

E. G. HATCH.
SMOKE CONSUMING SYSTEM.
APPLICATION FILED MAY 18, 1911.

1,064,478.

Patented June 10, 1913.

2 SHEETS—SHEET 1.

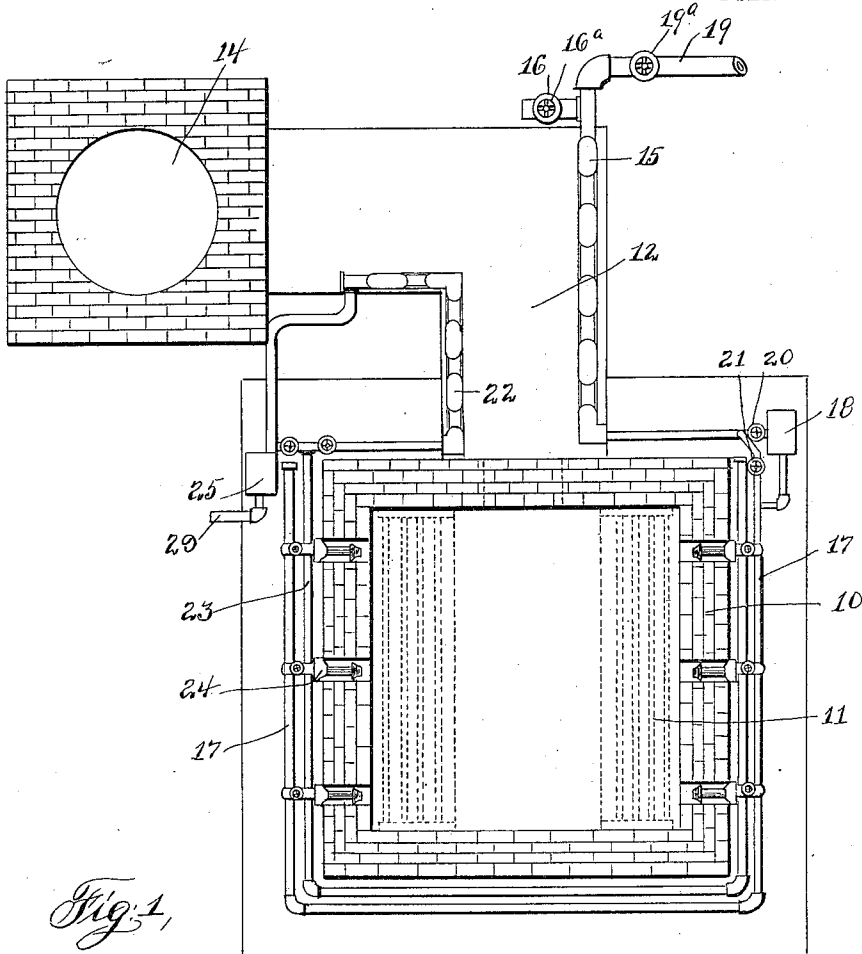


Fig. 1.

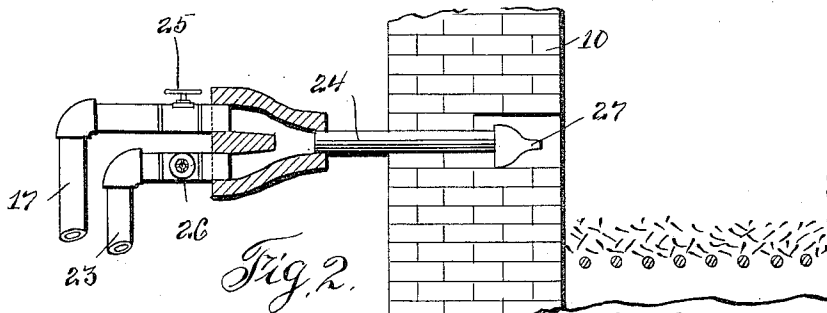


Fig. 2.

Witnesses:
Arthur D. Daniel,
Thomas F. Seelye.

