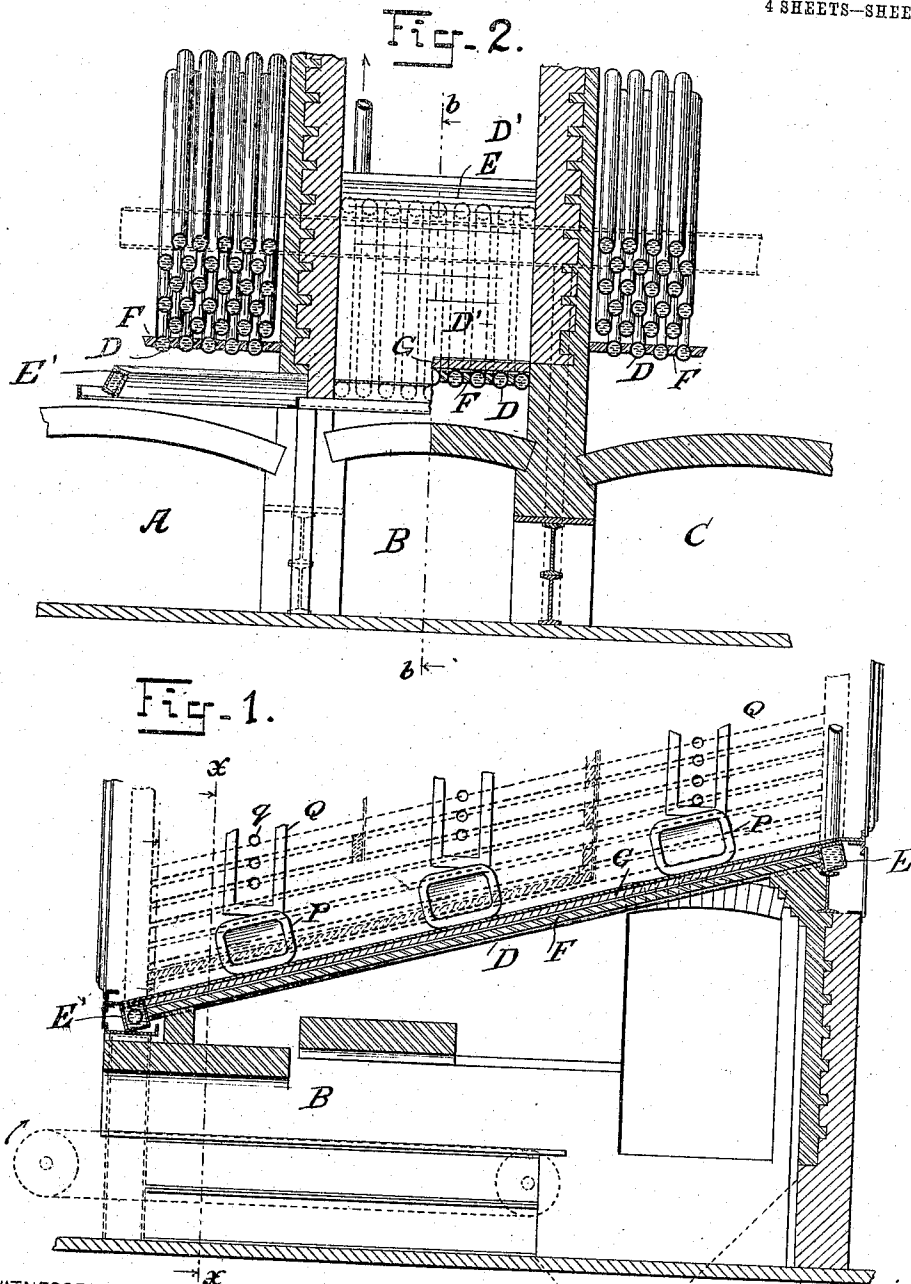


941,658.

