

(No Model.)

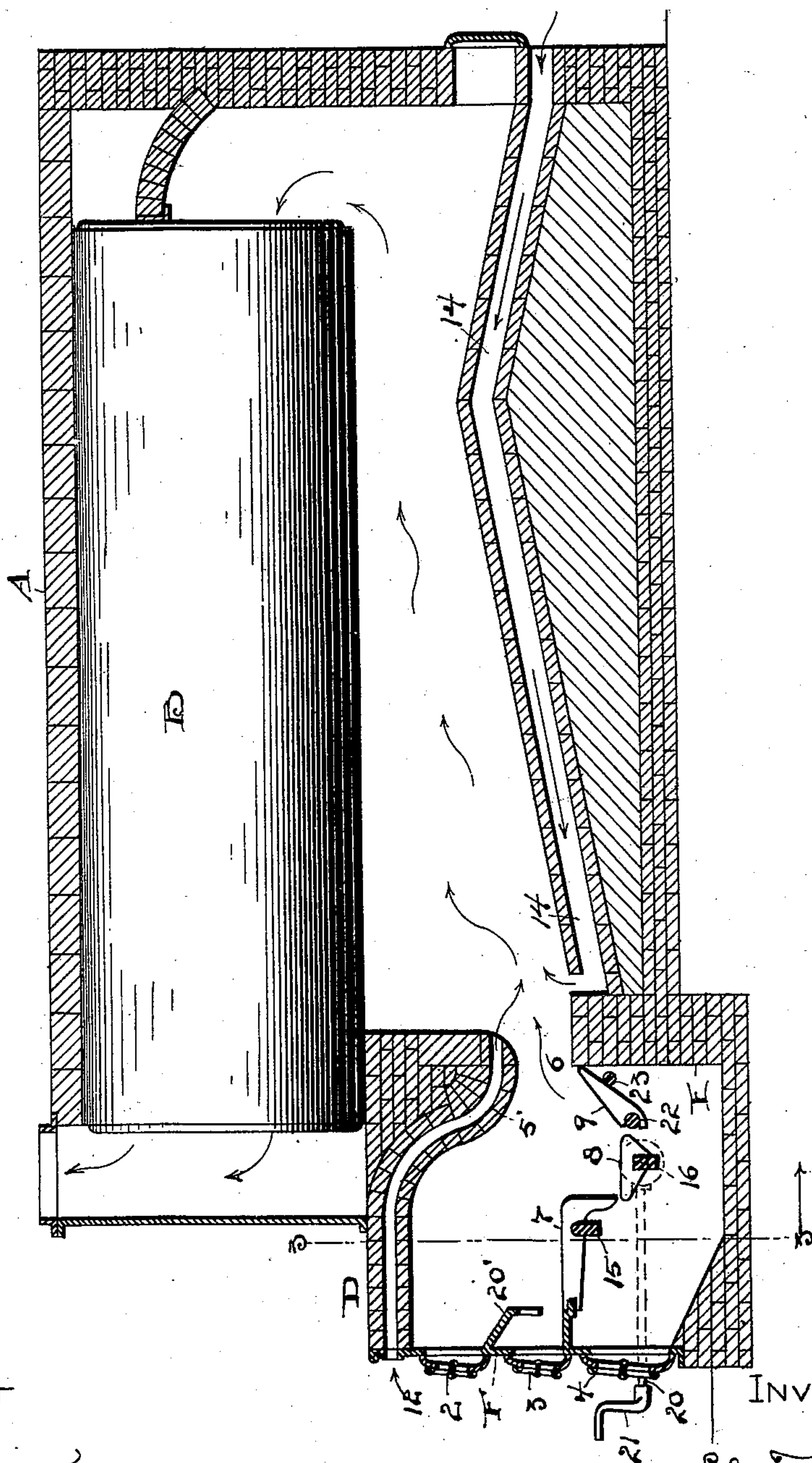
2 Sheets—Sheet 1.

L. F. SHINNERS.
GAS PRODUCING FURNACE.

No. 548,014.

Patented Oct. 15, 1895.

Fig. 1.



