

3 Sheets—Sheet 1.

No. 467,704.

Patented Jan. 26, 1892.

WITNESSES:

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A. MERCER.
SECTIONAL STEAM BOILER.

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Fig. 4.

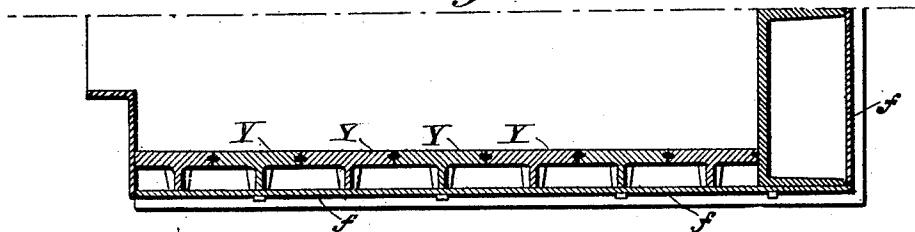


Fig. 2.

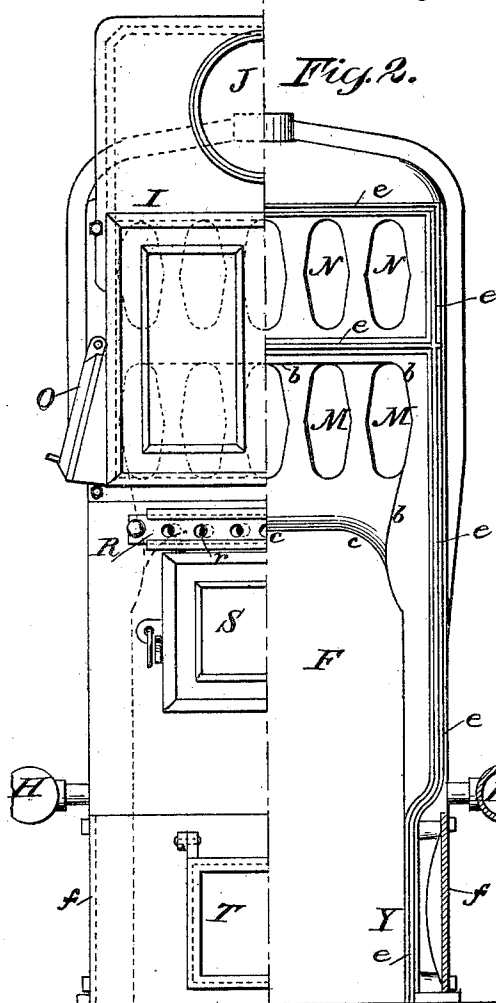
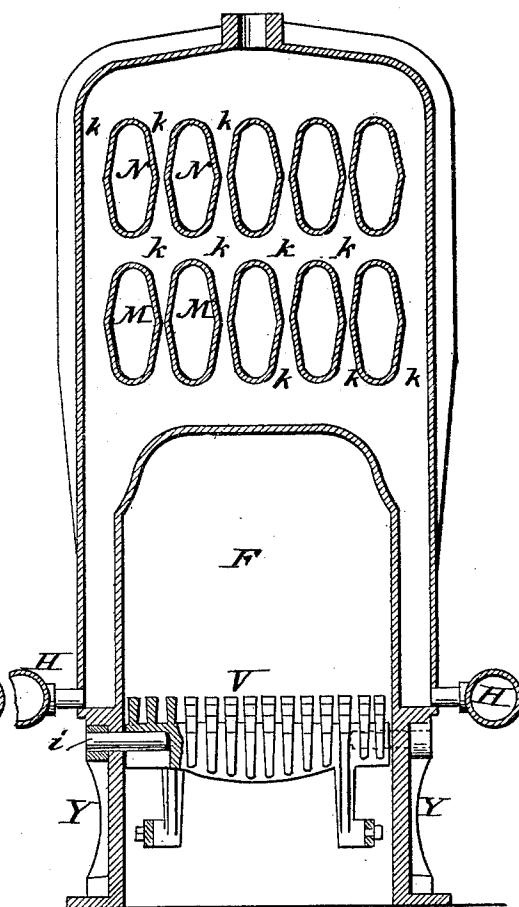


Fig. 3.



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(No Model.)