M. W. SEWALL.
FURNACE.
APPLICATION FILED OCT. 1, 1908.

Patented Nov. 30, 1909.
4 SHEETS—SHEET 1.



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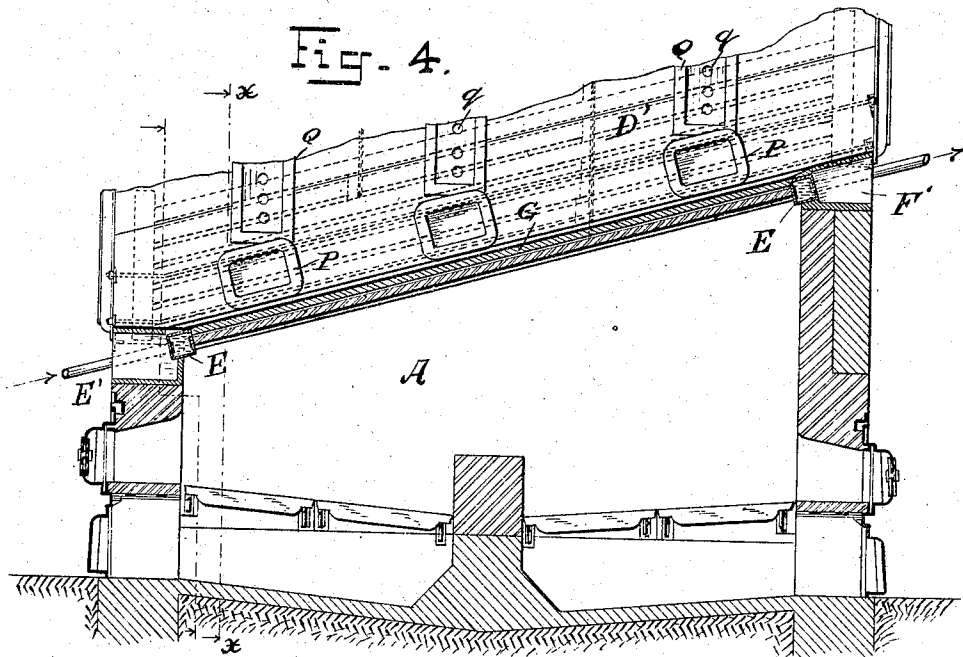
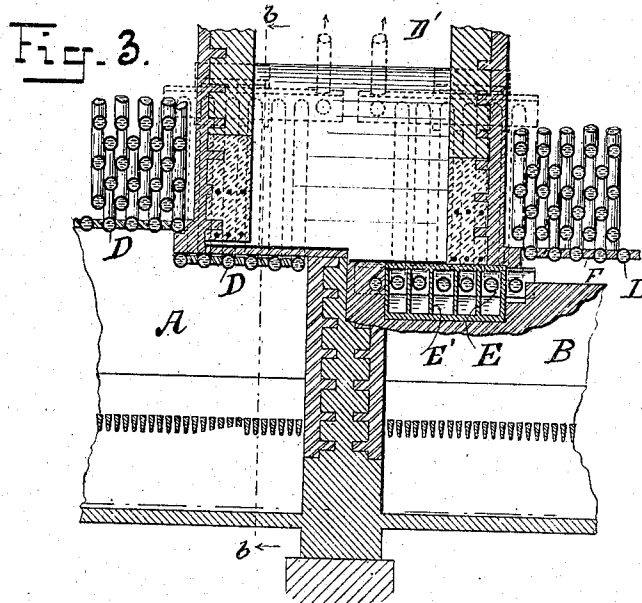
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4 SHEETS—SHEET 2.



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SHEETS-SHEET 3.

Fig-5.

