

No. 730,409.

PATENTED JUNE 9, 1903.

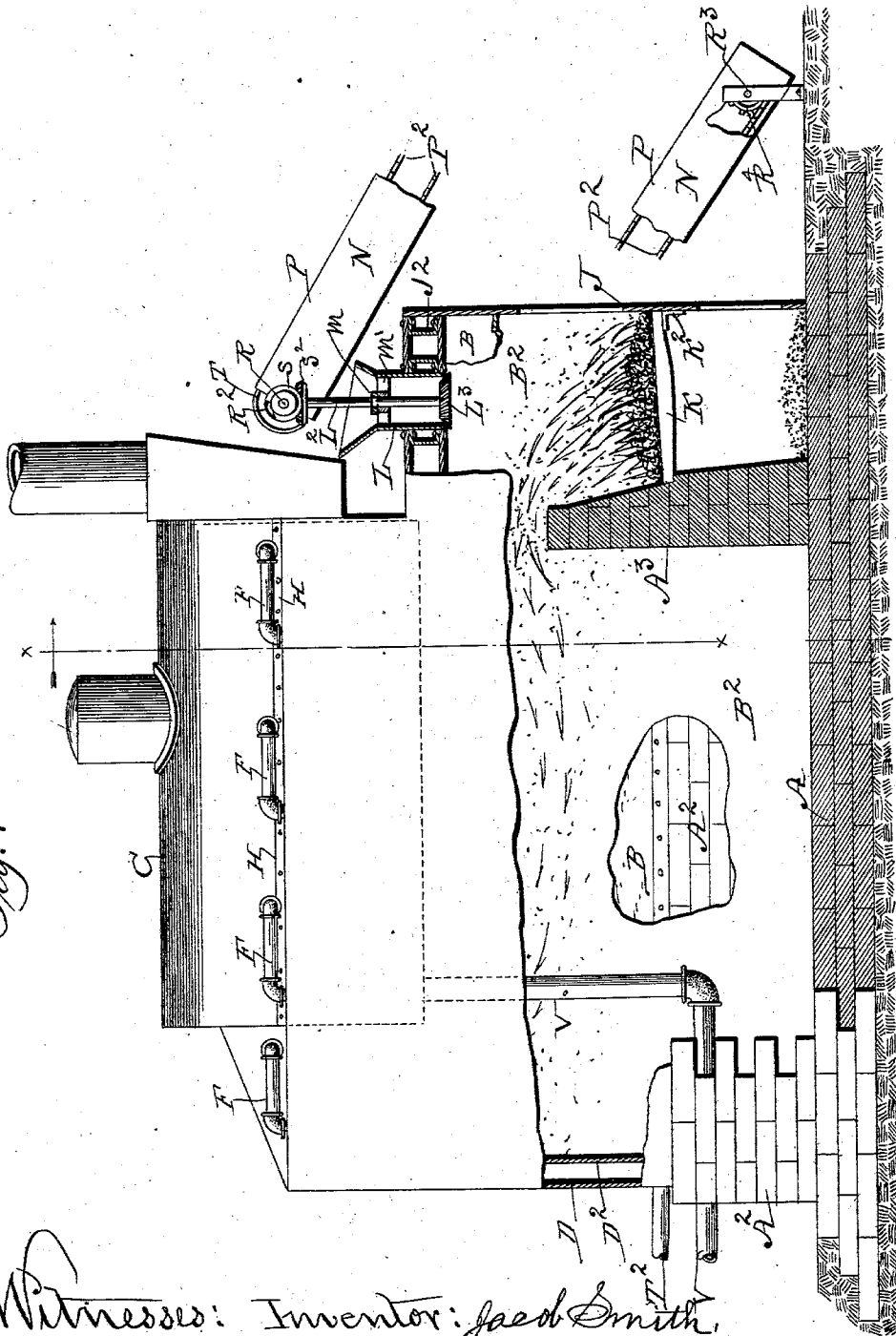
J. SMITH.  
BOILER FURNACE.

APPLICATION FILED JAN. 7, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses: Inventor: Jacob Smith.  
R. S. Orrig. }  
H. C. Stuart. } Thomas G. Orrig, Attorney.

