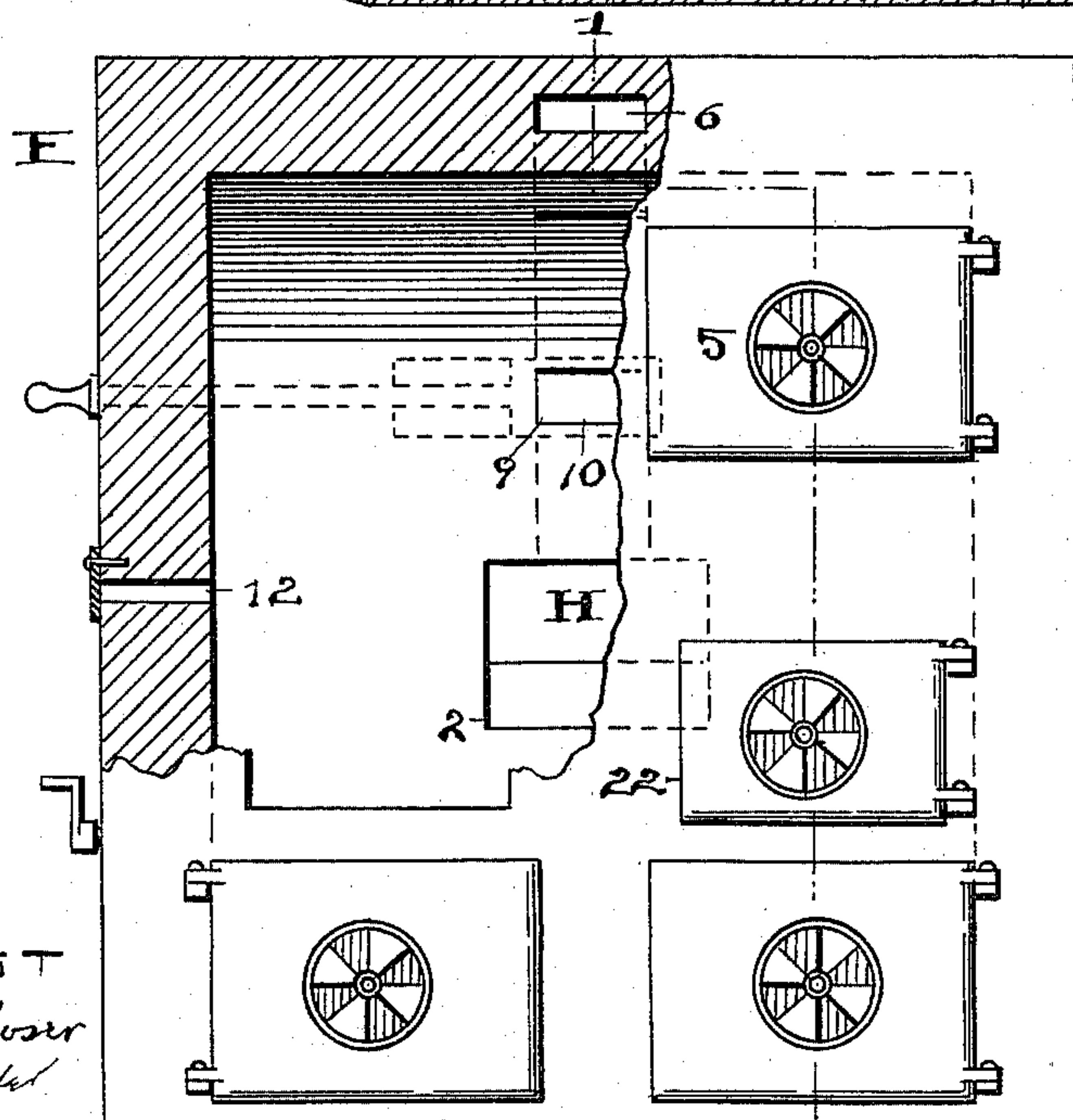
