

(No Model.)

2 Sheets—Sheet 1.

H. M. SMITH.  
LOCOMOTIVE FURNACE.

No. 264,355.

Patented Sept. 12, 1882.

Fig. 1.

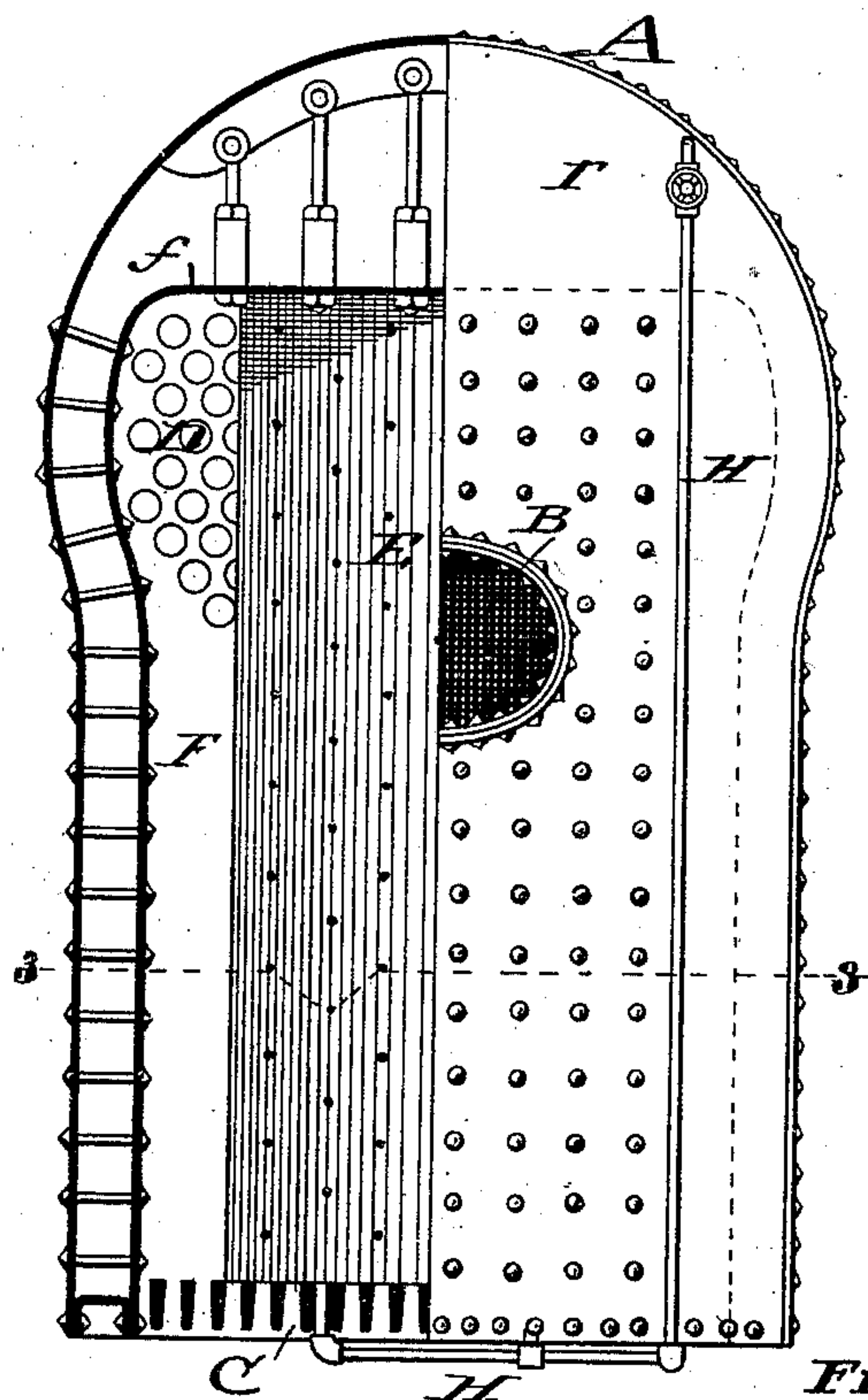


Fig. 2.

