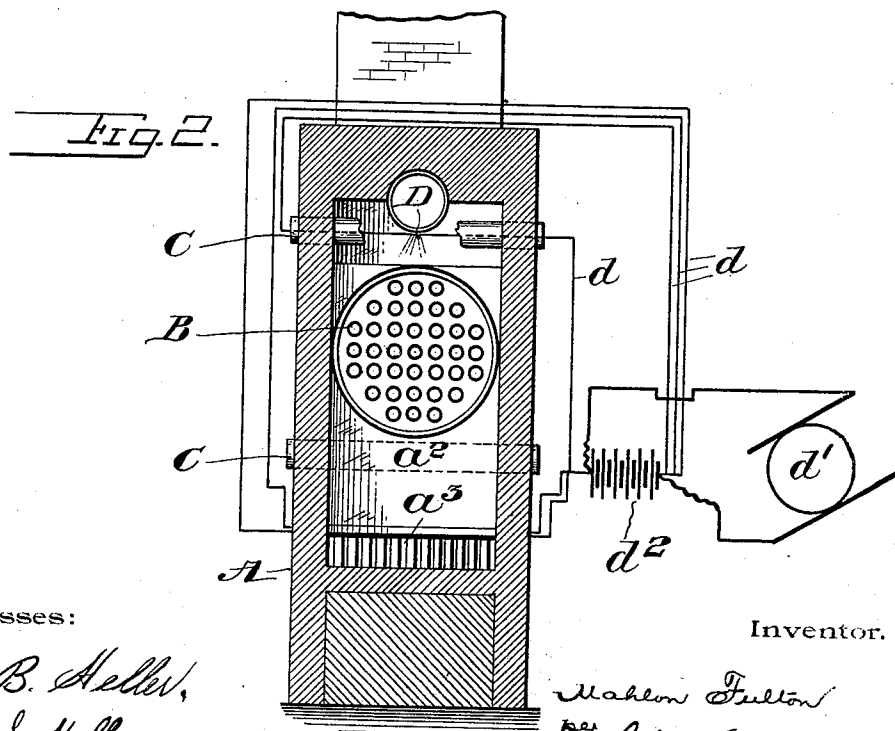
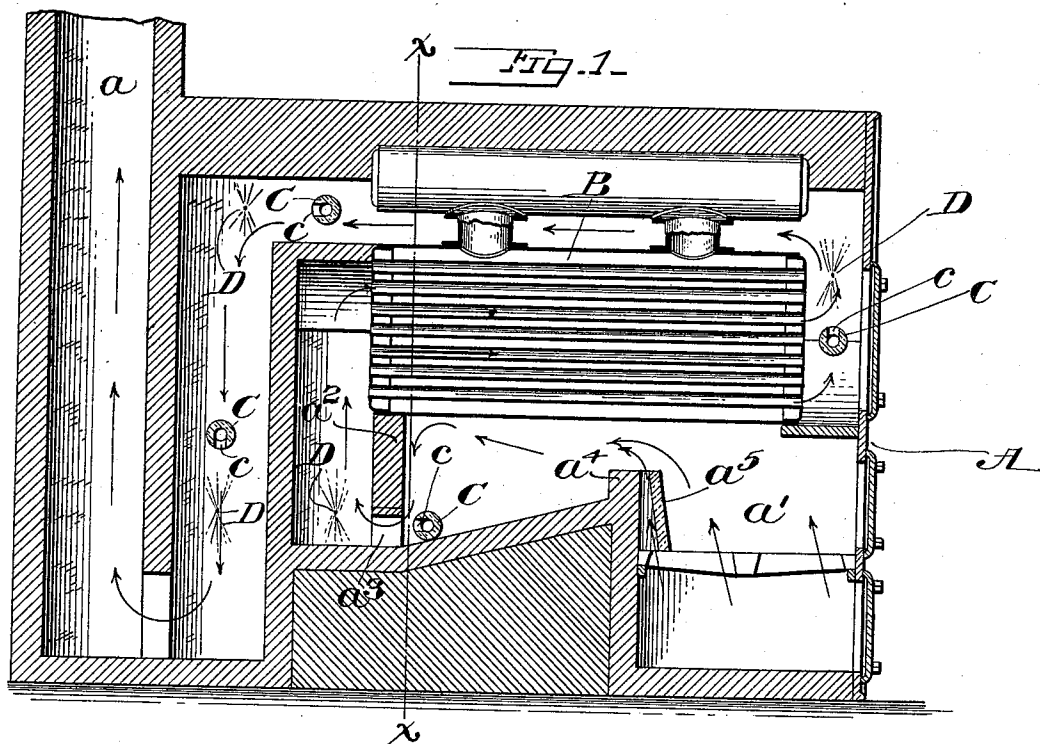


(No Model.)

M. FULTON.
SMOKE CONSUMING FURNACE.

No. 519,530.

Patented May 8, 1894.



Witnesses:

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UNITED STATES PATENT OFFICE.

MAHLON FULTON, OF PHILADELPHIA, PENNSYLVANIA.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 519,530, dated May 8, 1894.