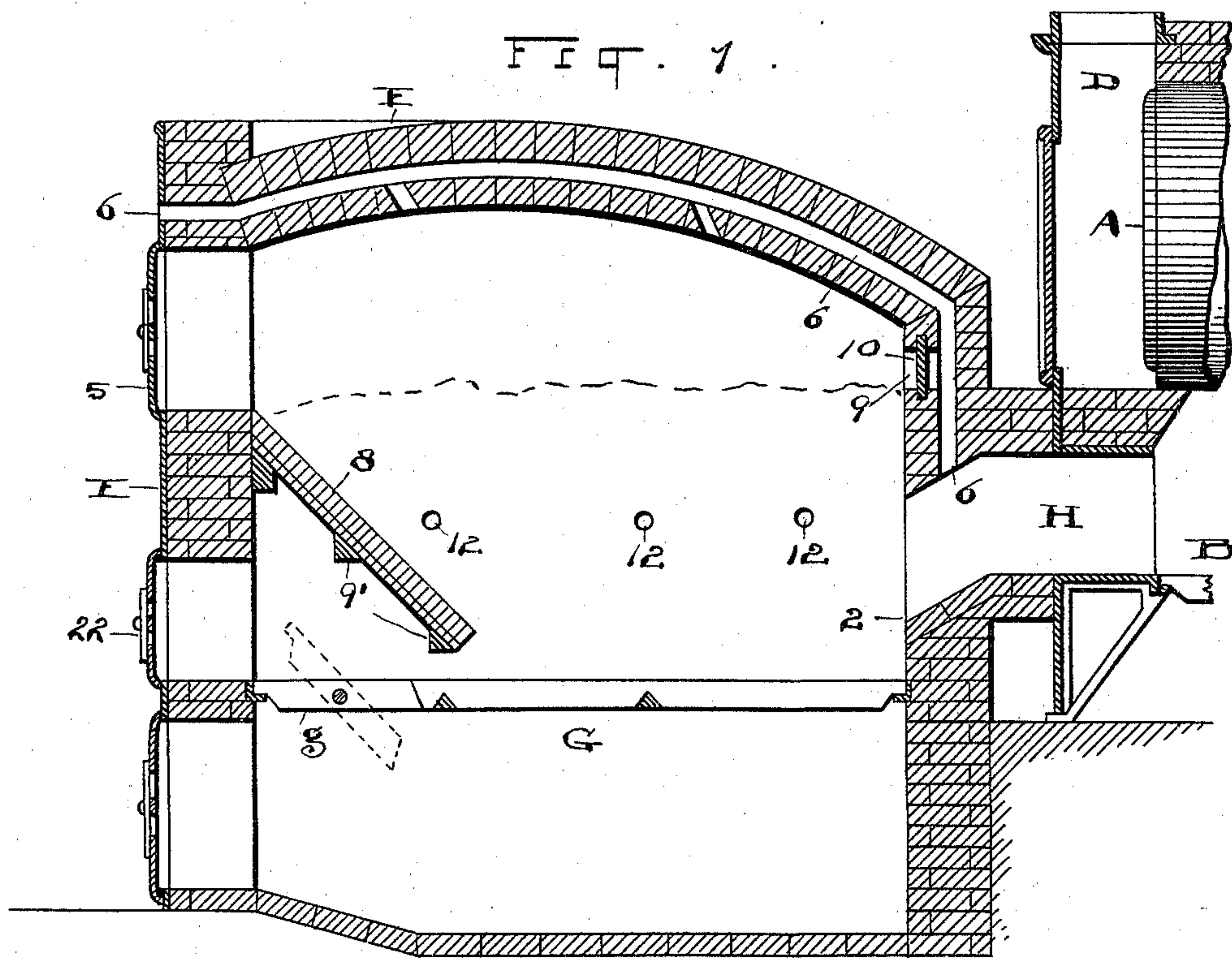