ATTEST

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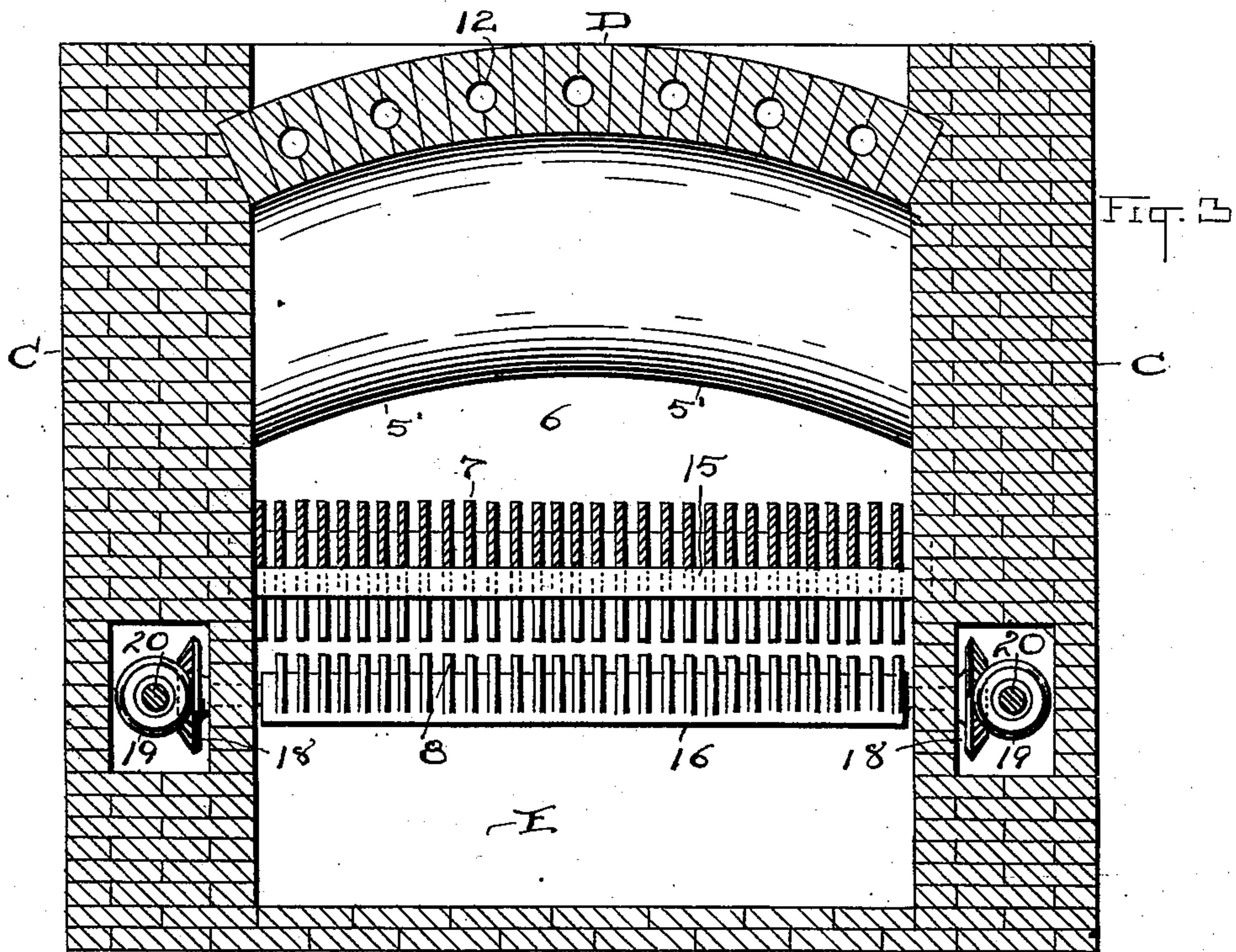
