

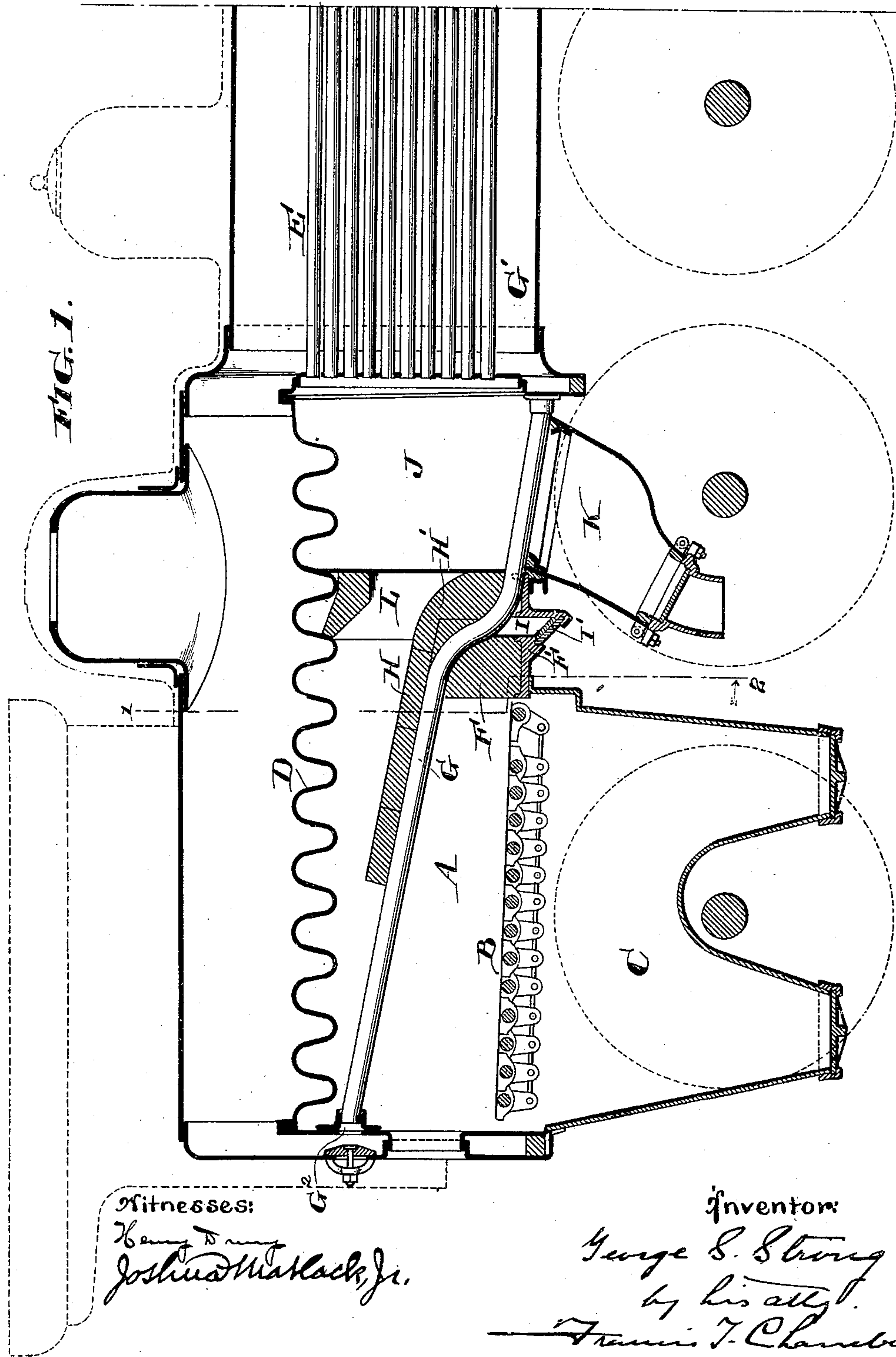
(No Model.)

2 Sheets—Sheet 1.

G. S. STRONG.  
BOILER FURNACE.

No. 475,357.

Patented May 24, 1892.