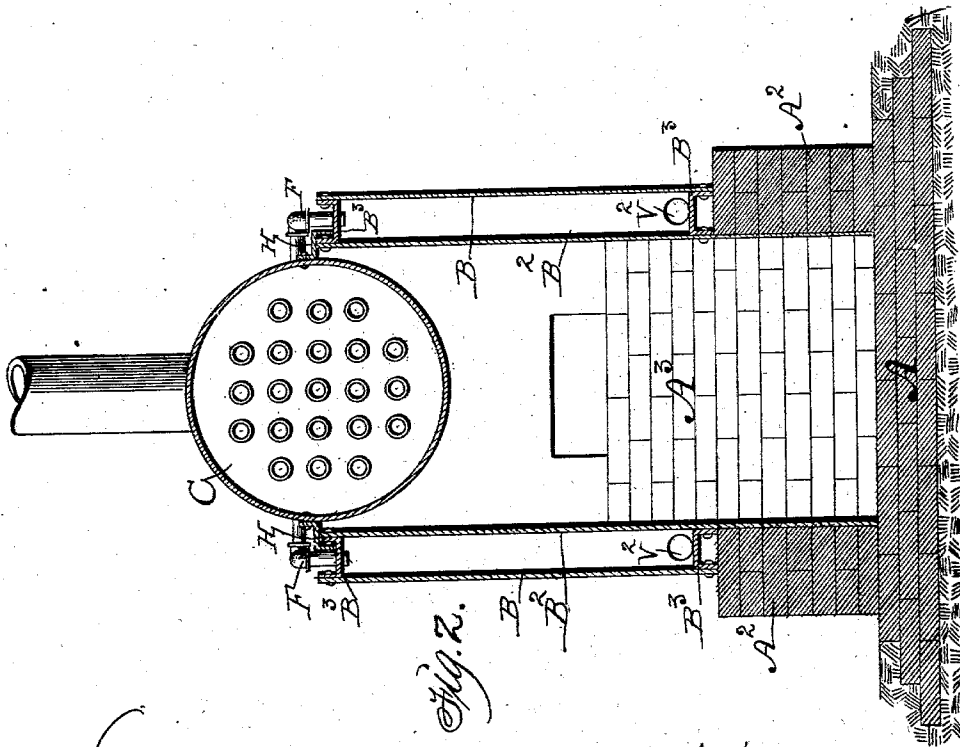
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2 SHEETS—SHEET 2.



Witnesses: {  
R. B. Orwig.  
J. C. Stuart.  
Inventor: Jacob Smith,  
By Thomas G. Orwig, Attorney.

# UNITED STATES PATENT OFFICE.

JACOB SMITH, OF DES MOINES, IOWA.

## BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 730,409, dated June 9, 1903.

Application filed January 7, 1902. Serial No. 88,742. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB SMITH, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have  
 5 invented a new and useful Boiler-Furnace, of which the following is a specification.

My object is to prevent the waste of fuel and annoyances incident to the escape of soot and black smoke from boiler-furnaces by  
 10 producing an enlarged combustion-chamber to increase the water-heating surface of a boiler by means of boiler-sections adapted to serve as walls of the combustion-chamber and the fuel-chamber.

Further objects are to combine boiler-sections with a brick wall to aid in supporting a tubular boiler, to protect boiler-flues from being damaged by heat, and to feed fuel  
 15 through a hopper fixed in a boiler-section in such a manner that the fuel will be heated on top of the fire-chamber before it is dropped into the fire-chamber.

My invention consists in the construction, arrangement, and combination of parts, as  
 25 hereinafter set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my furnace, partly in section, and shows the forms and relative positions of different parts. Fig. 2  
 30 is a vertical transverse sectional view on the line  $x x$  of Fig. 1 and shows how the main and cylinder portion of the boiler is connected with and supported by the boiler-sections that constitute the side walls of the combustion-chamber.

The letter A designates the foundation upon which parallel side walls  $A^2$  are built with brick.

40  $A^3$  is the bridge-wall.

B and  $B^2$  are flat metal plates connected by means of angle-plates  $B^3$  at their tops and bottoms to produce boiler-sections adapted to serve as side walls for supporting a cylindrical tubular boiler C of common form to extend beyond the cylindrical boiler to serve as side walls for the furnace. The inner plates  $B^2$  extend down inside of the brick walls  $A^2$  to rest upon the foundation A, as shown in  
 45 Fig. 2, and in combination with the brick wall aid in supporting the tubular boiler.

The rear ends of the plates B and  $B^2$  are connected by plates D and  $D^2$ , as required to produce a boiler-section at the rear end of the combustion-chamber to communicate with  
 55 the mating parallel walls and boiler-sections that communicate with the cylindrical boiler through a plurality of tubes F, fixed in the tops of the boiler-sections and the sides of the cylindrical boiler, as shown in Fig. 2, or  
 60 in any suitable way and in such a manner that lime and other foreign substances in the water will be precipitated in the upright boiler-sections and prevent fouling the main boiler at their tops. Angle-bars H, fixed to the  
 65 sides of the cylindrical boiler, rest upon the angle-plates  $B^3$  and serve as brackets for supporting the boiler C in the top of the large combustion-chamber that extends down to the foundation A.