(No Model.)

L. F. SHINNER.
GAS PRODUCER.

No. 540,277.

Patented June 4, 1895.



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

GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 540,277, dated June 4, 1895.

Application filed November 12, 1894. Serial No. 528,480. (No model.)

To all whom it may concern:

Be it known that I, LUKE F. SHINNER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements 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 relates to a combined gas producer and steam boiler furnace, and the objects of the invention are threefold, namely, to economize fuel, improve combustion and prevent smoke. All these objects are attained in a highly satisfactory degree in and through my invention. Indeed, combustion is so materially improved that it may be said to be practically perfect, and this is evidenced in the entire absence of smoke, at least so far as it can be detected by the eye, and hence, also, there is a corresponding economy in the quantity of fuel consumed or required to produce a given amount of heat. In practical results, therefore, I have a perfectly smokeless furnace, because no smoke is produced, and I am enabled to extract and apply practically all the heat units that are embodied in a given quantity of fuel.

My invention, therefore, consists in the construction of a gas producer and furnace, and in the combination of parts substantially as shown and described and particularly pointed out in the claim.

Figure 1 is a vertical sectional elevation of producer and furnace on a line corresponding substantially to 1 1, Fig. 2; and Fig. 2 is a front elevation of the furnace shown in Fig. 1, with a part of the front broken away at the left upper corner.

Referring now especially to Figs. 1 and 2, we have sections of a common horizontal boiler A, the usual grate bars or fire grates B beneath the same and the smoke flue D. All these parts may be considered as of any common and well-known construction, and it is immaterial whether the boiler be horizontal or upright. The grate bars B may, indeed, be dispensed with, because with my improved attachment of gas producer built onto the front of the furnace the grate bars B are not

needed. They serve, however, to show that the producer E is adapted to work with an old fashioned steam boiler furnace, as is done in this instance. If the producer were erected at the time the boiler is set, the grate bars B would be omitted and the construction of the fire space beneath the boiler correspondingly modified.

The producer E, is a separate and distinct organization or member which occupies a space wholly in front of and apart from the boiler and the inclosing walls thereof and supplemental to the usual boiler and furnace construction. At least two important objects not otherwise attainable are the result of this construction. Thus, first of all, in order that the fuel may be handled in a sufficient quantity to make this process or method a success, I necessarily require a coal chamber or space within the walls of the producer which will receive, say, from one half a ton of coal to three or four tons, the size of chamber depending on the size of boiler and quantity of steam required. This enables me to hold the great body of the coal in position to be brought gradually under the influence of the heat and to be thoroughly coked or roasted before it comes to the actual burning point in the furnace. In this process of coking or roasting the inflammable gases and all the elements which in the old fashioned furnace produce smoke, are emitted or given off and pass to the point of combustion and are consumed. Then after coking has been accomplished and all the really volatile constituents of the coal have been gradually drawn off and burned the coke itself works down to the fire area or line and is consumed. This fire line or space is about the grate bars G and thence up to the throat —2— of the flue or passage H, which connects the producer with the flame and heat space beneath or about the boiler. The actual flame occurs really about the throat —2— of the passage or flue H and thence through said flue into the flame space under the boiler.

Now, the use of a capacious coal chamber in the producer will be obvious from the foregoing description. First of all it is seen that no cold or fresh fuel whatever can come directly upon the fire. All fuel is fed to the chamber through the door or doors —5— at