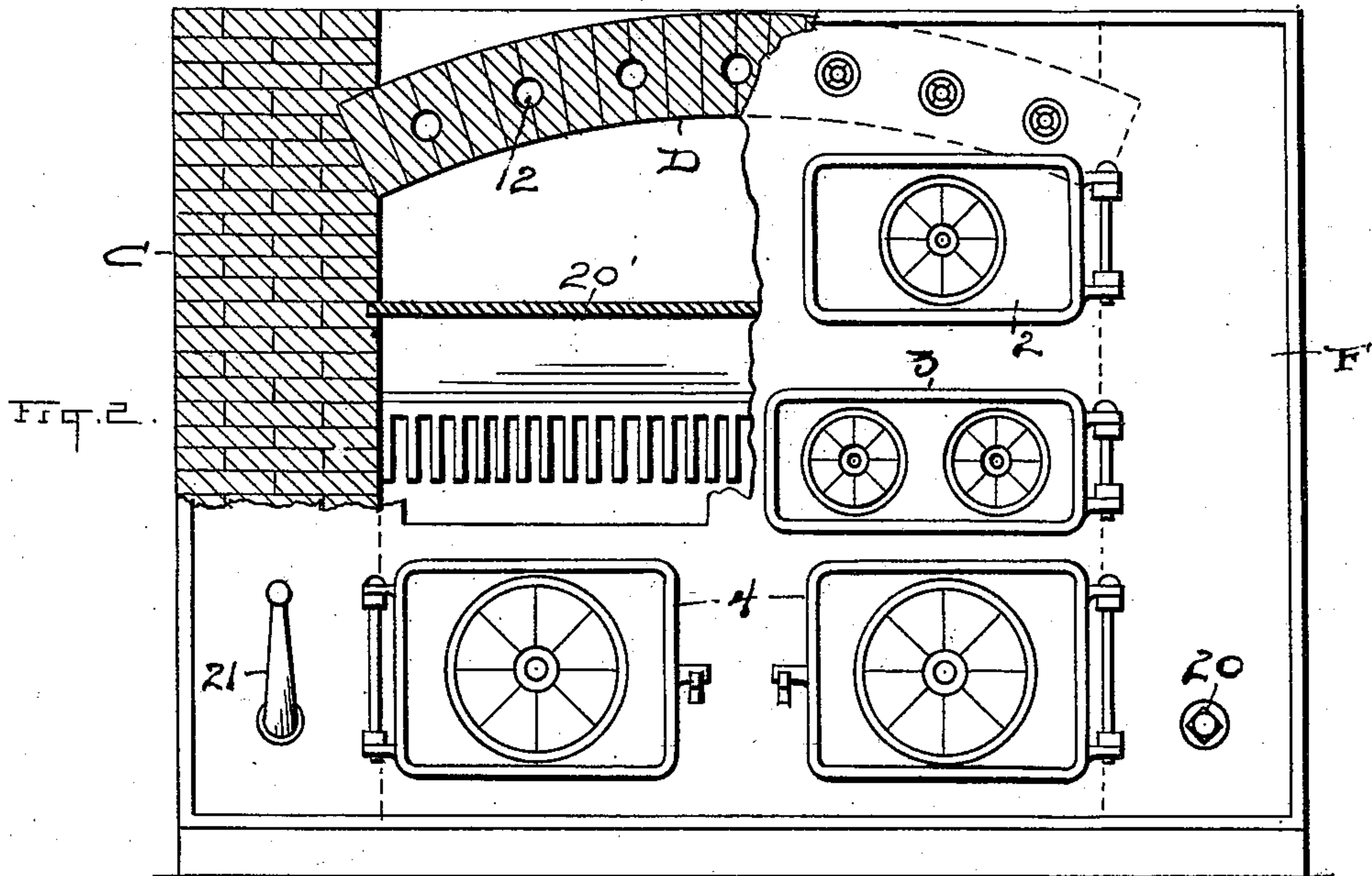
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UNITED STATES PATENT OFFICE.

