

(No Model.)

2 Sheets—Sheet 1.

R. L. SLATER.
STEAM BOILER FURNACE.

No. 277,361.

Patented May 8, 1883.

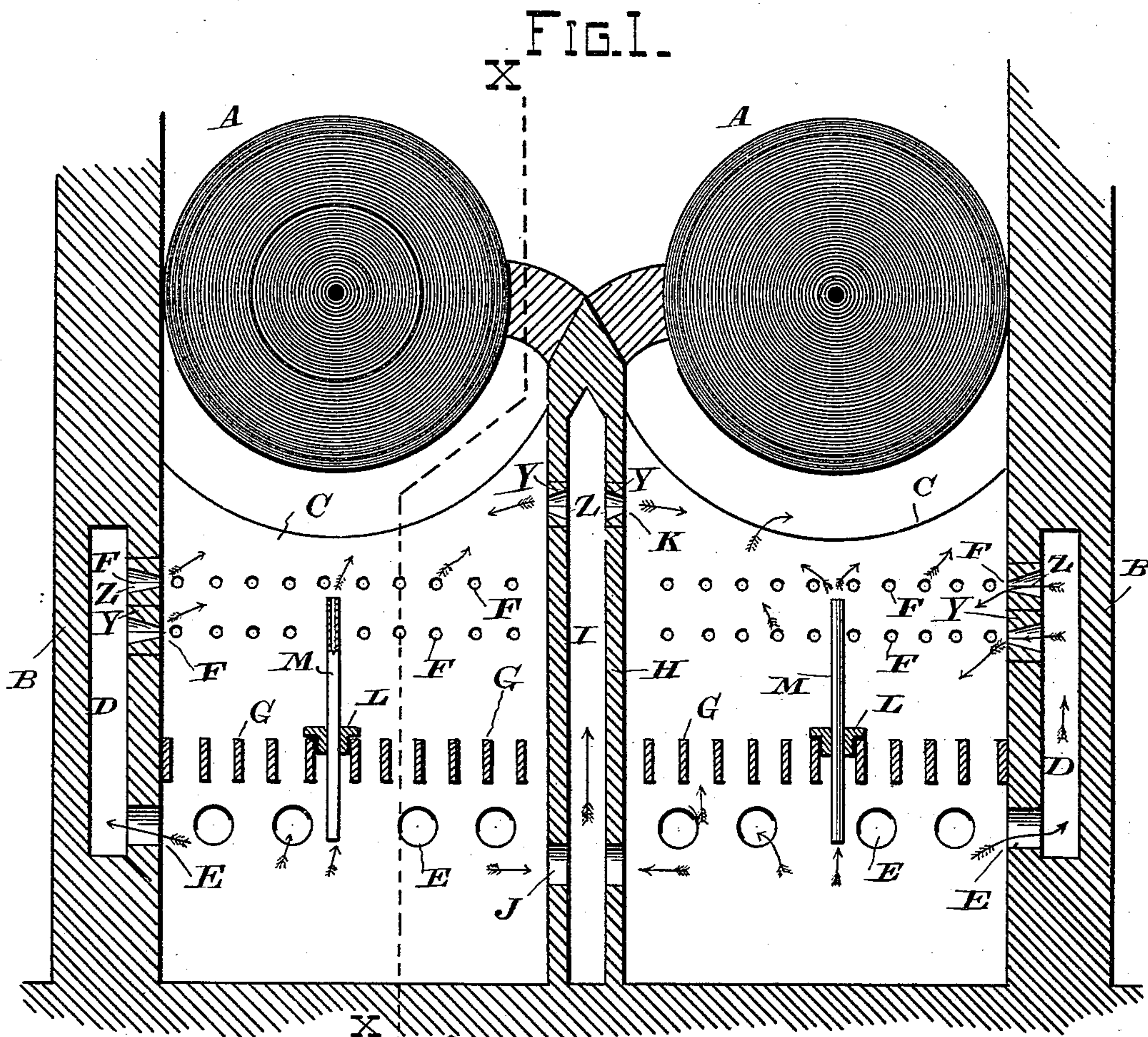


FIG. 2.