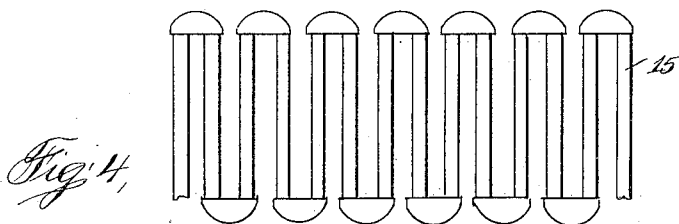
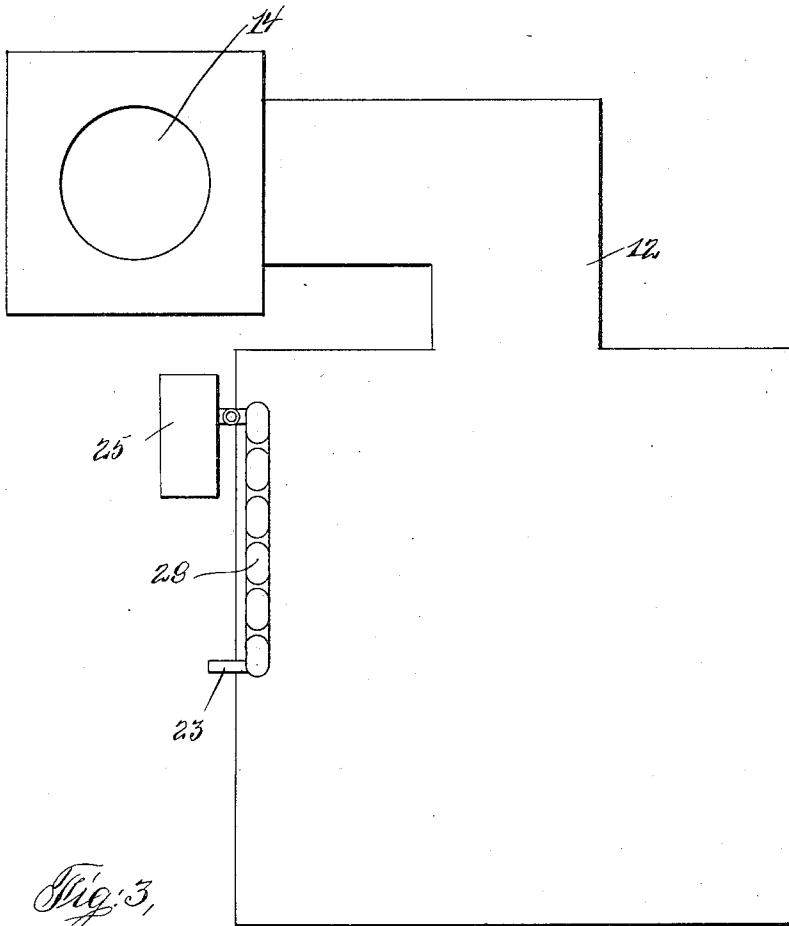
Edwin G. Hatch, Inventor,
By his Attorney,
W. B. Hutchinson.

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2 SHEETS—SHEET 2.



Witnesses:
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Thomas P. Seelye.

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UNITED STATES PATENT OFFICE.

EDWIN G. HATCH, OF NEW YORK, N. Y.

SMOKE-CONSUMING SYSTEM.

1,064,478.

Specification of Letters Patent.

Patented June 10, 1913.

Application filed May 18, 1911. Serial No. 628,114.

To all whom it may concern:

Be it known that I, EDWIN G. HATCH, of the city of New York, county of Kings, and State of New York, have invented a new and useful Improvement in Smoke-Consuming Systems, of which the following is a full, clear, and exact description.

My invention relates to improvements in systems for smoke consuming, by which the unconsumed products of combustion in a boiler or furnace are consumed before they reach the stack or chimney, and by which the heat from the combustion of the soot, gases, or other unconsumed products is utilized in the furnace, and the objectionable soot and smoke issuing from the chimney is avoided.

The object of my invention is to supply a series of jets of flame solely above the fuel bed which shall come in contact with the products of combustion which have not been consumed in the furnace grate, together with an accelerated draft of heated air, in such a manner that the unconsumed carbon or gas shall be ignited and consumed before it reaches the stack or chimney. To accomplish this I provide series of burners along both sides of the combustion chamber from end to end which project through the walls of the furnace, together with means for separately delivering to the burners heated air and heated gas or combustible vapor which is mixed within the burners, together with means for heating the air and gas without obstructing the draft by the heat of the furnace which would ordinarily be wasted and lost out of the stack, and also for providing means whereby this air and gas may be, if desired, delivered to the burners under a regulable pressure.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a top sectional view showing my invention as applied to a furnace or boiler. Fig. 2 is a side view partly in section of the burner. Fig. 3 is a top view of a detail of the device in a modified form, and Fig. 4 is a detail in elevation of the heating pipes.

In the drawings I have indicated a boiler furnace having walls 10 and tubes 11, and a flue 12, leading to the stack or chimney 14. The boiler shown may be the water tube

or fire tube type, but my invention is not limited to use with these types of boiler furnace, but may apply equally well to other forms of furnaces used for entirely different purposes than steam generation, and also while I have shown my invention used in connection with only one boiler or furnace, it is understood that it may be used equally well in connection with a battery of boiler furnaces, or other furnaces, without in any way changing the principles involved in my invention.