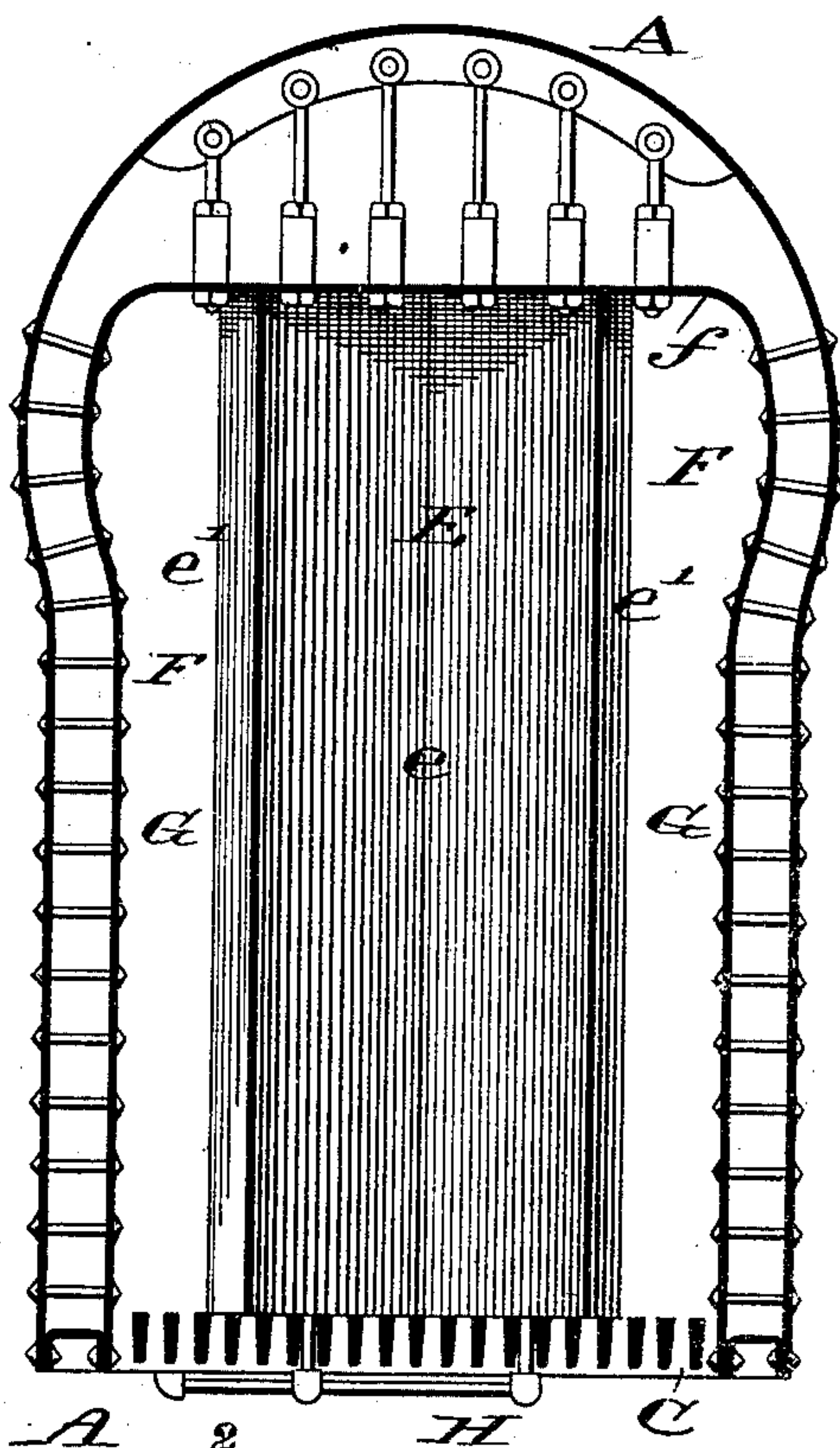


Fig. 3.