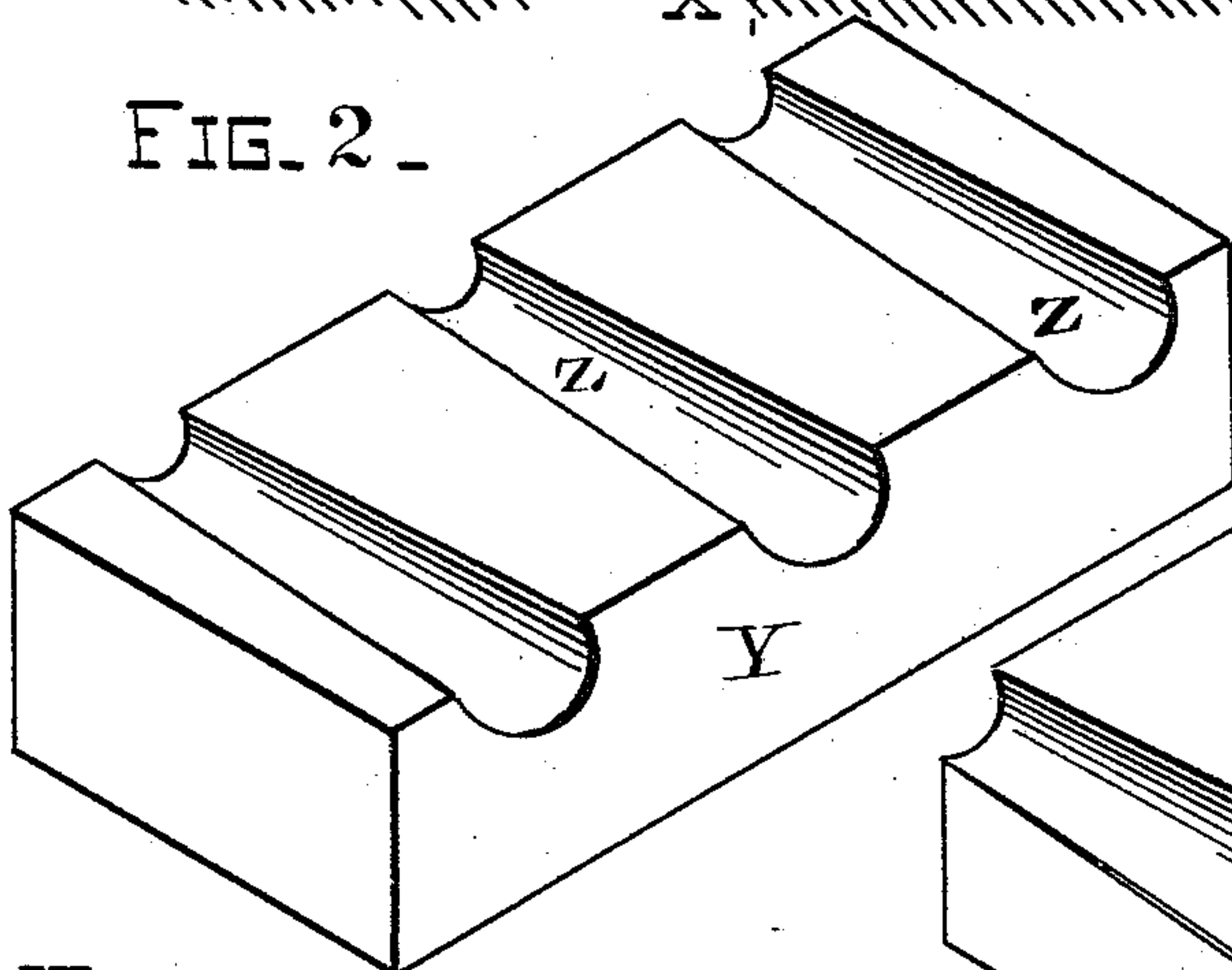