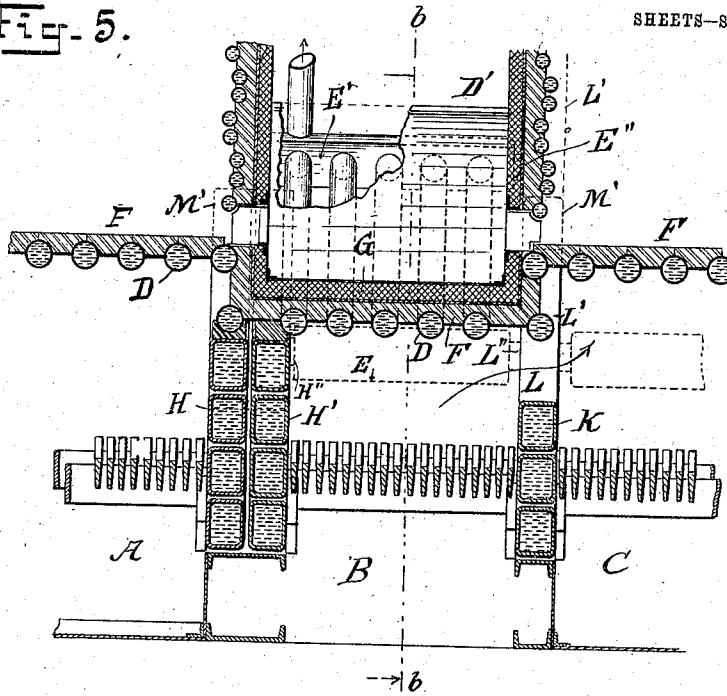
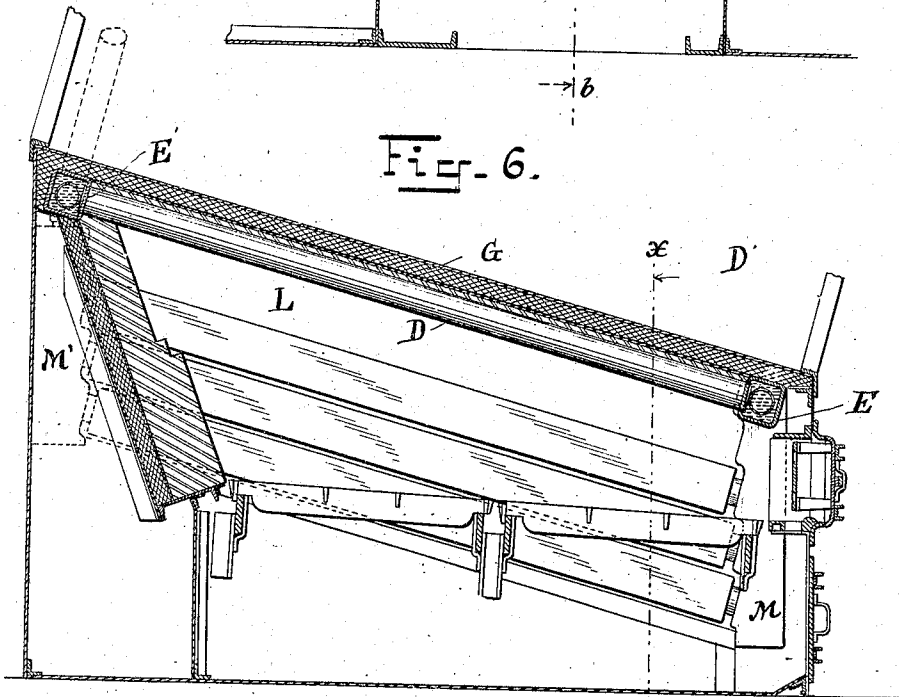


Fig-6.