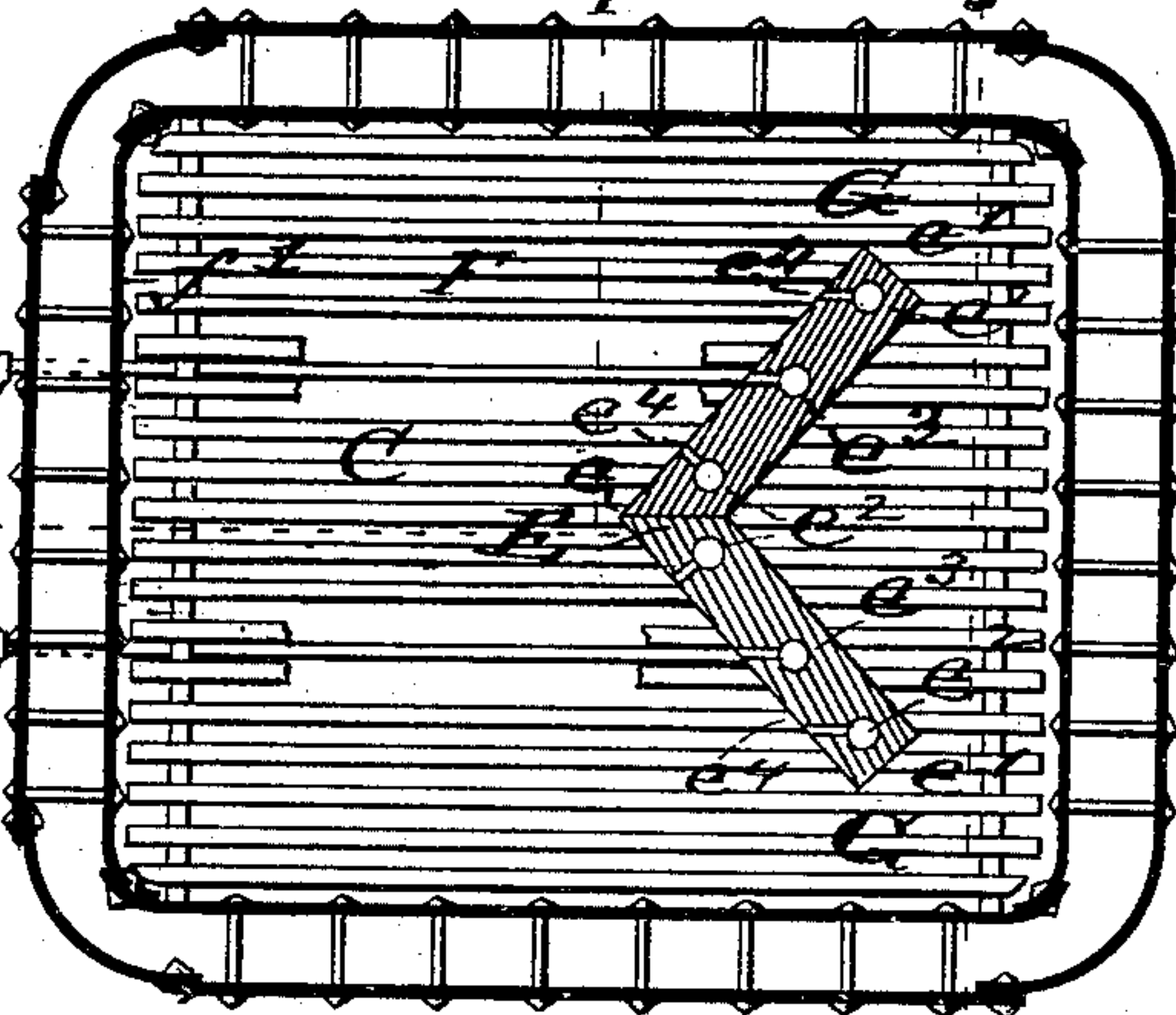


Fig. 4.

