

(No Model.)

2 Sheets—Sheet 1.

E. REYNOLDS.
BOILER FURNACE.

No. 484,507.

Patented Oct. 18, 1892.

Fig. 1.

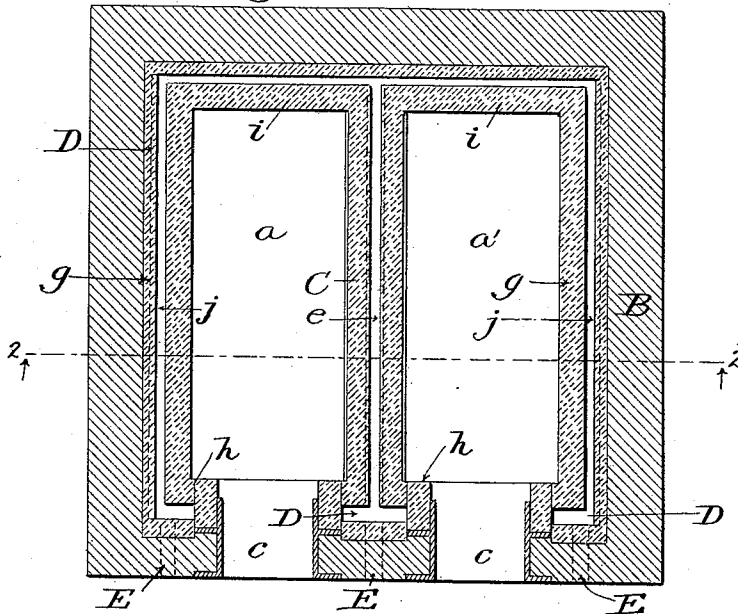
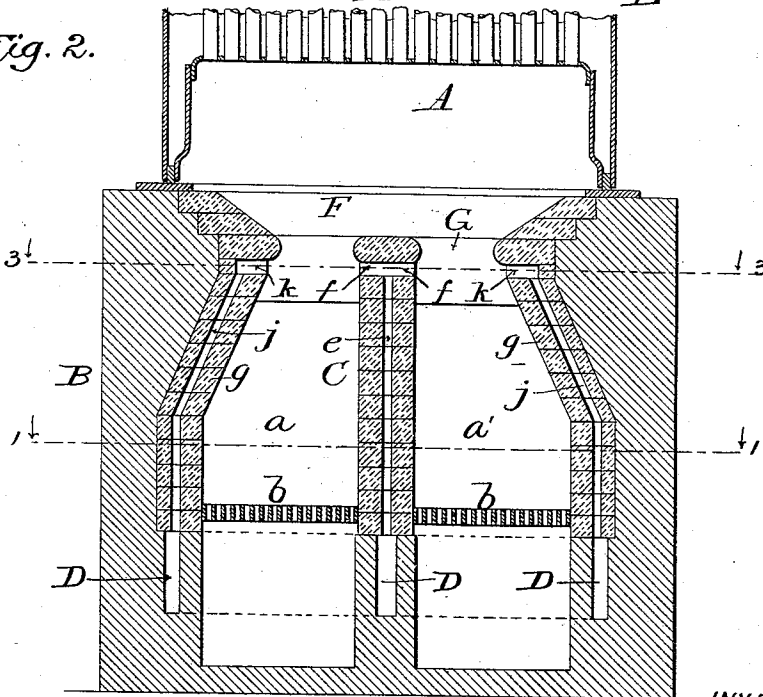


Fig. 2.



Witness:

James F. Duhamel.
Horace A. Dodge.

INVENTOR:

Edwin Reynolds
by Dodge & Sons
Attys.

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Fig. 3.