LUKE F. SHINNERS, OF CLEVELAND, OHIO, ASSIGNOR TO THE AMERICAN SMOKELESS FURNACE COMPANY, OF SAME PLACE.

GAS-PRODUCING FURNACE.

SPECIFICATION forming part of Letters Patent No. 548,014, dated October 15, 1895.

Application filed May 11, 1895. Serial No. 548,944. (No model.)

To all whom it may concern:

Be it known that I, LUKE F. SHINNERS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in a Combined Gas-Producer and Steam-Boiler Furnace; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention has reference to a combined gas-producer and steam-boiler furnace and is an improvement on the invention embodied in my Patent No. 540,277.

The object of the invention is to improve combustion and thereby prevent smoke, and at the same time economize fuel.

Referring to the drawings, Figure 1 is a longitudinal sectional elevation of my improved furnace and producer. Fig. 2 is a front elevation thereof, partly broken away at the left and top; and Fig. 3 is a cross-section on a line corresponding to 3 3, Fig. 1.

A represents the wall of the boiler-setting and B the boiler. The gas-producer at the front of the boiler-wall is in a sense a distinct and separate part, and yet an essential part of the furnace, and working with the boiler-chamber immediately at the rear thereof, in which combustion may be said to take place. As here shown, the producer has side walls C, Fig. 3, dome or top D, a bridge-wall E at the rear thereof, built up from below, and a front F, having three several different sets of openings or doors 2, 3, and 4. The doors or openings 2 are for the introduction of fuel, the doors 3 for entrance to stoke the coal over the adjacent grate-bars, and the doors 4 for entrance to the ash-pit and to the other grate-bars, which are hereinafter described. It will be noticed that the arch or top wall D of the gas-producer is deepened and deflected downward at the rear and that it is fashioned carefully on curved lines over its entire exposed surface between side walls C. This enlargement also takes on the arch form, as seen at 5', Fig. 3. Experience has shown that this point 5' is an intensely hot point in the furnace and that it is difficult to get any material that will endure for any length of time

the extreme heat which occurs here, especially if unduly exposed, as is the case where a wall or arch is made with sharp angles or exposed corners of fire-brick. I have therefore overcome this difficulty by building a heavy wall and arch at the discharge of the producer into the boiler-furnace, which has no abrupt exposure whatever, but is protected at all points by a uniformly-curved surface. It is of course understood that the producer is practically filled with coal at all times and that the coal-line approaches to the throat or discharge 6, but stops there. The coking of the coal and the liberation of its gases occur mostly about the grates, although there will be roasting of coal higher up, but the flame begins in the throat 6 at the surface of the coal and runs back thence beneath the boiler. Hence it will be seen that the curved surface 5' over the throat 6 is an excessively hot place and requires all the protection possible to prevent its burning out. The arch D is further provided with a series of air-passages 12, which discharge into the furnace at the throat 6 to mingle with the gas at that point, and there is a further supply of air through the one or more air-passages 14 at the bottom of the furnace beneath the boiler, having their entrance at the rear thereof and discharge also at said throat. By this arrangement the air is superheated in both channels 12 and 14 and abundant oxygen is supplied at the point where it is needed to promote perfect combustion and prevent escape of combustible gases from lack of air. Three several grates 7, 8, and 9 are used. The grates 7 are fixed rigidly in their place and extend rearward about half the depth of the furnace, and at their rear have downward projections 15, corresponding to the depth at that point at which are located the grates 8. These grate-bars 8 are rigidly fixed to the cross-bar 16, which has a beveled gear 18 attached thereto at each end and located in a pocket in the wall of the furnace, where it is protected from the direct heat of the furnace. A beveled gear 19 meshes with gear 18 and is supported upon a shaft 20, which runs to the front of the furnace and is exposed there to temporarily affix a crank-handle 21 to turn said shaft and thus rotate the grates 8 more or less, as may be

needed for dumping or the like. Then at the rear of the grates 8 are the inclined grates 9, which are set rigidly upon the two rods or bars 22 and 23 or their equivalent means of support.

It will be noticed by the foregoing arrangement of grates that a pocket or basket, so to speak, is formed between the grates 7 and 9 with the bottom at 8, in which the coal is thoroughly exposed to air passing in through the ash-pit. Hence the quantity of coal exposed is always large and there is no difficulty in getting a very large volume of gas for large-sized boilers when needed. This construction and arrangement of grates, furthermore, makes it very easy and convenient for keeping the grates clean, because the grates 7 are accessible through the doors 3 with a poker, and any ashes or like accumulation thereon are either sifted through into the ash-pit or pushed back over the rocking bars, where they are dumped. The inclined bars 9 are self-cleansing, owing to their position and relation to the rocking bars 8, and they are so positioned that they admit air directly into the throat of the furnace, where it is most needed. An inclined shield or guard 20' extends across the front and inside of the producer over the front ends of the grate-bars 7 and serves to keep the space clear within and about the doors 3. It will be noticed that the discharge 6 is about midway the elevation of the producer and the rear wall of the boiler-set-

ting. The curved line 5', which extends downward and rearward to the discharge, begins about the middle of the dome or top of the producer.

What I claim is—

1. In a combined gas producer and boiler furnace, the gas producer having a dome shaped vault constructed at its rear with an arch 5' rounded over its surface as shown and on a plane near the plane of the front grate bars, in combination with said front grate bars 7, the rocking grate 8, and the fixed inclined rear grate bars 9, said bars arranged substantially as shown, whereby a combustion point is established substantially under the arch 5', substantially as set forth.

2. The producer described having a rearward and downwardly curved dome terminating in an arch, 5' over the outlet and a bridge wall between said arch, 5', the front horizontal grate bars, 7, having downward extensions, 15, the rotating bars, 8, on a lower plane than bars, 7, and at the ends thereof, and the upward and rearward inclined bars, 9, extending to said bridge wall, the rotating bars, 8, spanning the space between bars, 7, and 9, substantially as set forth.

Witness my hand to the foregoing specification this 29th day of March, 1895.

LUKE F. SHINNERS.

Witnesses:

H. T. FISHER,
N. M. THOMAS.