Application filed December 9, 1893. Serial No. 493,275. (No model.)

To all whom it may concern:

Be it known that I, MAHLON FULTON, a citizen of the United States, residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Methods of and Means for Consuming Waste Products of Combustion, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to a method of and means for consuming the escaping gaseous products of combustion in furnaces.

In carrying out my invention I introduce to the gaseous products, preparatory to their escape to the open air, a volume of air, which, commingling with said products, and blending its oxygen therewith, renders the same highly combustible. I also dispose in the path of the gases thus prepared an electric sparking device, by which said gases are ignited. I preferably arrange a series of air supplying and sparking devices alternately, at regular intervals apart, whereby the gases are acted upon at successive stages throughout their course, and effectually consumed before their final escape to the atmosphere.

In the preferred embodiment of my invention, the electric energy by which the spark is effected, is transmitted from a suitable storage battery which is charged from a dynamo, as will hereinafter appear.

Referring to the annexed drawings, Figure 1 is a longitudinal vertical section of a furnace structure to which my invention is applied. Fig. 2 is a transverse vertical section, as on the line $x-x$ of Fig. 1.

Although, in the present instance, I have shown my invention as applied to the furnace structure A of the horizontal boiler B, it will be understood that the improvement is applicable to any furnace or combustion apparatus in which carbonaceous gases are evolved from the fuel consumed. Various attempts have been made to reduce these gases, and to prevent their escape to the atmosphere. The method most commonly practiced has been the injection of air to the gases preparatory to their escape from the combustion chamber, the mixture of the oxygen with the hot carbonaceous gases rendering the same inflam-

mable. Thus, the resultant gases were ignited by the flames in the combustion chamber. A complete combustion of the gases evolved in the chamber could not be had, however, and hence the object in view was only partially attained.

By my invention I am enabled to effect the consumption of the major part of the carbonaceous products and, at the same time, economically utilize the resultant heat, as follows: Disposed at intervals throughout the course traversed by the products of combustion on their way to the chimney or stack, a , from the combustion chamber, a' , is a series of pipes C, by which air may be introduced to the products. In the present instance these pipes are arranged transversely between the walls of the structure, their ends communicating with the open air. The inner portions of these pipes are perforated on their forward faces, as at c , relative to the direction of movement of the gases, so that the latter in their passage draw in a supply of air, and are thus rendered inflammable. Alternating with these air supply pipes is a series of electric sparking devices, D, the function of which is to ignite the inflammable gases successively, and thus occasion their effectual combustion. By introducing the air at different stages of the course, and progressively igniting the resultant gases, a more thorough consumption of the latter is attainable than if ignition took place at a single point. Although the electric conductors, d , may be run directly from a dynamo d' , I preferably connect the wires with a storage battery d^2 , and in turn connect the latter with the dynamo. The object of this arrangement is to enable the sparking to be continued after the dynamo has been stopped for a period, and hence prevent the accumulation of gases in the furnace during such stoppage, and their consequent violent explosion upon the re-starting of the current. The battery is of such capacity that during the running of the dynamo for a period of, say, ten hours, sufficient electric energy is stored to effect the requisite sparking for a period of, say, four-
ten hours.

I preferably dispose in the rear of the furnace a back wall a^2 , the lower portion of which is grated, as at a^3 . This wall directs the

volume of gas to the incoming air and effects an intimate mixture thereof preparatory to ignition.

- In addition to the features above described, I sometimes build in front of the usual bridge wall, a^4 , of the furnace, a supplemental wall a^5 , to form an intermediate space a^6 , which communicates with the ash box and the combustion chamber.
- By the above described construction, the heat resulting from the ignition of the gases is utilized upon the boiler, and, at the same time, the draft of the furnace is materially increased.
- I remark that the words "spark" and "sparking" are used herein in their broadest and most comprehensive sense that a "glow" shall be embraced thereby.
- I claim as my invention—
1. The method of consuming waste products of combustion in furnaces, which consists in introducing air thereto, and then igniting the combined gases by means of an electric spark, substantially as described.
 2. The method of consuming waste products of combustion in furnaces, which consists in introducing air thereto at intervals, and igniting the combined gases at alternate points by means of electric sparks, substantially as described.
 3. In a furnace, the combination with the

combustion chamber, of an air feeding tube or duct communicating with said chamber, and an electric sparking device in advance of said tube or duct, substantially as described.

4. In a furnace, the combination with the combustion chamber, of a series of air feeding tubes or ducts intermediate said chamber and the smoke stack, and a series of electric sparking devices alternating with said tubes or ducts, substantially as described.

5. In a furnace, the combination with the combustion chamber, of an air feeding tube intermediate said chamber and the smoke stack, an electric sparking device forward of said tube, a storage battery electrically connected with said sparking device, and a dynamo electrically connected with said battery, substantially as described.

6. In a furnace, the combination with the combustion chamber of an air feeding duct, an electric sparking device forward thereof, and a grated or perforated wall or partition between said duct and sparking device, substantially as described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

MAHLON FULTON.

Witnesses:

JOHN R. NOLAN,
JESSE B. HELLER.