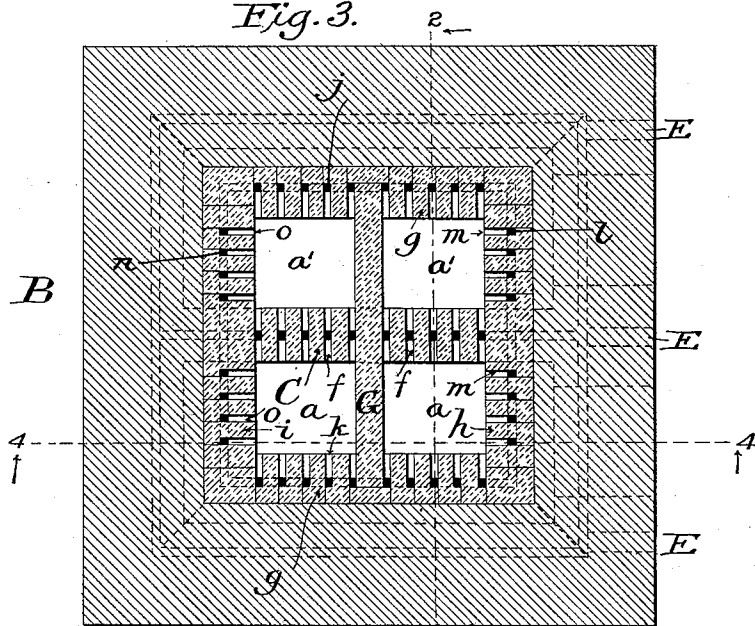
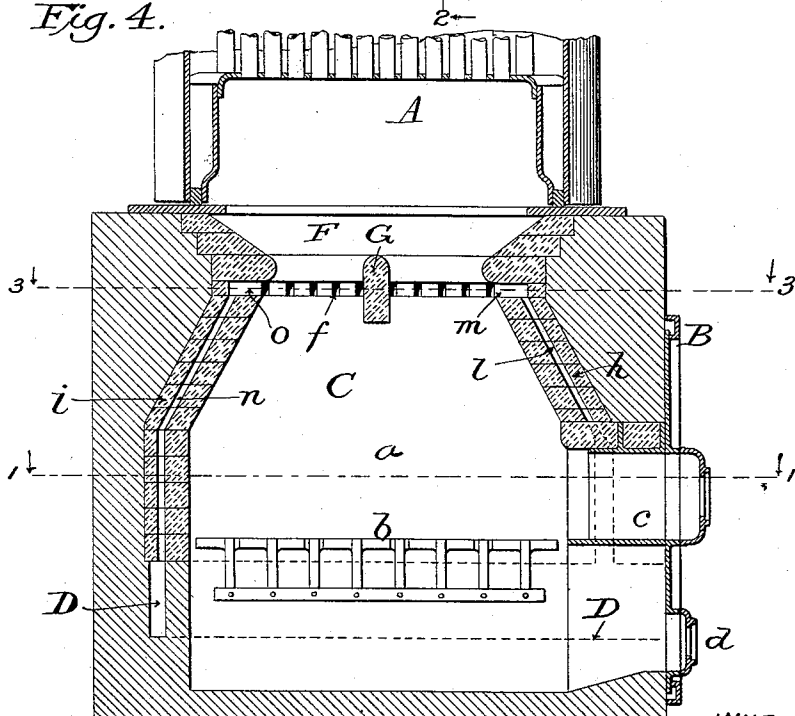


Fig. 4.



Witness:

James F. Duhamel.
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INVENTOR:

Edwin Reynolds,
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UNITED STATES PATENT OFFICE.

EDWIN REYNOLDS, OF MILWAUKEE, WISCONSIN.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 484,507, dated October 18, 1892.

Application filed May 14, 1892. Serial No. 433,037. (No model.)

To all whom it may concern:

Be it known that I, EDWIN REYNOLDS, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Boiler-Furnaces, of which the following is a specification.

My invention relates to boiler-furnaces; and it consists in various features and details hereinafter set forth and claimed.

In the drawings, Figure 1 is a horizontal sectional view on the line 1-1 of Figs. 2 and 4; Fig. 2, a vertical sectional view on the line 2-2 of Figs. 1 and 3; Fig. 3, a horizontal sectional view on the line 3-3 of Figs. 2 and 4, and Fig. 4 a vertical sectional view on the line 4-4 of Fig. 3.

The object of the present invention is to secure a complete consumption of the fuel and those products of combustion which usually pass off in an unconsumed condition.

The invention is applicable to both vertical and horizontal boilers, although I have shown it in connection with only the vertical style of boiler.