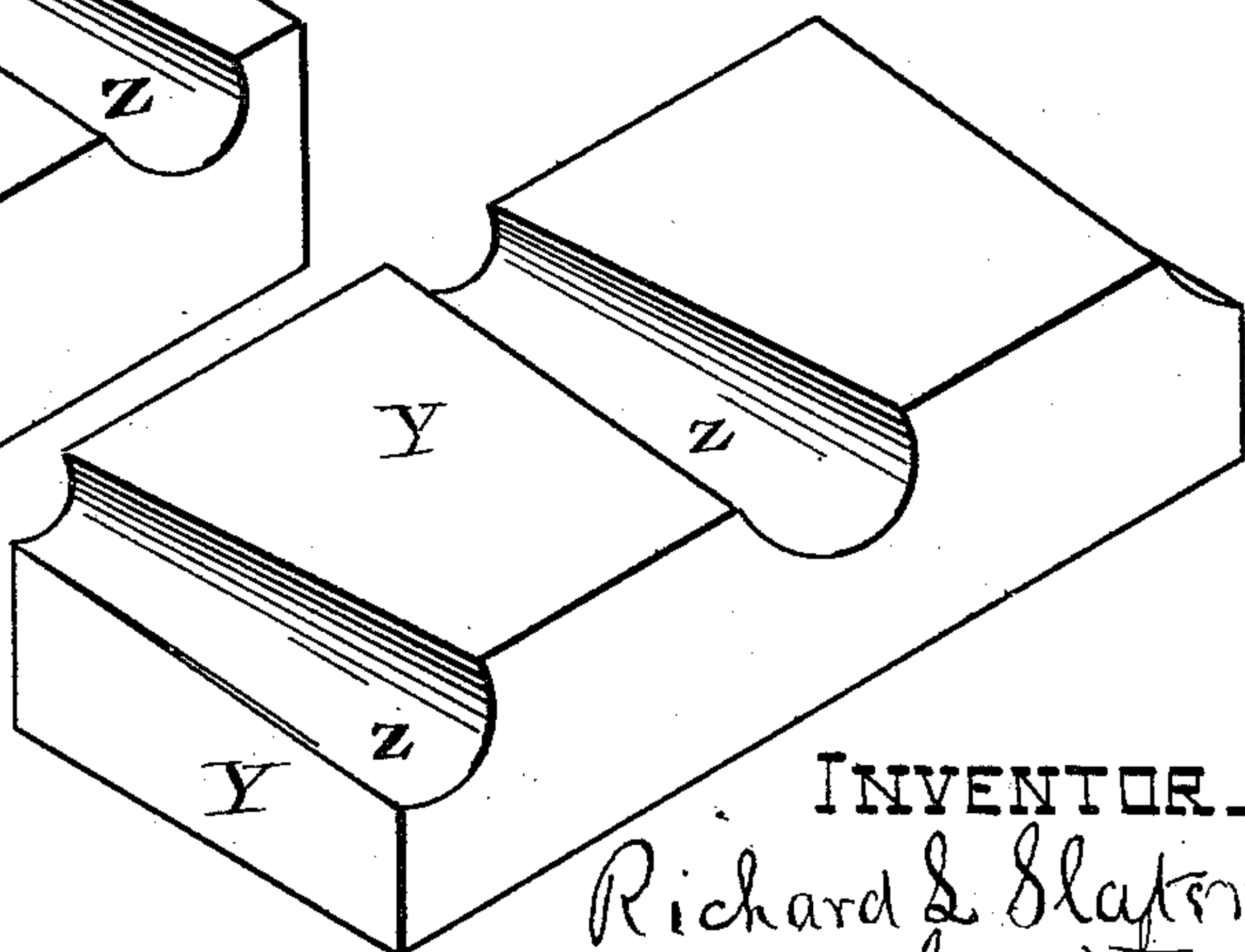


