

F. C. AMBLER.  
 Improvement in Apparatus for Burning Hydrocarbon Vapors.  
 No. 127,402. Patented June 4, 1872.

Fig. I.

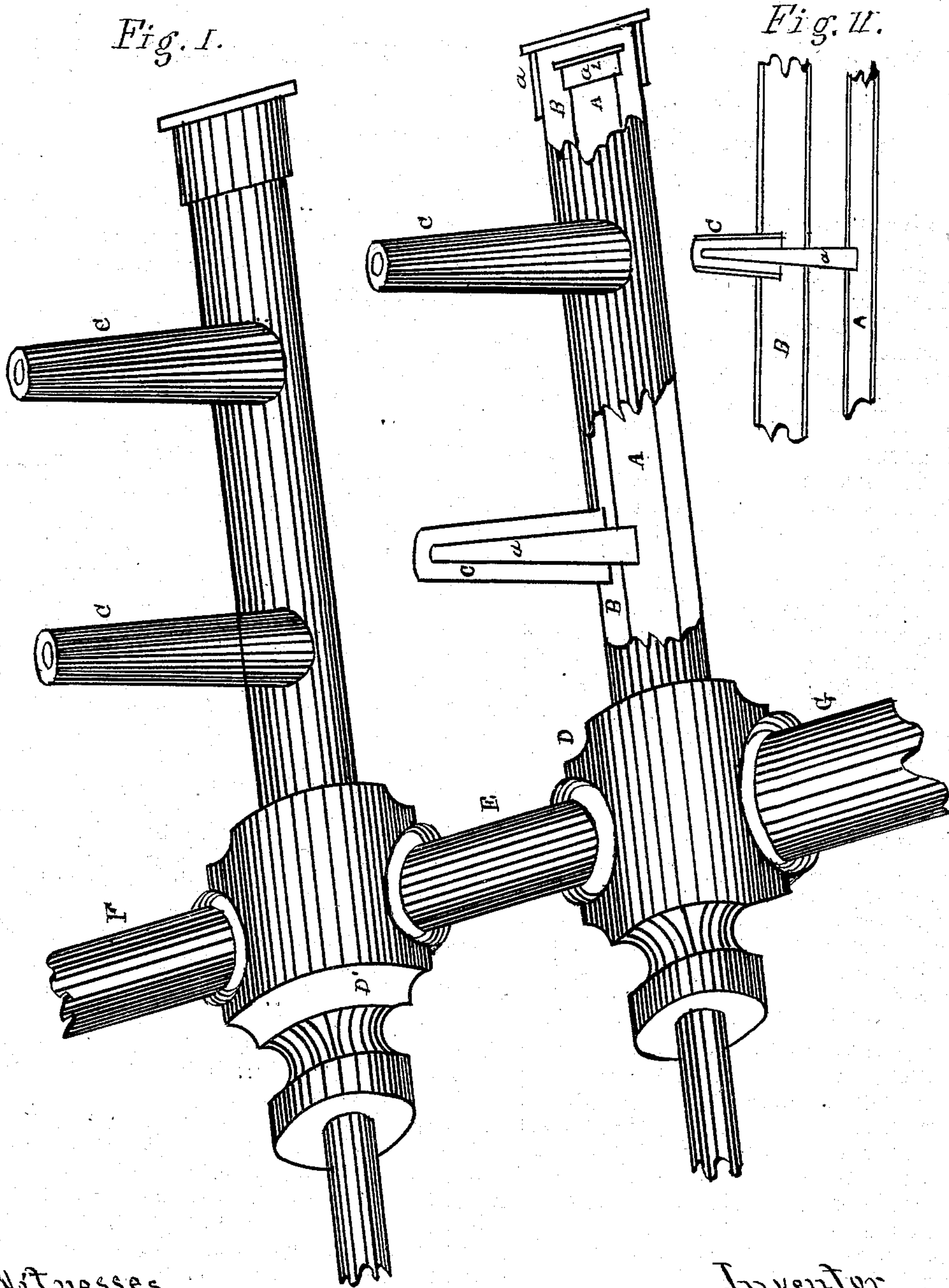
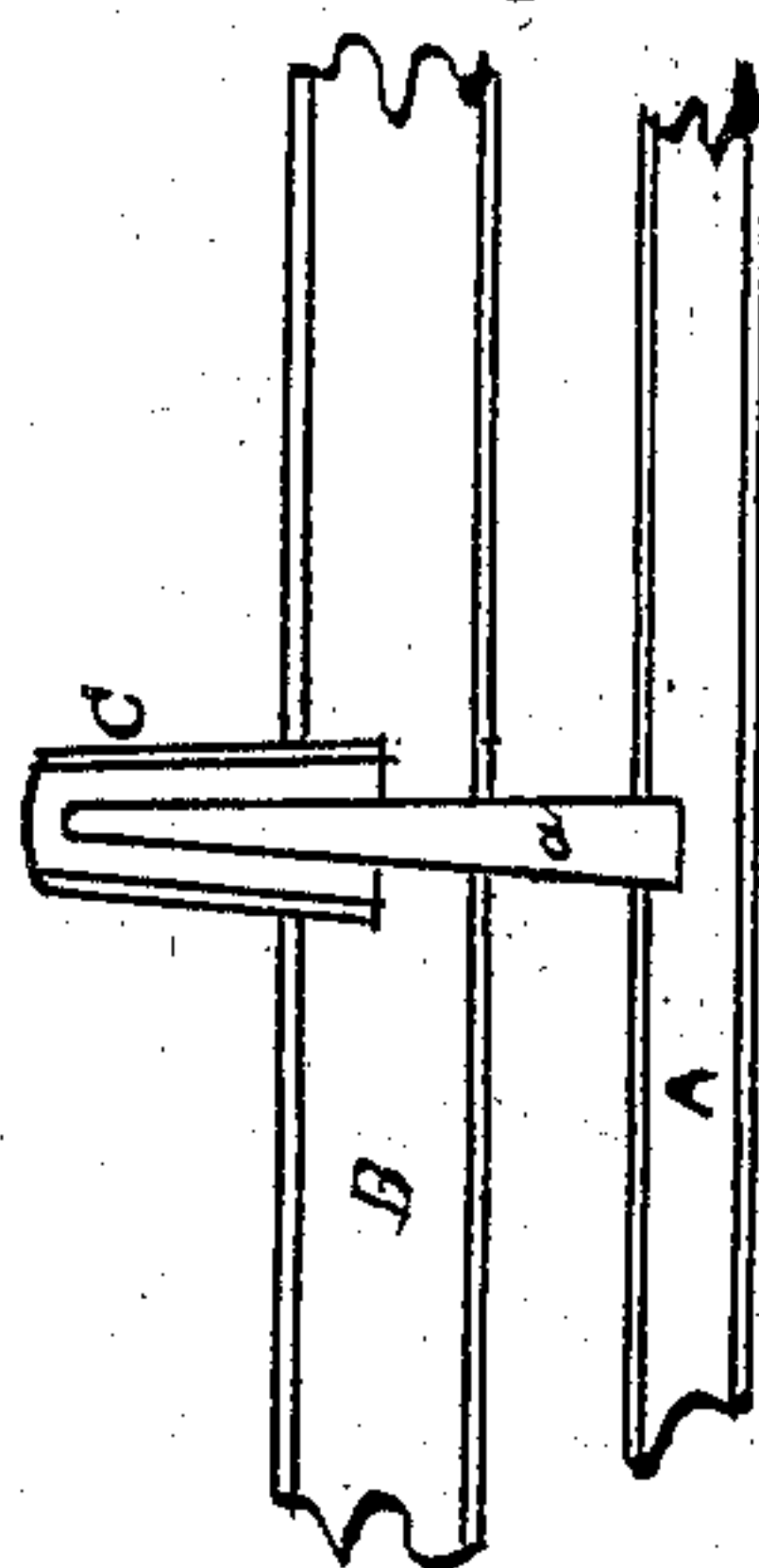