In carrying out my invention I construct the furnace with two fire-chambers separated by a suitable partition or wall, said chambers communicating at their upper ends with or opening into a common combustion-chamber. In the walls of these two fire-chambers I form a series of ducts, flues, channels, or passages adapted to receive air and discharge the same in a heated condition at the tops of the fire-chambers, whereby not only is the combustion promoted, but the the furnace-walls are prevented from becoming unduly heated and burning out. The walls of the fire-chambers, except the division wall or partition, preferably converge, so as to form a somewhat-contracted throat at the point at which the heated air-currents are discharged, while the combustion space or chamber immediately above is enlarged, so as to give the gases, &c., a chance to expand and distribute themselves over as large a boiler-surface as is possible. These features will be better understood upon referring to the drawings, in which—

A represents a boiler, which may be of any desired type or style, and B the furnace. The furnace B comprises the two fire-chambers a

and a' , each having a grate b , a fuel-supply c , and a draft-door d , as usual. These two fire-chambers a and a' are separated by an upright partition or division wall C, which extends upward nearly to the base-plate of the boiler, as shown in Figs. 2 and 4. This partition-wall is made hollow or provided with a flue e , which latter is provided near its upper end with outlets or openings f , which are designed to discharge the air from both sides of said partition, the lower end of the flue e communicating with one branch of the main air-supply flue or passage D, formed in the body of the masonry of the furnace and extending therearound, as shown. The main air-supply flue or passage D receives its supply of air through the openings E, formed in the front wall of the furnace, as indicated by the dotted lines in Fig. 3.

The side walls $g g$ and the front and rear walls h and i of the fire-chambers converge at their upper ends, so as to form a somewhat-contracted throat, through which the products pass into the combustion-chamber F, as shown in Figs. 2 and 4. In the side walls $g g$ I form a flue or passage j , which communicates at its lower end with a branch of the main supply-flue D, but which is provided at its upper end with outlets or openings k , through which the heated air is discharged inward over the top part of the fire-chambers. Front wall h is likewise provided with a flue or passage l (communicating with flue D) and outlets m , while the rear wall i is provided with a similar flue n and outlets o .

Upon reference to Fig. 3 it will be observed that the openings or outlets f , k , m , and o are all practically in the same horizontal plane at the top of the fire-chambers or in the throat between the fire-chambers and the combustion-chamber. Consequently there will be distributed from three sides of each fire-chamber a large number of streams of heated air, which, mingling with the gases, &c., rising from the fires, will aid the proper combustion of such gases and avoid smoke.

The use of the partition-wall C permits of alternate firing and the keeping of a well-burning fire on one side at all times. The flames, &c., from one chamber mingling with the gases from the freshly-coaled fire in the

other chamber in the combustion-chamber above will, with the aid of the air-jets, burn them, so as to avoid smoke. This center wall or partition furnishes a large amount of heating-surface for the air which passes up through the flue *e*.

A cross-bar *G* extends transversely across each fire-chamber at the upper end, which, in connection with the upright partition, directs the gases, &c., into four flues in which heated air is admitted on three sides of each flue, besides tending to brace or support the upper end of the division-wall.

Having thus described my invention, what I claim is—

1. In a boiler-furnace, two fire-chambers separated by an upright division-wall, said wall being provided with an internal vertical air-flue *e* and with a series of lateral openings *f* on both sides thereof throughout the length of the wall, all substantially as shown and described.

2. In a boiler-furnace, two fire-chambers separated by an upright division-wall, said wall being provided with an internal vertical air-flue *e* and with a series of lateral openings *f* on both sides thereof throughout the length of the wall, and a gradually-enlarged combustion-chamber above the upper edge of the wall, all substantially as shown and described.

3. In a boiler-furnace, two fire-chambers separated by a division-wall having lateral air-outlets on both faces, a contracted throat for the two chambers, having lateral air-out-

lets on its inner face, and a combustion-chamber located above the throat.

4. In a boiler-furnace, two fire-chambers separated by a division-wall having lateral air-outlets on both faces, a contracted throat for the two chambers, having air-outlets on its inner face, and a gradually-enlarged combustion-chamber above the throat, all substantially as shown and described.

5. In a boiler-furnace, two fire-chambers separated by a partition-wall and having a transverse bar *G* to direct the products into the four flues thus formed and means for delivering air from three sides of each of the four flues.

6. In a boiler-furnace, two separated fire-chambers communicating with a common combustion-chamber and provided with hollow side and front walls having air-outlets at their upper (inner) faces and a hollow division-wall also having air-outlets on both faces near its upper end.

7. In a boiler-furnace, two separated fire-chambers communicating with a common combustion-chamber, the inclined hollow side, front, and back walls provided, respectively, with the flues *j l n* and outlets *k, m, and o*, and the division-wall provided with flue *e* and openings *f*.

In witness whereof I hereunto set my hand in the presence of two witnesses.

EDWIN REYNOLDS.

Witnesses:

W. M. RUTH,

THEO. N. BROWN.