneath the drum, so as to cover those parts of their upper portions that are not occupied by the ends of said drum, are panels, I, which, riveted or otherwise secured at their ends to the end-frames E E, are provided on their upper edges with recesses, *i*, *i*, of the proper conformation to suit them to the under semi-circumference of said steam and water drum, and, with the portions of the end-frames above, surround the ends of such drum where they protrude therethrough. The ends of the steam and water drum thus protruding are, or may be, covered by suitable covers or caps, C′ C′, which are secured to the end-frames and panels by rivets or otherwise, as shown.

The panels I I will, in some instances, be made of a size to completely cover the central openings in the end-frames E E. I prefer however, in practice, to provide one or both of them with a door, K, whereby to afford access to the interior of the boiler setting at the end or ends thereof when required to remove soot and other accumulations from the exterior of the water tubes and for other purposes. When this last mentioned construction is adopted, the panel I, instead of being made of the proper width to cover the entire central opening, will be made of a width to cover only the upper portion thereof, and the door K hinged to the lower edge of the same by hinges, *k k*. As thus arranged, the door K may be made of a width to cover the portion of the central opening in the end-frame E, not covered by the panel I. I find it convenient, however, to make it of a width somewhat narrower than what is required for that purpose, and to employ a second panel, L, which, secured to the end-frame E by rivets or otherwise, and extending across under the door K, so as to cover the lower portions of the central opening in such end-frame, is provided at its upper edge with buttons or other fastening devices, *l l*, for engagement with the lower edge of the door, whereby to hold such door tightly closed, when access to the interior of the boiler setting at that place is not desired.

When employed in connection with a boiler setting that admits of the firing or stoking at the end or ends thereof, as in the construction illustrated in Figs. 1 and 2, the end-frames E E (one or both), in addition to being provided with openings for the reception of the ends of the water drums D D, or other supporting devices for the boiler, will be likewise provided with openings to the fire-box or furnace and to the ash-pit, which will be equipped with suitable doors, M and N, respectively. In those constructions, in which these end-frames E E, are made solid, without any central opening therethrough, the openings to the fire-box or furnace and to the ash-pit will be both formed therein, and the doors M and N will be hinged to their outer side. When, on the other hand, the end-frames are made in open skeleton form, then only the opening to the ash-pit will be made through such frame, E, and the opening to the fire-box or furnace will be made through the panel L, the doors M and N in that case being hinged respectively to the end frame and panel, as shown, but this arrangement, it is obvious, may be modified in various ways, and both openings, either formed through the end-frames or through the panel if desired. Again, when the firing or stoking is effected along the side of the boiler, as shown, for instance, in Fig. 5, the openings to both the fire-box or furnace and to the ash-pit, with their accompanying doors, are omitted from the end-frames E E, and such end-frames, however constructed otherwise, left unprovided with those parts.

Secured to the end-frames E E, and extending across from one to the other are the side-casings O O, by means of which the sides and

top of the setting are formed. These side-casings may be constructed in various ways and from a diversity of materials. I prefer however to make them in plate form, either with or without an appropriate lining, and to apply them to the setting in such a manner as to leave a door or doors along one or both sides thereof, above the fire-box or furnace whereby to afford easy access to the interior of the setting for removal or cleaning of such tubes or for making other repairs to the boiler as occasion may demand.

In the embodiment of the invention illustrated in the drawings, the side-casings are made in the form of independent panels of sheet-metal, p p', &c., of which the panels p p' and p^2 constitute the fixed and immovable parts of the casing at its top and bottom, and are suitably lined with an appropriate heat resisting material, as shown at q in Figs. 3, 4 and 5, while the panels p^3 and p^4 constitute the doors on the sides of the casing, and may be either lined or unlined as may be preferred. The panels as thus constructed are provided on their inner sides, along their edges with ribs or angle-irons, r, which are secured thereto by rivets, s, or otherwise, whereby to impart to the same the necessary degree of stiffness and strength, and, in addition thereto, to serve as limiting walls for the heat resisting material q, which is arranged on that side of the panels between such ribs or angle-irons as in a shallow pan.

In the construction of the panel p, the ribs or angle-irons r are secured inward from the edges thereof some little distance, whereby to permit of the sheet-metal body projecting slightly beyond the same, as is also the case with the edges of the doors p^3, and p^4,—see Fig. 3, while with the other panels p' and p^2, such ribs or angle-irons r are secured to their respective panel with their depending portions flush with the extreme edges thereof. As thus constructed, the panel p, which is or may be provided with a suitable thimble, t, or other appliance by means of which to connect with the chimney or up-take, is secured to the top of the boiler setting by rivets or other equivalent means co-operating with the end frames E E, with the projecting edges of its sheet-metal body extending downward over the upper edges of the panels p', which are similarly secured to the end-frames on opposite sides of the setting. By this means, as will be seen, provision is made not only for closing the cracks that would be formed between the edges of the panels p and p', but also for securing such panels firmly together, which latter may be done by passing bolts or rivets down through the projecting edges of the panel p and through the edges of the panels p', as illustrated at u.