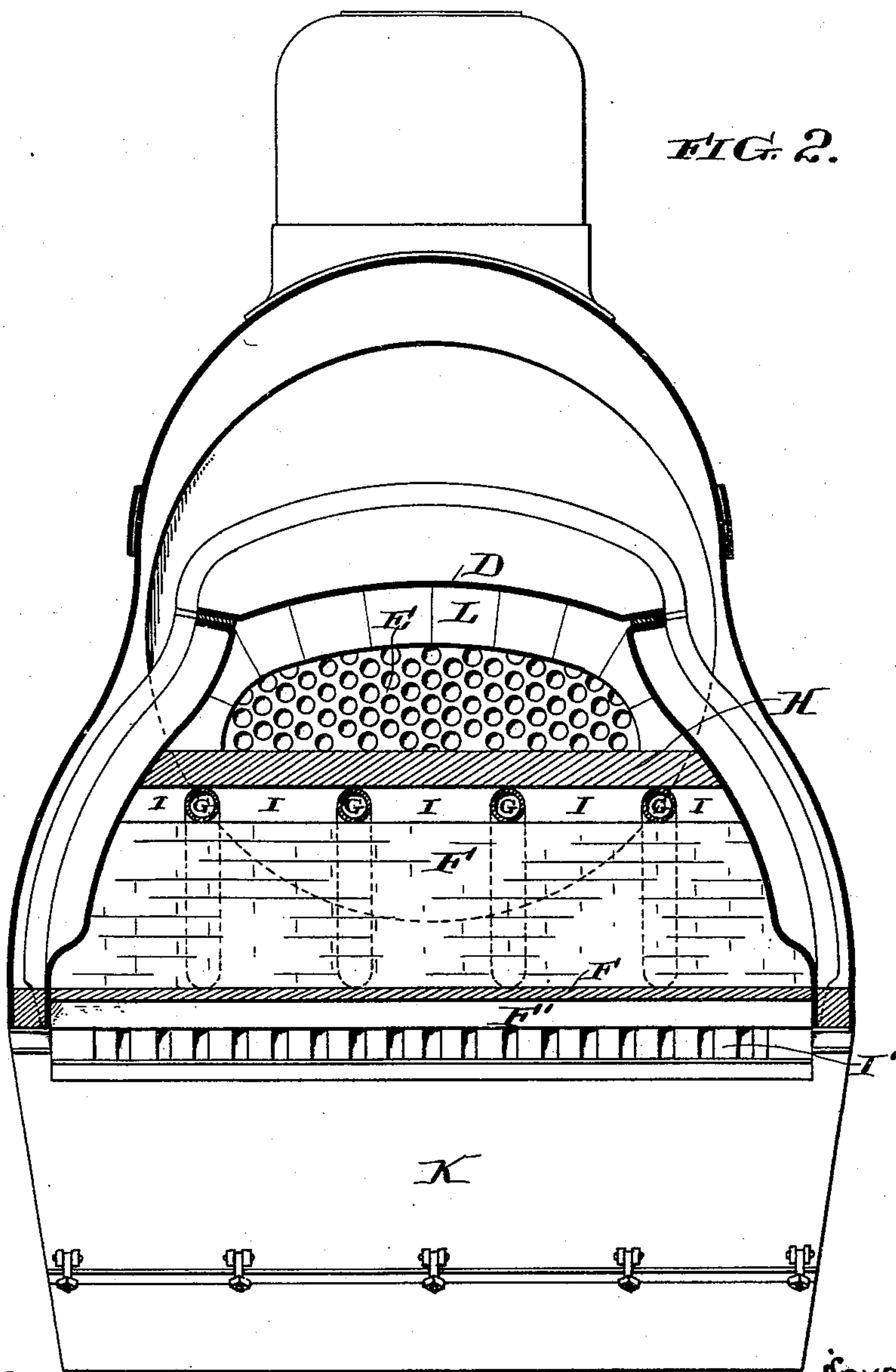
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Witnesses:

*Henry D. ...*  
*Joshua Makach, Jr.*

Inventor:

*George S. Strong*  
*by his atty.*  
*Fleming T. Chambers*



# UNITED STATES PATENT OFFICE.

GEORGE S. STRONG, OF NEW YORK, N. Y., ASSIGNOR TO JAMES N. GAMBLE,  
OF CINCINNATI, OHIO.

## BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 475,357, dated May 24, 1892.

Application filed May 19, 1891. Serial No. 393,251. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE S. STRONG, of the city and county of New York, State of New York, have invented a certain new and  
5 useful Improvement in Boiler-Furnaces, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

10 My invention relates to the construction of boiler-furnaces, and is particularly adapted for use in connection with locomotive-boilers.

My improvements relate in part to a special arrangement of air-flues, in connection with  
15 the bridge-wall and deflector, and in part to improved appliances for arresting sparks and solid matter coming from the fire-box before they pass into the tubes of the boiler.

The nature of my improvement will be best  
20 understood as described in connection with the drawings in which they are illustrated, and in which—

Figure 1 is an elevation taken on the central longitudinal section, and Fig. 2 a cross-  
25 section taken on the line 1 2 of Fig. 1.