Fig. II.



Witnesses  
 C. Rogers  
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 By his attorney  
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# UNITED STATES PATENT OFFICE.

FRANK C. AMBLER, OF NEW YORK, N. Y.

## IMPROVEMENT IN APPARATUS FOR BURNING HYDROCARBON VAPORS.

Specification forming part of Letters Patent No. 127,402, dated June 4, 1872.

*To all whom it may concern:*

Be it known that I, FRANK C. AMBLER, of the city, county, and State of New York, have invented new and useful Improvements in Burners for Vapor Fuel; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon making a part of this specification.

My invention has for its object a burner for burning vapor fuel, and is intended or designed to be attached to a machine or apparatus patented to A. I. Ambler for generating gas from petroleum; and this burner is designed to burn vapor and gas as it is generated by the apparatus, the burners being connected with or attached thereto; and by proper couplings and attachments a series of them may be placed underneath the boiler within the furnace, so as to bring the flame emanating from the series of burners directly in contact with the boiler.

The nature of my invention consists in first constructing a pipe of suitable strength and dimensions for the burners and the apparatus to which it is designed to be attached. Within this pipe I arrange another pipe of lesser diameter, which is designed to conduct the superheated steam to the burner. Between the outer surface of the inner or smaller pipe and the inner surface of the outer or larger pipe is an annular space, which conducts the gas and hydrocarbon vapors to the burners. The burners are constructed in the same manner. The annular gas-space in the burner connects or communicates with the annular gas-space in the pipe, and the inner tube of the burner which connects with the smaller pipe that conducts the superheated steam thereto. The gas and hydrocarbons are forced through the annular space under a pressure of twenty-five pounds to forty pounds to the square inch; at the same time the superheated steam is allowed to escape through the inner tube. The gas and vapor before mentioned being ignited makes a circular flame, and the superheated steam at about 800°, escaping just below and in the center of the gas-escape, comes directly in contact with the gas flame, which instantly decomposes the superheated steam and converts into hydrogen gas, which instantly ignites and greatly adds

to the intensity and volume of the flame. My invention can be readily applied wherever a heating apparatus may be required, and to any vapor-fuel apparatus.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

Figure I represents a perspective view of my invention attached to pipes as placed in an ordinary furnace for steam-boiler, with a portion broken out so as to show the construction and arrangement of the pipes and burners. Fig. II represents a different arrangement of the pipes, but the operation and results are similar.

Letters of like name and kind refer to like parts in each of the figures.

A represents the superheating steam-pipe, placed within the gas and vapor pipe B in such a manner as to form an annular space, around and through which the gas and vapors are conducted to the burner C, in which an annular space is also formed by the introduction of the steam-pipe *a*, which connects with the steam-pipe A. D and D' are couplings, that may be made in any of the most convenient and well-known forms. E is a coupling-pipe, employed when a series of burners are designed to be used. F represents also another coupling-pipe, so that, in the manner herein shown, any desired number of burners may be used. G is the main gas and vapor supply-pipe, that connects with the generating apparatus, while all the steam-pipes connect with the superheater. *a*<sup>1</sup> *a*<sup>2</sup> are caps fitted over the ends of the steam and gas pipes.

In Fig. II is shown a different arrangement of the steam and gas pipes, the steam-pipe A being located immediately below the gas-pipe B. This plan is equally operative, as has been fully tested, but involves more expense in fitting the burners; so, for economy, I prefer the plan as shown in Fig. I.

The operation is simple and effective, and the most economical burner heretofore known or used. The burners, together with the pipes, as herein shown, are placed within the furnace under the boiler, or wherever the heat is designed to be applied, and as the gas and vapor are generated in the apparatus from petroleum, the burners having proper connections with the gas-generating apparatus and steam-boil-



er, the gas is admitted under pressure through the pipe B to the annular burner C, where it is united, and at the same time a jet of superheated steam is admitted through the pipe *a* at a temperature of about 800° Fahrenheit, when it comes in immediate contact with the gas-flame, which immediately decomposes and converts the same into hydrogen gas, which instantly ignites and largely increases the intensity and volume of the flame.

It will be observed that the flow of both steam and gas is regulated by suitable valves, so that the intensity of heat may be governed as circumstances may require. The quantities or proportions of steam and gas may also be regulated by proper valves.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The steam-pipe A and tube *a*, in combination with the gas-pipe B and tube C, substantially as herein shown and described, and for the purposes set forth.

2. The combination of the tube C with the tube *a*, for the purposes and substantially as shown and described.

3. I claim the tubes C and *a* as a burner, in connection with the pipes A and B, substantially as shown and described.

F. C. AMBLER.

Witnesses:

CHARLES ROGERS,  
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*1400 words*