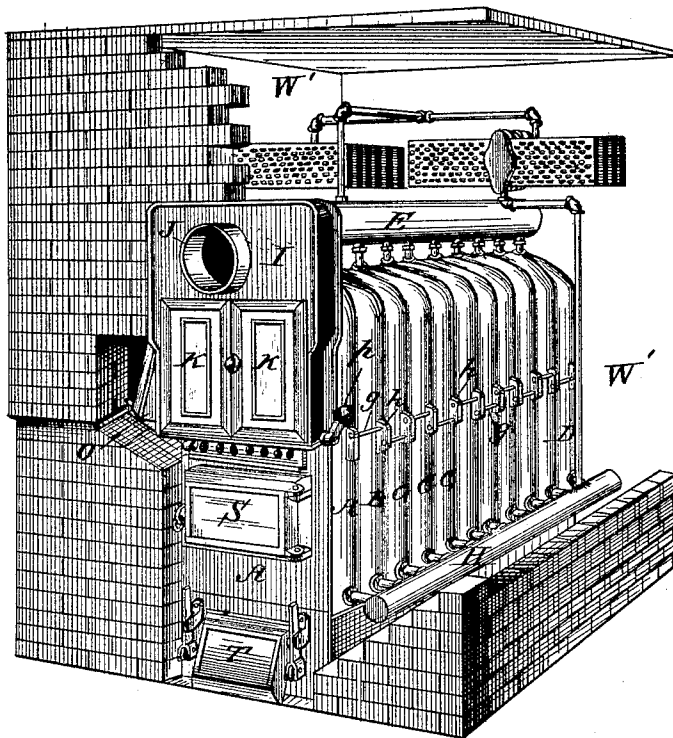
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Fig. 5.



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UNITED STATES PATENT OFFICE.

ANDREW MERCER, OF BROOKLYN, NEW YORK.

SECTIONAL STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 467,704, dated January 26, 1892.

Application filed November 3, 1891. Serial No. 410,794. (No model.)

To all whom it may concern:

Be it known that I, ANDREW MERCER, a citizen of the United States, residing at Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Sectional Steam-Boilers, of which the following is a specification.

My invention relates to sectional boilers adapted for house-heating purposes, and to that class of boilers composed of a plurality of like sections which may be built up in any desired number intermediate to the front and back section to vary and determine the capacity of the boiler; and the purpose of my invention is to adapt a return-flue boiler for the delivery of smoke at the front end and to locate all the parts that require access during the use of the boiler in proximity. Thus when the boiler is in a brick or other setting designed to compose a hot-air chamber the escape of smoke therein is avoided and all parts rendered accessible for operating or cleaning after the superstructure is completed.

The purpose of my invention is also to establish a means of direct draft for starting or accelerating the fire, and to variously improve the construction and operation of the apparatus.

To these ends my invention consists in certain novel features of construction and arrangement of the parts of a sectional boiler, hereinafter fully described and claimed.

Referring to the accompanying drawings, Figure 1 is a longitudinal section of the apparatus; Fig. 2, a front end view, partly in elevation and partly in section, on the line *xx*, Fig. 1; Fig. 3, a cross-section taken on the line *yy*, Fig. 1; Fig. 4, a partial horizontal section taken on the line *zz* in the several views, and Fig. 5 a perspective view showing the application of the invention.

Similar letters of reference indicate corresponding parts throughout the illustration.

A represents the front end section; B, the secondary front section; C C, &c., two intermediate sections, and D the rear section. Each of these sections include or form component parts of the steam-space and the water-space, which are separate in each section, the furnace F, and the walls of the ash-pit G.

E is the steam-drum connected to all the sections by pipes *a a*, &c.

H H in Fig. 2 represent longitudinal water-drums nipped to each section of the series.

I is a front extension smoke-box; J, the smoke-delivery flue; J', the smoke-hood; K, the cleaning-doors whereby deposits are removed from the flues M N; O, the check-draft damper, and P the direct-draft damper.

R is a supplemental draft-damper composed of a perforated slide controlling perforations *r*, provided adjacent to the fire-door S in the front section A.

Provision is made whereby the ash-pit door T may be raised and kept in a partly-opened position, as indicated in Fig. 1, to afford the necessary main supply of air to the furnace.