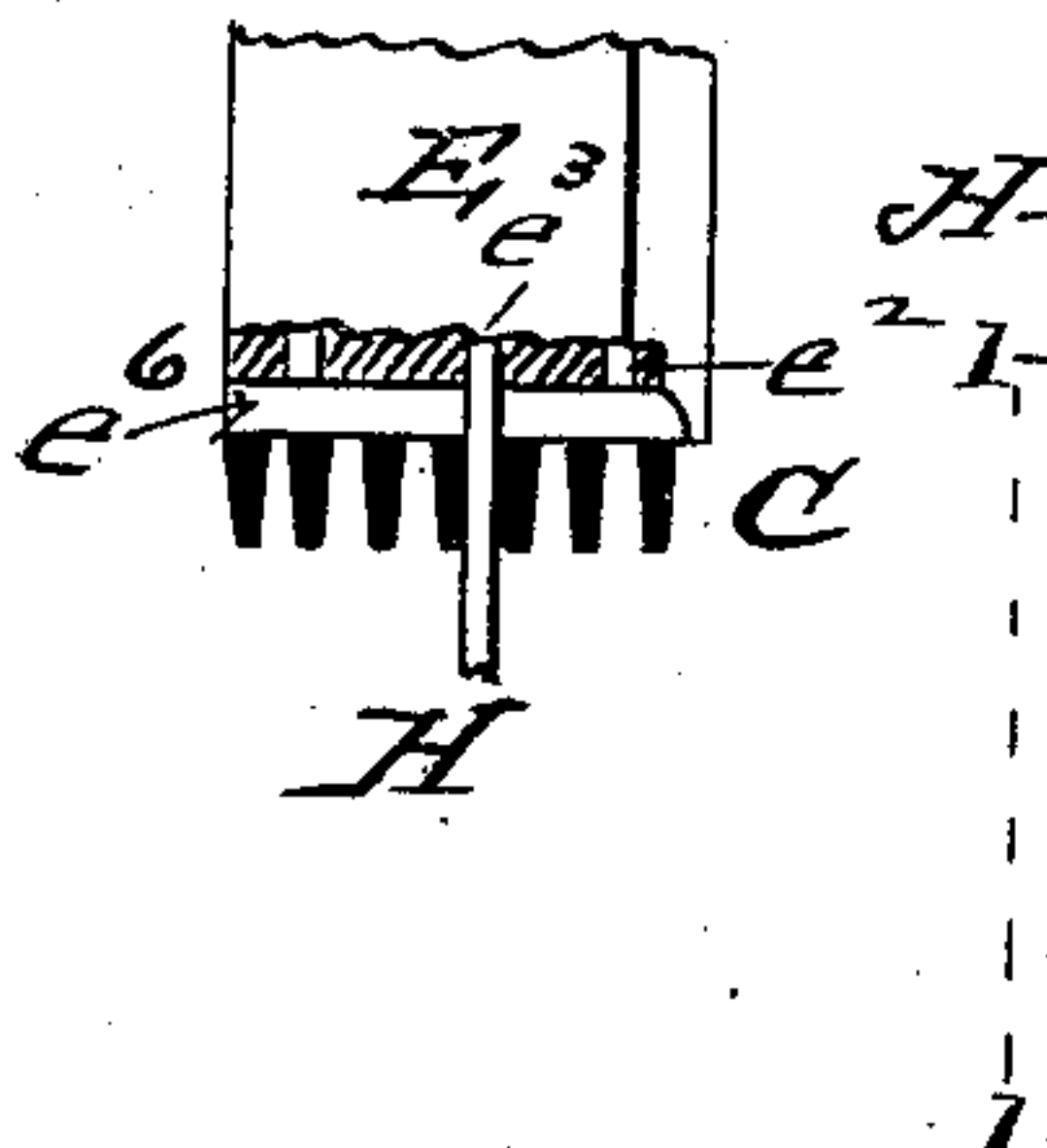
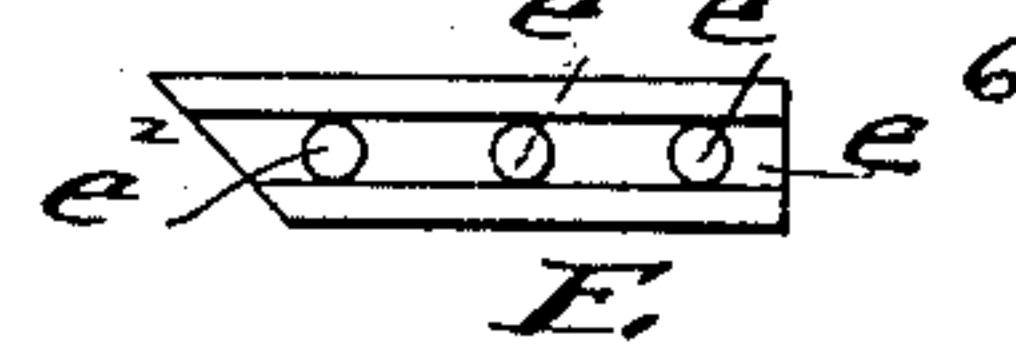