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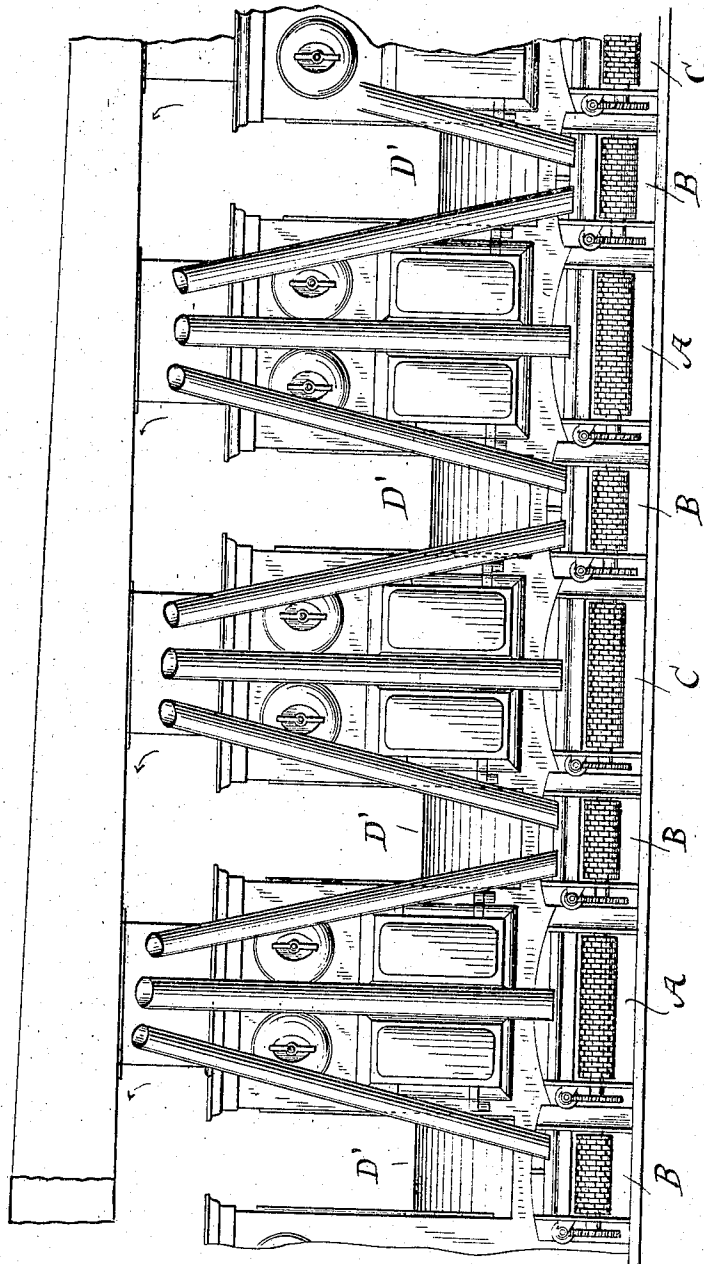
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4 SHEETS—SHEET 4.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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FURNACE.

941,658.

Specification of Letters Patent.

Patented Nov. 30, 1909.

Application filed October 1, 1908. Serial No. 455,767.

To all whom it may concern:

Be it known that I, MINOTT W. SEWALL, a citizen of the United States, and a resident of Roselle, in the county of Union and State of New Jersey, have invented a certain new and useful Improvement in Furnaces, of which the following is a specification.

This invention relates to improvements in furnaces and particularly steam boiler furnaces.

The usual method of setting certain types of boilers, like water-tube, is to place two boilers in one brick setting, allowing a passageway between the adjacent settings for access to one side of each boiler for purposes of cleaning. Very large boilers are frequently set singly.

In the present instance I provide a structure wherein I increase the grate surface without increasing the floor space occupied by the plant.

This invention utilizes the passageway between a plurality of boilers for grate surface and at the same time conserves the space between the boilers for dusting the tubes and for access to the internal chambers.

The invention consists in the construction, combination and arrangement of parts set forth in and falling within the scope of the appended claims.

The accompanying drawings show one manner of carrying out my invention with a plurality of boilers, also with boiler set singly and as adapted to boilers for marine service.

Figure 1, Sheet 1, is a longitudinal vertical section on the line *b, b*, Fig. 2, and Fig. 2 a transverse vertical section through the additional furnace space on the line *x, x*, Fig. 1, showing the adjacent boiler wall on each side together with a portion of each boiler.