the top of the furnace where the fire never reaches. Then as the lower strata of fuel is burned away the coal above settles down and takes its place; but in doing this it not only
 5 is heated to a combustible degree but it is effectually roasted a sufficient length of time to draw from it all its gases and thus leave it, when it reaches the burning point, not only in a condition to promptly ignite but with its
 10 smoke producing properties eliminated. The gases are compelled to pass off through the flue H and are there met with a supply of oxygen or air and flame which insures their instant and complete combustion. This pas-
 15 sage way or flue where the gases ignite is of such size and length that ignition occurs before they strike the boiler. Otherwise there might be such a lowering of temperature at the surface of the boiler as would retard or
 20 prevent perfect combustion and that would result, possibly, in more or less visible smoke in the chimney. The two objects, therefore, of coking the coal in bulk and consuming the gases before they reach the boiler or boiler
 25 chamber are attained by this construction. These are highly important advantages because in them I have practically perfect combustion and hence absence of smoke, and, incidentally, a very great saving of fuel as com-
 30 pared with the old fashioned furnace in which the raw coal is thrown immediately upon the fire bed.

Referring now more particularly to the construction of the producer, it will be seen that
 35 I have formed it with an air passage —6— running from the front through the top wall or dome thereof to the mouth of flame flue H so as to afford all the necessary supply of fresh air at this point to insure the consump-
 40 tion of the evolved gases. This air passage —6— may come directly through the top wall as here shown, or it may take a different course and be so located as to heat or super-heat the air before it discharges. As it is the
 45 air will necessarily be more or less heated when discharged. I might also employ other air passages if found necessary and in some instances these passages might be connected with a blower.

To prevent escape of gas from over the coal bed when the doors —5— are opened and coal-
 50 ing occurs, I provide a rear passage —9— which discharges into the flue —6—, and this passage is especially for coaling by withdraw-
 55 ing the slide door —10—. Indeed, this passage, or a similar one, to withdraw the gases over the coal may at all times be more or less open as may be required. The doors —5— are constructed to provide air inlets to the
 60 top of the coal chamber and other air inlets to this space may be provided if found necessary, or all said inlets may be closed and air be supplied through other channels. All

details of this kind may be varied without departing from the spirit of the invention. I
 65 might also provide for the introduction or injection of raw or superheated steam at available points, if preferred.

Poke holes —12— are provided through the sides of the furnace to enter the body of the
 70 fuel and break it up to prevent undue baking or packing at that point.

The walls of the producer may be built according to any approved plan or furnace construction, and I do not herein lay claim to
 75 any special plan or form. In any event the construction should be such as to prevent radiation and loss of heat as much as possible. There is, however, an undue tendency in the coal to coke and throw off gases over the
 80 front of the grate bars G, and when the furnace is built relatively as deep from front to rear as here shown, the gases arising at the front of the furnace are apt to crowd outside
 85 and be lost as well as make a disagreeable odor in the boiler room. To obviate this tendency and promote draft at the front toward the combustion flue H, I construct a suitable
 90 bridge wall —8— of fire brick or the like from side to side at an inclination of about forty-five degrees and extending inward and downward from about the feed doors —5—
 95 to near the grate bars G. This arch or shed —8— is supported at its back by suitable cross bars —9—. This incline forms an air chamber at its rear exposed to air inlet open-
 ings through the doors —22—, and crowds the infed coal toward the draft H in such way that the gases arising therefrom come within
 100 range of the very heavy suction of flue H and thus are drawn off and consumed according to the spirit and purpose of my invention. At the front of the grate bars G is a rocking
 105 grate —g—, which enables any clinkers that may accumulate on the grate G to be raked forward and dumped into the ash-pit.

Having thus described my invention, what I claim is—

A gas producer for furnaces having a suitable grate and ash-pit and a discharge H for
 110 the products of combustion at the rear thereof starting at a point near the grate bars, the walls of the producer extending above said discharge all around and having a substantially dome-shaped top, a fresh air passage
 115 —6— through said dome from the front and discharging into discharge H, and the gas inlet opening —10— from the top of the producer into said passage, substantially as set forth.

Witness my hand to the foregoing specification.

LUKE F. SHINNER.

Witnesses:

H. T. FISHER,

GEORGIG SCHAEFFER.