A indicates the fire-box; B, the grate; C, the ash-pan of a locomotive-boiler, D being the crown-sheet of the fire-box and E the boiler-tube. At the rear of the fire-box A is  
30 a bridge-wall F, made of fire-brick, and supported on casting F', through which casting, also, an opening closed by a gridiron-valve I' is formed back of the bridge-wall. Passing from the bridge-wall F and conforming to its  
35 shape at the back are a series of water-tubes G, connecting front and back with the boiler, so that the water will circulate freely through them, and supported on these tubes G is a deflector H, made of fire-brick, and extending  
40 forward beyond the front of the bridge-wall for a considerable distance. Between the back of the deflector H and the bridge-wall F, I form air-passages I, which open at the top of the bridge and at a considerable distance  
45 back of the front edge of the deflector. These air-passages communicate with the valve I', as shown, and the air admitted to the fire-box through them is regulated to the extent to which the said valve is open. It is of course  
50 apparent that that part of the deflector H situ-

ated behind and above the bridge-wall is, in effect, a part of the bridge-wall, and thus the air-flues I may be said to pass through or be formed in the bridge-wall and beneath and behind the deflector. The special construction shown enables me to introduce air into  
55 the back of the fire-box through the fire-brick bridge-wall, and not in a position where the openings of the air-flues are not liable to become clogged by coal and cinder, for it will  
60 will be noticed that all products of combustion arising from the grate are carried away from the opening of the air-flues I, and that the projecting deflector H is so placed that  
65 no coal is likely to be thrown into the mouth of the air-passage.

On the rear of the bridge-wall and deflector is a combustion-chamber J, from which lead the boiler-tubes, and this chamber I provide with a downwardly-extending receptacle K,  
70 which acts to catch and retain sparks and particles of solid matter passing from the bridge-wall and deflector into the combustion-chamber. The rear of the bridge-wall or back of the deflector H should be made with a  
75 downward inclination, as shown, so that the solid matter will enter the combustion-chamber with a descending impetus, and to intensify this action I provide an arch L, situated above the back of the bridge-wall and hav-  
80 ing its face beveled downward and upward, as shown, so that the products of combustion, solid matter, &c., will be directed downward with greater certainty, the effect being that  
85 the solid matter will, to a very large extent, reach and be held by the receptacle K, while the gaseous products of combustion will pass into the tubes of the boiler. By providing, as aforesaid, for arresting sparks, &c., in the  
90 chamber J and before they pass into the boiler-tubes I am enabled to greatly diminish the tendency of the tubes to clog up.

Having now described my invention, what I claim as new, and desire to secure by Letters  
95 Patent, is—

1. In a boiler-furnace, a fire-chamber A, having a bridge-wall at its rear end, in combination with a combustion-chamber J in the rear of the bridge, said combustion and fire chambers communicating only over the top of said  
100



bridge, boiler-flues extending from the rear of the said chamber, a spark-arresting chamber K at the bottom of the combustion-chamber, and a downwardly-inclined deflector arranged above the bridge-wall, substantially as described, and so as to give the products of combustion a downward movement on entering the combustion-chamber.

2. In a boiler-furnace, a fire-chamber A, having a bridge-wall at its rear end, in combination with a combustion-chamber J in the rear of the bridge, said combustion and fire chambers communicating only over the top of said bridge, a deflecting-arch L at the front of the combustion-chamber, and a spark-arresting chamber K at the bottom thereof.

3. In a boiler-furnace, a fire-chamber A, having a bridge-wall at its rear with downwardly-inclined rear surface, a deflecting-arch L, situated over the bridge-wall and having a correspondingly-inclined face, a combustion-chamber J behind the bridge and arch and having boiler-tubes leading therefrom, and a spark-receiver K, situated at bottom of chamber J, all substantially as and for the purpose specified.

4. In a boiler-furnace, a fire-chamber A, hav-

ing a bridge-wall at its rear, in combination with water-tubes G, extending over the bridge and forward through the fire-chamber, a deflector H, supported on said tubes and extending over and to the front of the bridge-wall, air-passages I, entering the fire-box at the top of the bridge-wall and back of the edge of the deflector, a deflecting-arch L, arranged above the back of deflector H and having a downwardly and backwardly inclined face, a combustion-chamber J in the rear of arch L, and a spark-arresting chamber K at the bottom of chamber J.

5. In a boiler-furnace, the combination of the casting F', having a valve I' in its under side, the bridge-wall E, supported on casting F', the water-tubes G, extending over the bridge-wall, as described, the deflector H, supported on tubes G, and the air-flues I, extending to the fire-box at the top of the bridge-wall and beneath the deflector, said air-flues leading to valve I' in casting F', substantially as and for the purpose specified.

GEORGE S. STRONG.

Witnesses:

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JOSHUA MATLACK, Jr.