FIG. 3.



WITNESSES.

Willmet Bradford
Edwin Derby

INVENTOR.

Richard L. Slater
by *C. M. Smith*
Attorney.

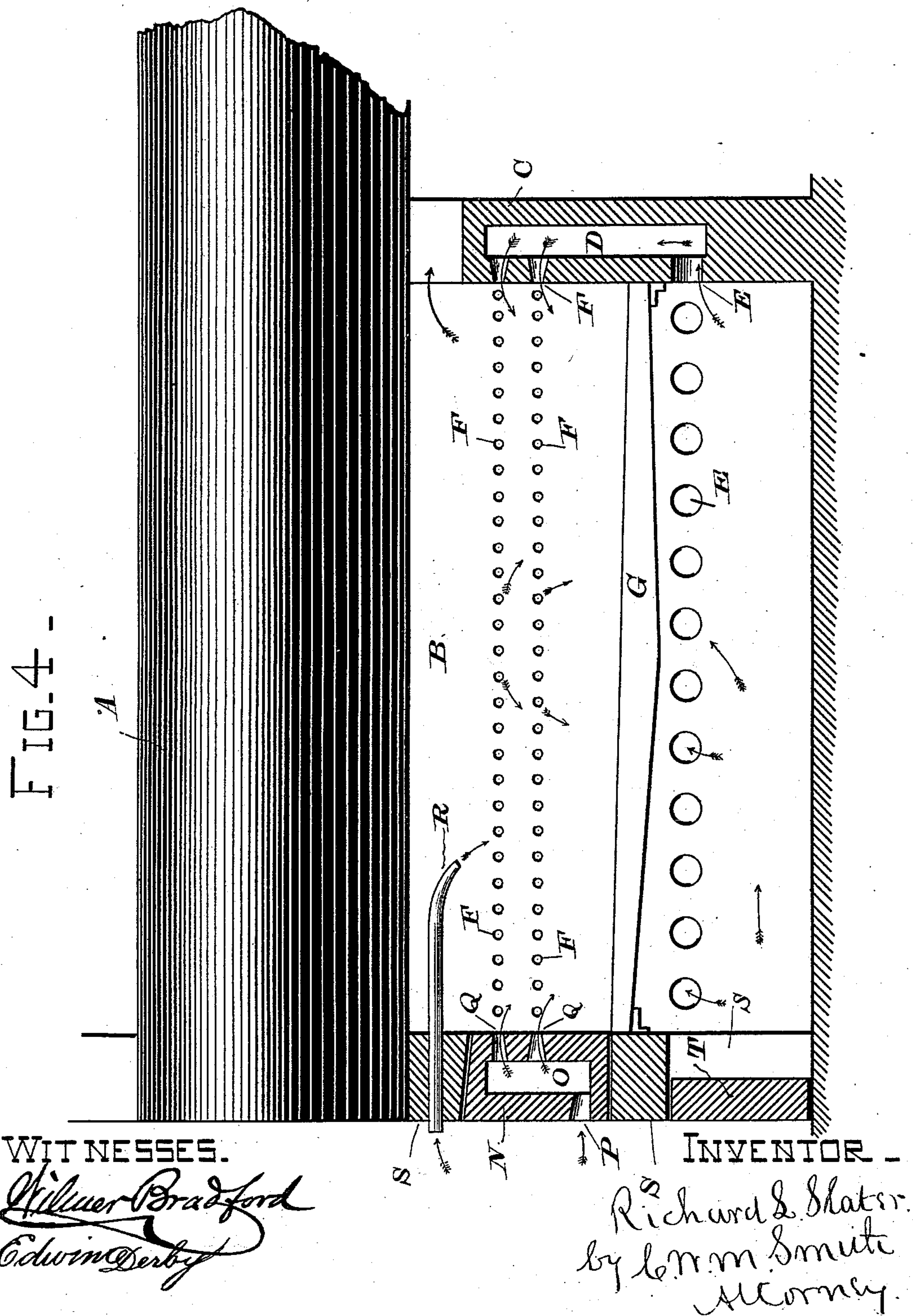
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UNITED STATES PATENT OFFICE.

RICHARD L. SLATER, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO
PERKINS H. BAGLEY, OF SAME PLACE.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 277,361, dated May 8, 1883.

Application filed January 4, 1883. (No model.)

To all whom it may concern:

Be it known that I, RICHARD L. SLATER, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Steam-Boiler Furnaces, of which the following is a specification.