The secondary front section B has an interior contour, such as represented by the line *b b* in Fig. 2, embracing one set of flue-sections M, and the remaining intermediate sections C C, &c., and the front section A embrace both series of flue-sections M and N, and the interior contours of the said sections C C, &c., are represented by the lines *cc*, Fig. 2. Thus a furnace is formed having its main air-supply beneath an exit for hot gases near the front, and a supplemental draft near said exit, whereby the burning gases are replenished with oxygen preparatory to entering the flues. The return-bend of the flues is formed by the concave W in the rear section D. Each section is extended below the water-space to form component parts of the ash-pit walls, the legs Y being cast integrally with the upper parts of the sections. There are packing-grooves formed by the ribs *ee*, which are filled with suitable packing arranged to extend around or embrace the flues and the fire-box F, and these ribs and packings are also continued downward to the floor of the ash-pit, as indicated in Figs. 2 and 4, to render the latter air-tight in the joints between the sections. The outside plates *f* are secured to the sides and back of the sections in the manner indicated to finish the exterior of the lower portion thereof, and the several sections are all secured together by bolts *g* entering their flanges *h*.

The rocking grates V have inverted-U-shaped grooves under their extremities, and

there are inserted therein and through the sectional ash-pit walls supporting-pins *z*, whereon the said grate may be oscillated by means of the levers shown for usual purposes.

5 The flues M and N, as seen in Fig. 3, are of oval-like cross-sectional form, being broadest at the center and tapering toward top and bottom, a feature which as applied to an assembled group of cast tubes provides for a substantial body of sand in the core employed for casting, especially at the parts *k* of the interstices between the tubes, so that the said core may stand securely in the mold, at the same time preserving the necessary area of the flues, whereas if the sides of the said flues were vertical and parallel, as is usual, with the necessary areas and the narrow chambers between them, the small columns of sand therein would be liable to break.

20 When the boiler is inclosed in its setting of brick-work, as represented in Fig. 5, the extension I admits of the direct connection of the smoke flue or pipe without passage through the hot-air chamber W', whence hot air is supplied to the building. The check-draft damper O for the delivery-flue is also rendered accessible at the front of the boiler. A cleaning-box is provided having cleaning-doors K covering both series of flues M N, and a means of direct draft from the lower series of flues M to the delivering-point J is, moreover, provided and a suitable chamber afforded for the direct-draft damper P to operate in. The damper P may be operated from the exterior by means of a suitable handle *p* on the side of the box I, which handle also serves as a tumbling-bob to keep the said damper shut.

40 When the damper P is dropped, as indicated by dotted lines and the cleaning-doors K opened, the flues may be cleaned by means of a suitable scraper and the deposits collected from both sets of flues precipitated through the opening B' into the furnace.

45 In starting the fire the damper P may be temporarily opened to augment the draft until the fuel has become well ignited, subsequent to which a slow fire is maintained by the closure of said damper, and the complete combustion of the gases may then be promoted by opening the supplemental draft R

to charge the candescent gases with fresh oxygen.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a sectional boiler built up of transverse sections, the upper and lower flues therein, the latter communicating with the furnace at or near the front section thereof, the said flues communicating together in a rear section of the boiler to form a return draft, and in combination therewith a front extension smoke-box forming the exit, including the extremities of all the flues, and a damper within the box controlling the direct communication of the lower flues therewith, for the purposes described.

2. The combination, in a sectional boiler built up of transverse sections, of the intermediate sections having openings forming, when united, continuous lower and upper series of flues; a front section having thereon a smoke-box forming the exit, a secondary front section containing portions of the upper flues only and establishing a passage between the lower flues and the furnace, and a rear section concaved to form a communicating passage between the said lower and upper series of flues, substantially as described.

3. In conjunction with the direct and indirect flues in a sectional boiler of the character described, delivering at the front thereof, an extension-box opposite the said flues, comprising a smoke-exit, a cleaning-receptacle, a check-draft chamber, and a direct-draft chamber, the said box being provided with the dampers O and P, substantially as set forth.

4. In combination with the furnace in a sectional boiler of the character described, the flues and the delivery-passage of the furnace communicating thereto adjacent to the front section, and a draft-supply beneath the grates, the supplemental draft-passages adjacent the said delivery-passage of the furnace and a damper, for the purpose specified.

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Witnesses:

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