The panels p^2 are in like manner secured to the end-frames E E on opposite sides of the setting, at or near its bottom, by bolts or rivets, v, while the panels p^3 and p^4, constituting the doors, are hinged respectively to the panels p' and p^2, by hinges, w, with the projecting edges of their sheet-metal bodies overlapping the adjoining edges of such latter panels, whereby to cover up the cracks between them when the doors are closed. The doors, being thus hinged to the fixed parts of the setting, may be held closed by any appropriate hasping or fastening devices. I prefer however to provide their adjoining edges with projections or abutments w', and to employ bolts, w^2, for that purpose which, passing through suitable orifices in such projections or abutments, are provided with nuts on their ends by means of which the adjoining edges of the doors may be drawn together when required and firmly held in that position with the projecting edges of their sheet-metal backs overlapping.

When the firing or stoking is to be effected from the end or ends of the boiler, the panel p^2 will be made imperforate throughout, as shown in Figs. 1 and 2, but when such firing or stoking is to be effected along the side or sides of the boiler, as shown in Fig. 5, then such panels will be made somewhat wider, and one or both of them will be provided with suitable openings into the fire-box or furnace and into the ash-pit, which openings will be equipped with appropriate doors, M N, as is the case when the firing or stoking is done at the ends thereof. As thus constructed and arranged, the panels or doors p^4 will be hinged to their upper edges, all as is shown in Fig. 5.

For lining the various panels constituting the side-casings of the setting, any of the well known heat resisting materials may be employed. I prefer however to make use of cement, magnesia, or fire-felt, which, having been treated as is usual in such cases, is firmly packed against the inner sides of the panels in the cavities formed by their sheet-metal backs and the ribs or angle-irons r secured thereto. In most instances, the lining will be held in the cavity of the panel by its own adhesion or by passing bolts therethrough, and through the sheet-metal backs, but if desired sheet-metal strips, g, may be arranged on its inner side, and be tied to the sheet-metal backs or to the ribs or angle-irons r by bolts passing through them and through such strips, as illustrated in Fig. 4, or by other appropriate means.

The setting, being constructed as above set forth, occupies but little more space than the boiler itself, and being built up from material of plate or sheet form permits of the location of doors in its sides and ends, whereby free access to the interior of the setting is afforded for the removal of tubes, repairs or otherwise, without necessitating the demolition or destruction of any part thereof. Further than this, the setting while applying the heat to the boiler in the most efficient and economical manner, at the same time presents a construction which is exceedingly cheap, and more ornamental and sightly than those heretofore in use.

When the length of the boiler required is greater than it is practicable or desirable to make the panels of the side-casings, open skeleton frames similar to the end-frames E may be interposed between such end-frames and the several panels and doors constituting the side-casings spliced thereon.

Although in the foregoing I have described the best means contemplated by me for carrying my invention into practice, I wish it distinctly understood that I do not limit myself strictly thereto, as it is obvious that I may modify the same in various ways without departing from the spirit thereof.

Having now described my invention and certain of the ways in which it is or may be carried into effect, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, with the end-frames of a boiler setting constructed in plate form, and provided with openings and doors above the fire-box or furnace, of side-casings composed of independent sheets or panels secured to said end-frames, and provided with openings and doors therein, substantially as described.

2. The combination, with the end-frames of a boiler setting, and a boiler, of openings and doors in said end-frames above the fire-box or furnace, and side-casings composed of independent sheets or panels secured to said end frames, and provided with openings and doors also above the fire-box or furnace, substantially as described.

3. The combination, with the end-frames of a boiler setting and a cross tubular boiler, of side-casings composed of sheets or panels and provided with openings and doors in line with the ends of the series of water tubes, substantially as described.

4. The combination, with a cross tubular boiler, and the end-frames of a boiler setting, provided with openings and doors opposite the series of water tubes, of side-casings composed of sheets or panels and provided with openings and doors in line with the ends of the series of water tubes, substantially as described.

5. The combination, with the end-frames, and side-casings of a boiler setting constructed in sheet or panel form, and secured to such end frames by bolts or rivets, of openings and doors to the fire-box or furnace and to the ash-pit, and other openings and doors in the side-casings above the fire-box or furnace, substantially as described.

6. The combination, with the end-frames and side-casings of a boiler setting constructed in sheet or plate form, of openings and doors to the fire-box or furnace and to the ash-pit, and other openings and doors in both the end-frames and side-casings above the fire-box or furnace, substantially as described.

In testimony whereof I have hereunto set my hand this 22d day of May, 1893.

AMASA WORTHINGTON.

Witnesses:
SYLVANUS L. TRIPPE,
WM. E. TREFCER.