Fig. 5.



Attest:

Samuel S. Boyd  
Charles Pickles

Inventor:

Howard M. Smith  
by C. Moody atty

(No Model.)

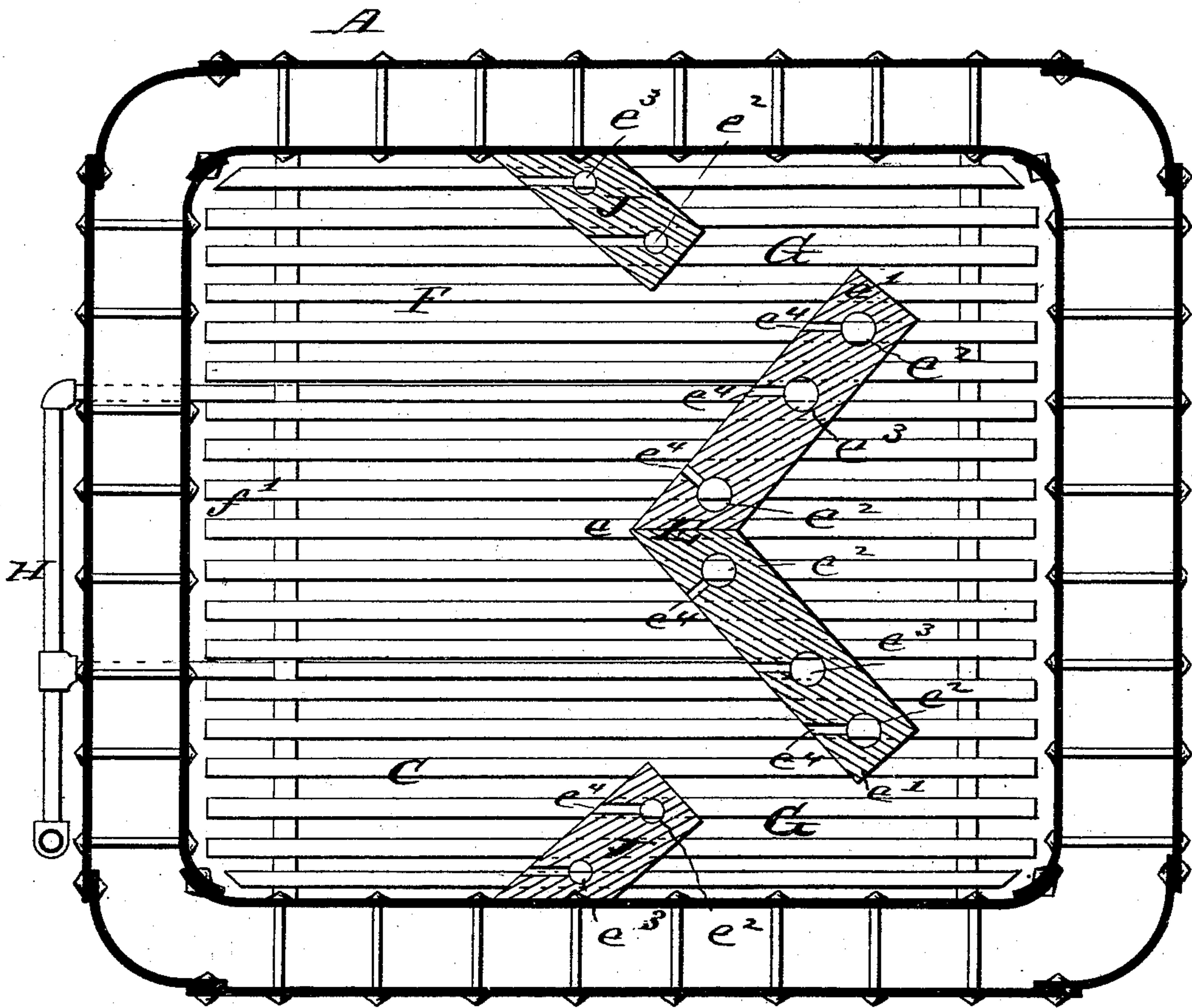
2 Sheets—Sheet 2.