My invention relates to improvements in the construction of furnaces adapted for the heating of steam-boilers placed above the flame and combustion-chamber; and the objects of my invention are, first, to provide a furnace with means whereby the draft and degree of heat may be greatly increased and the combustion of the gases and vapors arising from the burning fuel may be accomplished; second, to provide a means whereby thin streams of vital heated air may be discharged into the combustion-chamber above the bed of burning fuel, and also to certain details of construction, which will be more fully described hereinafter. I attain these objects by the means illustrated in the accompanying drawings, in which—

Figure 1 is a cross-sectional view of a furnace embodying my improvements. Fig. 2 is a perspective view of one of the grooved bricks. Fig. 3 represents a modified form of brick. Fig. 4 is a longitudinal section through the fire-box, taken on line X X of Fig. 1.

Similar letters are used to designate like parts throughout the several views.

A A represent the steam-boilers of a double furnace; B B, the side walls, and C the bridge-wall, of the combustion-chamber. The front, bridge, and side walls are made hollow, or with a chamber, D, extending throughout their entire length and from below the line of grate-bars to any convenient height above them. A series of perforations or holes, E, are made in the fire-face of the walls, and communicate with the chamber D near the lower edge or base thereof. Near the upper end of the chamber I make one or more series of perforations, F, which communicate with the fire-box at any convenient height above the bed of coal upon the grate-bars G. At or near the center of the combustion-chamber, and extending from the front to the bridge-wall, I erect a partition-wall, H, which extends up to

or above the top of the bridge-wall, and thus divides the fire-box into two compartments, and, in furnaces where double boilers are used, causes an equal amount of heat and flame to pass under each boiler. The wall H is made hollow, as shown in Fig. 1, and its chamber I is provided with apertures J and K at the top and bottom, which communicate with the combustion-chamber above and the ash-pit below the grate-bars. Near the center of each subdivision of the combustion-chamber I lay upon and bolt to the grate-bars a strip of casting, L, which extends throughout the length of the fire-box, and is sufficiently wide to lap the top faces of two adjacent grate-bars. This casting carries a series of vertical pipes, M, which extend a short distance within the ash-pit, and are sufficiently high to clear the bed of burning fuel. The door N of the fire-box is also made hollow, or with a chamber, O, having at its base an opening, P, communicating with the outer air, and at the top the openings Q, communicating with the interior of the fire-box. A series of air-pipes, R, are passed through the front wall, S, and extend with a slightly-downward curve into the fire-box, as shown in Fig. 4.

The door T of the ash-pit is to be provided with the usual ventilator, and there may be other ventilators let into the front wall, if found desirable. The air which enters the ash-pit will be drawn up through and between the grate-bars, and will keep the lower portion of the fuel in a steady blaze. A portion will also enter the pipe M, and will be discharged into the fire-box above. Another portion will enter the hollow walls, and, after being heated by contact therewith, will be discharged into the combustion-chamber above the bed of fuel, and by mingling with the gases, vapors, and unburned products of combustion will thereby supply them with an increased supply of oxygen, and thus insure their almost total consumption and greatly increase the effectiveness of the fuel by supplying a larger percentage of live air to the burning coal than has heretofore been done without the aid of a fan-blower. The openings in the doors of the fire-box and the pipes R in the front wall supply air directly from the outside without be-

ing first heated in the ash-pit, and their main office is simply to augment the supply of vital air.

5 The bricks Y, which form the courses where the inner air-openings appear in the furnace walls or hinges, are made in the form shown—that is to say, upon one side I make three semicircular recesses, Z; but the outer recesses may be made on the edge of the brick, 10 and only one-quarter round, as shown at Fig. 3. These recesses are given a taper from the outside to the inside end, so as to concentrate the currents of air flowing through them. The brick are laid in a course with the recessed 15 face uppermost. The next course is then laid on with the recessed face downward, and thus by the two halves coming opposite each other a tubular aperture is formed.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, 20 is—

In a steam-boiler furnace, the combination of the boilers A A, side walls, B B, and bridge-wall C, formed with an air-chamber, D, extending from the ash-pit to the fire-chamber, and 25 provided with openings E F, the hollow partition-wall H, provided with openings J K, the grate-bars G L, air-pipes M R, and the hollow furnace-door N, having openings P Q, as and for the purposes described. 30

In testimony that I claim the foregoing I have hereunto set my hand and seal.

RICHARD L. SLATER. [L. S.]

Witnesses:

WILMER BRADFORD,
CHAS. E. KELLY.