In order that the air which is to be supplied to the burners may be heated before its mixture with the combustible gas or vapor is accomplished at the mixing chambers of the burners, I provide means for heating this air by causing it to pass through a series of pipes 15, arranged within and flat against one side of the waste flue without obstructing the draft. In the drawings, Fig. 4, these pipes are shown in a vertical position, but they may be placed horizontally or coiled, as may be found desirable. The tubes 15 are fed by an inlet pipe 16, one end of which is open to the atmosphere and which contains the valve 16^a.

Connecting with the heating pipes 15 I provide the main pipes 17 which encompass the combustion chamber and are preferably supported on the outside of the furnace wall, together with a fan or blower 18, or some other suitable apparatus which shall be capable of sucking air into the system at the pipe 16, and supplying an accelerated draft of air at pressure into the air main or pipe 17. This fan or blower, or other suitable apparatus before mentioned, may be operated in any convenient way, although I prefer electric control as best adapted to easy and efficient regulation of the pressure of the air supply. In case other means is desired for supplying the air under pressure I provide an inlet pipe 19 controlled by the valve 19^a. When this is used the valve 16^a will be closed, the valve 21 opened, and the valve 20 controlling the flow of air to the fan 18 will be closed. When a supply of compressed air is available from the pipe 19, the fan or blower 18 and valve 20 are not necessary to the satisfactory working of the system, but may be present if desired for use in case of the possible failing of the supply of air from the pipe 19. In a similar manner I provide a series of pipes 22 which are also located in the flue of the fur-

nace flat against one side in such a way as not to interfere with the furnace draft, and so that the heat of the furnace will raise the temperature of the combustible gases for supply to the burners, somewhere near their combustion point. These pipes 22 connect with main pipes 23 which encompass the combustion chamber and are supported on the outside of the furnace wall preferably, and deliver into the burners 24, located along both sides of the combustion chamber and solely above the fuel bed.

In order that the supply of heated gas may be delivered under a regulable pressure, I provide a fan or blower 25 or some other apparatus capable of bringing the combustion gas from its source of supply through the pipe 29 and forcing it through the heating pipes 22 as desired. This fan or blower 25 may be operated in any desired way. The gas and air pipes 17 and 23 are adapted to deliver into the burners 24 as shown in Fig. 2, and the amount of air and gas may be further regulated by the valves 25 and 26 in the branch connections from the main pipes 17 and 23. If desired an electric lighting device may be used in connection with the mouth of the burner 27. This is not indicated in the drawings as I do not consider it as an essential element of my invention.

In case it is desired to use an oil or other liquid fuel, and use it instead of a combustible gas, I have indicated in Fig. 3 a series of pipes 28 located within the walls of the furnace. By this means an oil vapor delivered in regulable quantities from the supply tank or vaporizer 30 may be heated and used instead of the combustible gas as previously described.

My invention therefore provides means for projecting a flame into the interior of a furnace at as many points as may be thought necessary solely above the fuel bed, together with an excess of heated air which will be ignited with the unconsumed products of combustion of the furnace by the flame, and in this way burn up in the furnace all or

most of the unconsumed gas and soot, and also means for supplying air and gas at a relatively high temperature so that the heat generated by the burning of the combustible gas or vapor supplied from the burners may be most efficient in causing the burning of the unconsumed matter, and further make possible the saving of heat to do useful work.

I claim:—

The combination of a furnace of the type burning a primary fuel and having a fuel bed, a combustion chamber and a waste flue leading to the stack or chimney, and apparatus for economizing heat and consuming smoke applied to said furnace and comprising series of air pipes and series of fuel pipes arranged within and against the opposite sides respectively of the waste flue without obstructing the draft, means for supplying a regulable accelerated draft of air under pressure to said series of air pipes, means for supplying a regulable quantity of gaseous or vaporous fuel under pressure to said series of fuel pipes, burners located along both sides of the combustion chamber from end to end and solely above the fuel bed, separate and independent main conduits outside of and encompassing the combustion chamber and leading from the series of air pipes and the series of fuel pipes respectively to points in proximity to the burners, a plurality of branch connections from said independent main conduits to the burners, for separately supplying the draft of air and the auxiliary gaseous or vaporous fuel to the burners and mixing the air and fuel at the burners, valves for controlling said independent main conduits and valves on the branch connections for individually controlling the said plurality of branch connections from the said main conduits to the burners, independently of the main conduits.

EDWIN G. HATCH.

Witnesses:

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