H. M. SMITH.  
LOCOMOTIVE FURNACE.

No. 264,355.

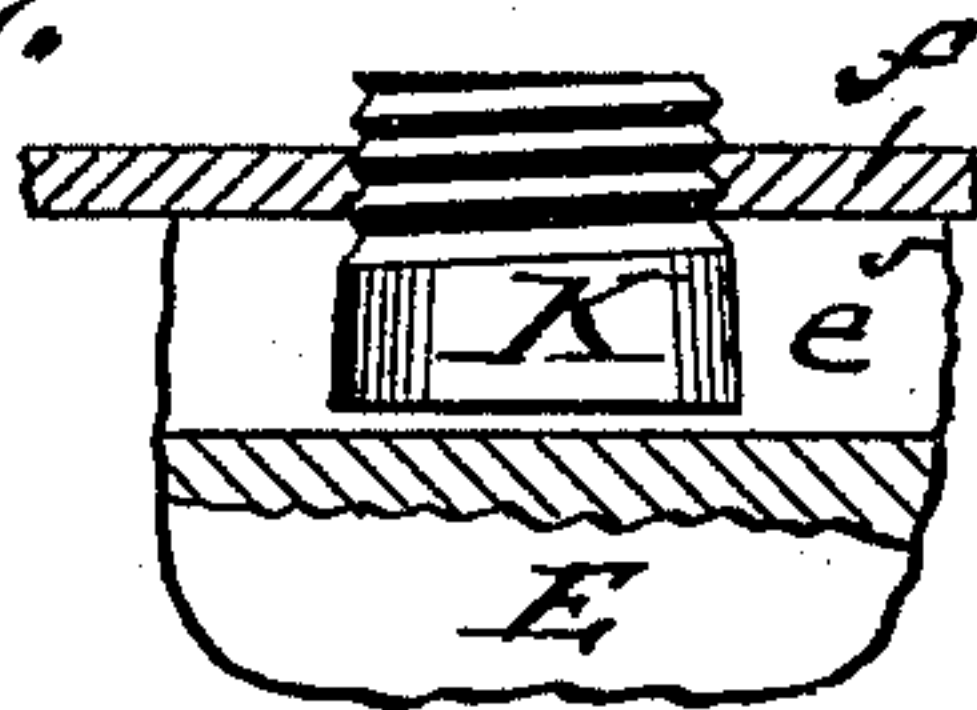
Patented Sept. 12, 1882.