J is the metal plate and front of the furnace fixed to the front ends of the plates B and  $B^2$  and to a boiler-section  $J^2$ , fixed to its top to communicate with the parallel upright boiler-sections. The top of the furnace or  
 70 fuel-chamber is thus prevented from being damaged by intense heat to which it is subjected and also adapted for advantageously combining therewith means for supporting, heating, and feeding fuel to the furnace, as  
 75 shown in Fig. 1 or in any suitable way.

K is a grate supported by the bridge-wall  $A^3$  and an angle-bar  $K^2$ , fixed to the front wall J.

Each of the upright boiler-sections is provided with a tube  $T^2$  for feeding water thereto.

A pipe V is connected with the cylindrical boiler C for cleaning the boiler whenever necessary. Openings  $V^2$ , provided with suitable steam-tight covers, are formed in the bottom  
 85 and rear end portions of the upright boiler-sections for cleaning them.

In the practical operation of my invention the heat radiated from the inside surfaces of the boiler-sections that serve as a wall for the large combustion-chamber aids in maintaining a high degree of heat in the combustion-chamber to materially aid in promoting the combustion of all valuable products of combustion liberated by fire in the fuel-chamber,  
 95 as required to prevent the formation and escape of black smoke and soot, the fouling of  
 100

the boiler-tubes, and the annoyances and waste incident to the passage of black smoke and soot through the combustion-chamber.

Having thus described the construction, purpose, and operation of my invention, its practical utility will be obvious to persons familiar with the art to which it pertains, and

What I claim as new, and desire to secure by Letters Patent, is—

10 1. In a boiler-furnace, a boiler-section made of parallel plates and the inner plates extended downward to rest upon a foundation and forward to line a furnace, in combination with a bridge-wall, a grate and a brick wall  
15 extended from the foundation to the bottom of the boiler-section, for the purposes stated.

2. In a boiler-furnace, parallel boiler-sections made of plate metal and extensions at their front ends and the extensions connected  
20 at their tops by a boiler-section provided with an aperture adapting it for combining means therewith for heating and feeding fuel into the furnace, in combination with the front wall of a fuel-chamber and a bridge-wall and  
25 a cylindrical boiler supported upon the tops of the parallel boiler-sections, for the purposes stated.

3. In a boiler-furnace parallel brick walls extended upward from a foundation-bottom, metal plates resting on the foundation and  
30 extended up inside of the brick walls, metal plates resting upon the tops of the parallel brick walls and extended parallel with the plates on the inside of said plates and connected therewith at their bottoms and tops by  
35 means of angle-plates to produce boiler-sections adapted to serve as upright walls of a combustion-chamber and to support a horizontal boiler, extensions at the front ends of the parallel walls and a boiler-section fixed  
40 on top of said extensions and provided with an aperture and adapted for combining means therewith for heating and feeding fuel into the furnace, arranged and combined as shown  
45 and described for the purposes stated.

4. In a boiler-furnace parallel brick walls

extended upward from a foundation-bottom metal plates resting on the foundation and extended up inside of the brick walls, metal plates resting upon the tops of the parallel  
50 brick walls and extended parallel with the plates on the inside of said plates and connected therewith at their bottoms and tops by means of angle-plates to produce boiler-sections adapted to serve as upright walls of a  
55 combustion-chamber and to support a horizontal boiler, a bridge-wall between the front portions of the two upright parallel boiler-sections, a metal front connected with the front ends of said upright boiler-sections and a  
60 grate extending from the bridge-wall to the furnace-front, arranged and combined as shown and described for the purposes stated.

5. In a boiler-furnace, a bridge-wall, two parallel upright boiler-sections connected  
65 with the ends of the bridge-wall and the front wall of the furnace, a boiler-section extending horizontally rearward from the furnace-front and a hopper fixed in said horizontal boiler-section, arranged and combined to operate  
70 in the manner set forth for the purposes stated.

6. A boiler-furnace comprising parallel brick walls, boiler-sections fixed on top of the parallel walls and their inner plates extended  
75 down on the insides of the walls, a tubular boiler fixed on top of the parallel boiler-sections, tubes extending from the parallel boiler-sections into the tubular boiler, a boiler-section connected with the rear ends of the parallel boiler-sections, extensions of the parallel  
80 walls and the parallel boiler-sections, a bridge-wall, a grate, a furnace-front and a boiler-section on top of the said extensions adapted for supporting a hopper for heating and feeding  
85 fuel to the furnace, arranged and combined to operate in the manner set forth for the purposes stated.

JACOB SMITH.

Witnesses:

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