The furnace shown in Fig. 1 is arranged for a chain grate as represented in dotted lines, the iron supports under the walls allowing ample room for the wheels carrying the stoker frame.

In Sheet 2, Figs. 3 and 4 are views of like character shown in Sheet 1, Fig. 3 showing a continued line of boilers having the furnaces of adjacent boilers extended to a party wall, and Fig. 4 showing a furnace extending the whole length of the boiler and fired from opposite ends. The structures illustrated on Sheets 1 and 2 are designed for land boilers.

In Sheet 3, Figs. 5 and 6 show respectively a cross sectional view and side elevation of a structure embodying the invention and adapted to marine service.

Fig. 7, Sheet 4, is a front view of the arrangement of a battery of boilers, with extended furnaces and passageways between, and corresponding to the construction shown in Figs. 1 and 2.

In all the figures, except Fig. 7, the different views are shown on similar lines indicated by the lines *b, b*, and *x, x*, and the letters and numerals denoting the corresponding or similar parts of all the several figures are identified by the same numeral or letter.

In Figs. 2 and 5, A and C represent the furnace chambers of adjacent boilers having a passageway between them, and B the intermediate furnace chamber, having its roof composed of water tubes D which are expanded into transverse water boxes E at the opposite ends and arranged parallel with the inclined group of water tubes which form the main steam generating part. The spaces between the tubes D are filled with special bricks F and over these bricks and tubes a floor G is laid preferably of heat insulating material that will be sufficiently cool to walk upon, the space above this floor being left clear.

In Fig. 1 I have shown two sets of dusting doors P and Q, the latter having sight openings or holes *q* which may be closed by a swinging or sliding gate to permit of the insertion of a pipe for dusting the tubes, and the former an ordinary hinged door. These doors are in the side wall of the boiler above the roof of the supplemental furnace B and readily accessible for the purpose of cleaning the boiler tubes of dust and soot. This cleaning is accomplished by means of a steam jet carried by a pipe four or five feet in length with a special form of nozzle, and the workman, instead of using a ladder to reach the doors as heretofore, works along the passageway between contiguous boilers, the roof of the supplemental furnace B constituting the floor of such passageway.

Figs. 3 and 4, Sheet 2, show a longitudinal and cross section through two adjacent furnaces. In this construction each of two adjacent boilers has its furnace extended to a party wall placed in the center of the passageway between the boilers. A furnace roof of tubes and fire bricks extends from

the center wall toward each boiler far enough to cover not only the portion under the passage way, but it extends entirely under the side walls of the boiler itself. By this means, a continuous line of furnaces may be placed with boilers centrally above them, having passage ways, as at D', under the center of which stands the party wall between the two furnaces. In this construction each boiler has a single furnace equal to the original furnace width plus the additional amount gained on each side of the boiler by extending to the center of the passage way, as already mentioned. The boiler side walls may be carried above the furnace roof and clear of it on reinforced concrete beams, which are supported on the end walls of the boilers by castings E' and F'. These castings also partially support the end boxes E of the water-tube roof. The reinforced concrete beams are lined on the furnace side with fire brick, which is tied into the beams, sufficiently to carry its weight.

A clear space is provided between the furnace roof and the under side of the concrete or other beam, to insure the integrity of the roof itself. An inlet and outlet are indicated to show that a water circulation will be provided for the water-tube roof.

In Fig. 4 I have shown the dusting doors P and Q similar to the doors of Fig. 1, said doors being accessible to the workman as he passes along the roof of the lateral extensions of the two furnaces A and B.