*Fig. 6.*



*Attest: Fig. 7.*

*Samuel S. Royce  
Charles Pickles*



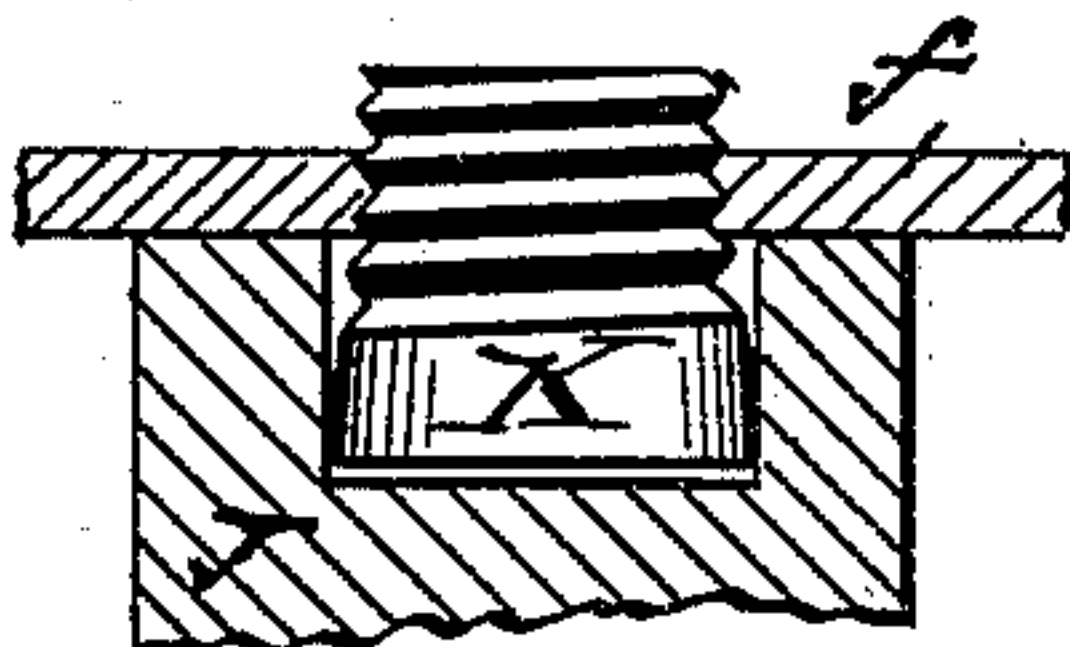
*Inventor:*

*Howard M. Smith*

*by C. D. Moody*

*att'y*

*Fig. 8.*





# UNITED STATES PATENT OFFICE.

HOWARD M. SMITH, OF ST. LOUIS, MISSOURI.

## LOCOMOTIVE-FURNACE.

SPECIFICATION forming part of Letters Patent No. 264,355, dated September 12, 1882.

Application filed April 14, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, HOWARD M. SMITH, of St. Louis, Missouri, have made a new and useful Improvement in Locomotive-Furnaces, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is an elevation, looking toward the rear end thereof, of a furnace having the improvement, the view being partly in section, taken on the line 1 1 of Fig. 3; Fig. 2, a vertical transverse section taken on the line 2 2 of Fig. 3; Fig. 3, a horizontal section taken on the line 3 3 of Fig. 1; Fig. 4, a detail, being an elevation partly in section, showing a portion of the lower end of one of the tiles; Fig. 5, a bottom view of one of the tiles; Fig. 6, a horizontal section similar to that of Fig. 3, but upon an enlarged scale, and showing side tiles as well as the center tiles; and Figs. 7 and 8, details.

The same letters denote the same parts.

The present invention is an improved means for more effectually consuming the fuel and increasing the heat in the furnace.

It consists in a diaphragm extending upward and downward in the furnace-chamber, and so as to leave spaces at the sides of the diaphragm for the passage of the heat-currents past the diaphragm. The diaphragm is not only a means by which the gaseous currents and products of combustion are directed to the sides of the furnace-chamber, but it is also utilized in supplying currents of air or steam, or of both air and steam, to the furnace, and by making the diaphragm of material—such as tiling—capable of being highly heated the heat of the furnace can be still further increased.

Referring to the drawings, A represents a locomotive-furnace having the improvement, B being the furnace-door, C the grate, and D the flues, all of the customary description.

E represents a diaphragm composed preferably of tiles and in one or more pieces, and extending upward and downward in the chamber F, and preferably from the grate C to the roof *f*, but in all cases so as to leave passages G G at the sides of the chamber. The diaphragm is also preferably shaped to bring its center *e* nearer the end *f'* of the furnace-cham-

ber than the wings or sides *e'* *e'* of the diaphragm, the exact shape preferred in this respect being that shown. The diaphragm has perforations *e*<sup>2</sup> *e*<sup>3</sup> extending vertically therein, and at various intervals having branches *e*<sup>4</sup> leading in the direction of the furnace end *f'* to the surface of the diaphragm. A portion, *e*<sup>2</sup>, of the perforations is for air-passages, and the others, *e*<sup>3</sup>, for steam, the air and steam entering the passages *e*<sup>2</sup> *e*<sup>3</sup> at the lower end of the diaphragm, and passing thence upward and through the passages *e*<sup>4</sup> outward and into the chamber F. The steam is supplied through a suitable pipe, H, leading, say, from the boiler I. The fuel is placed between the diaphragm and the end *f'* of the chamber F. The passages *e*<sup>2</sup> *e*<sup>3</sup> of the diaphragm E may be connected by a channel, *e*<sup>6</sup>.

Side diaphragms, J J, at each side of the furnace-chamber F, may be used in connection with the center diaphragm. They also extend upward and downward in the chamber F in manner similar to that of the diaphragm E, and they may have air and steam passages *e*<sup>2</sup> and *e*<sup>3</sup>. The side diaphragms, J J, are useful independently of the center diaphragm, E, but are more valuable in combination therewith.

To better hold the various diaphragms E J in place, plugs K K, Figs. 7, 8, are attached to or in the roof *f*, and made to engage in suitable recesses or slots, *e*<sup>5</sup>, in the diaphragms.

I claim—

1. A furnace-chamber, F, having a diaphragm provided with air and steam passages, and extending vertically upward and downward from the grate to the top of the furnace-chamber, leaving passages G G at the sides of the diaphragms, substantially as and for the purpose set forth.

2. In combination with the diaphragms E and J J, provided with air-passages *e*<sup>2</sup>, steam-passages *e*<sup>3</sup>, and channel *e*<sup>6</sup>, the steam-pipe H, substantially as and for the purpose set forth.

3. A furnace-chamber, F, having a diaphragm extending upward and downward therein from the bottom to the top of its chamber, leaving passages G G at the sides of the diaphragm, said diaphragm having the air-passages *e*<sup>2</sup>, steam-passages *e*<sup>3</sup>, and channel *e*<sup>6</sup>, substantially as set forth.

4. A furnace-chamber, F, having the center

diaphragm, E, and the side diaphragms, J J, having air-passages  $e^2$  and steam-passages  $e^3$ , all of said diaphragms extending downward and upward in the furnace-chambers, and passages G G, being provided between the central and side diaphragms, substantially as described.

5 5. The combination of the diaphragm E, the roof  $f$ , and the plugs K K, said plugs engaging loosely in the recesses  $e^5$ , substantially as described.

6. The combination of the diaphragms J J, the roof  $f$ , and the plugs K K, said plugs engaging loosely in the recesses  $e^5$ , substantially as described.

HOWARD M. SMITH.

Witnesses:

C. D. MOODY,  
SAML. S. BOYD.