Figs. 5 and 6, Sheet 3, show a similar side extension adapted to a boiler having its furnace inclosed by water boxes at the sides rather than brick walls, B represents the intermediate furnace and A and C a portion of the furnaces of the adjacent boilers. The roof of the respective furnaces is formed by tubes D and bricks F with insulation material G, as before described. The water box side of the furnace A is indicated by boxes H and the side of furnace B by boxes H'. Boxes K form the side of furnace C. The side boxes of the furnaces are connected at either end by nipples to vertical boxes, which are nipped at the upper ends to the outside section of the boiler, thus introducing the water contained in the side boxes directly into the circulation of the boiler itself.

In this construction, in order to allow a passage of the gases from furnace B to furnace C, the upper side box is left out, leaving the longitudinal passage L in its place the full length of the furnace through which gas may pass from furnace B to furnace C. The boxes K forming the side of furnace B adjacent to furnace C will be formed several boxes in height connected to vertical boxes M and M' (Fig. 6) at the end and of the same general form as are usually used for the furnace side and boxes.

The boxes H' will be supplied through

box E, which is nipped to the front corner box of furnace B at H'' and also at its opposite end to the upper end of the front corner box at L'', into which the boxes K are also nipped.

As shown in Fig. 5, the upper box E is nipped to the corner box M' to which the side boxes H are also nipped. This upper box E is also nipped at its opposite end at E'' to the side of the vertical corner box L' shown in dotted outline. The roof tubes D are also expanded into the boxes E and form the support for the bricks F and other portion of the furnace roof.

The advantages to be derived from this arrangement are as follows:—1st—In an existing plant where grate surface is insufficient, the extension furnaces may be introduced and the power of the plant increased thereby. 2nd—In a new plant with the increased grate surface corresponding heating surface may be introduced in excess of that which would otherwise be advisable. The result being that more boiler power can be placed on a given ground area, and a steam plant produced having a greater concentration of power than has heretofore been possible.

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

1. A plurality of boilers spaced apart forming passageways therebetween, furnaces for said boilers, the grate surface of said furnaces extending over the floor space between contiguous boilers, and means for separating contiguous furnaces.

2. A plurality of boilers spaced apart forming passageways therebetween, furnaces for said boilers, the grate surface of said furnaces extending over the floor space between contiguous boilers and the floors of said passageways constituting portions of the furnace roofs, and means for separating contiguous furnaces.

3. A plurality of boilers spaced apart forming passageways therebetween, furnaces for said boilers, the grate surface of said furnaces extending over the floor space between contiguous boilers and the floors of said passageways constituting portions of the furnace roofs, dusting doors in the side walls of the boilers above said roofs, and means for separating contiguous furnaces.

4. A boiler furnace comprising a suitable casing, a lateral extension for said casing, a roof for said extension, and dusting doors in the side of said casing above said roof.

5. A boiler furnace comprising a suitable casing, a lateral extension for said casing, a roof for said extension composed of circular water tubes and refractory material, and dusting doors in the side wall of said casing above said roof.

6. A plurality of boilers spaced apart

forming passageways therebetween, furnaces for said boilers, the grate surface of said furnaces extending over the floor space between contiguous boilers, the floors of said passageways constituting portions of the furnace roofs said roofs being composed of water tubes having suitable connections to the boiler circulation, and means for separating contiguous furnaces.

7. A plurality of boilers spaced apart forming passageways therebetween, furnaces for said boilers, each furnace having a grate extending laterally of the corresponding boiler over the floor space between contiguous boilers, and means for separating contiguous furnaces.

8. A plurality of boilers spaced apart, a furnace located between said boilers provided with a roof, and a passageway between said boilers above said roof.

9. A plurality of boilers spaced apart, a furnace for each of said boilers, a supplemental furnace located between certain of the boilers, tubes lying above the supplemental furnace, and a roof over said tubes.

10. A plurality of boilers, spaced apart forming passageways therebetween, furnaces for said boilers, the grate surface of said furnaces extending over the floor space between contiguous boilers, and walls between contiguous furnaces, said walls being composed of water boxes having suitable connections to the boiler circulation.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MINOTT W. SEWALL.

Witnesses:

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W. A. PAULING.