(No Model.) 2 Sheets—Sheet 1.

J. E. BAKER.

DEVICE FOR PROMOTING COMBUSTION IN FURNACES.

No. 282,035. Patented July 31, 1883.

Fig. 1.

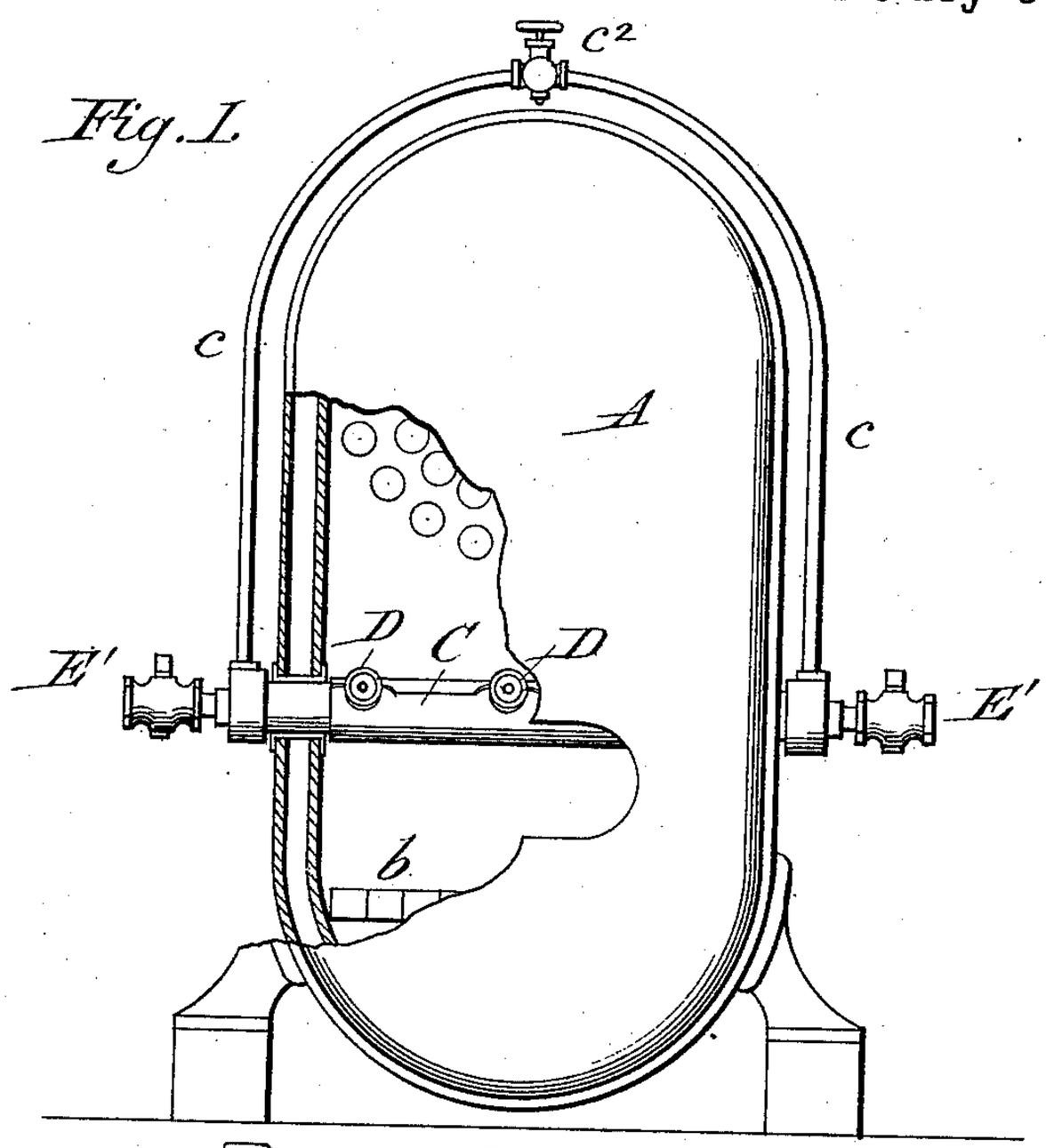
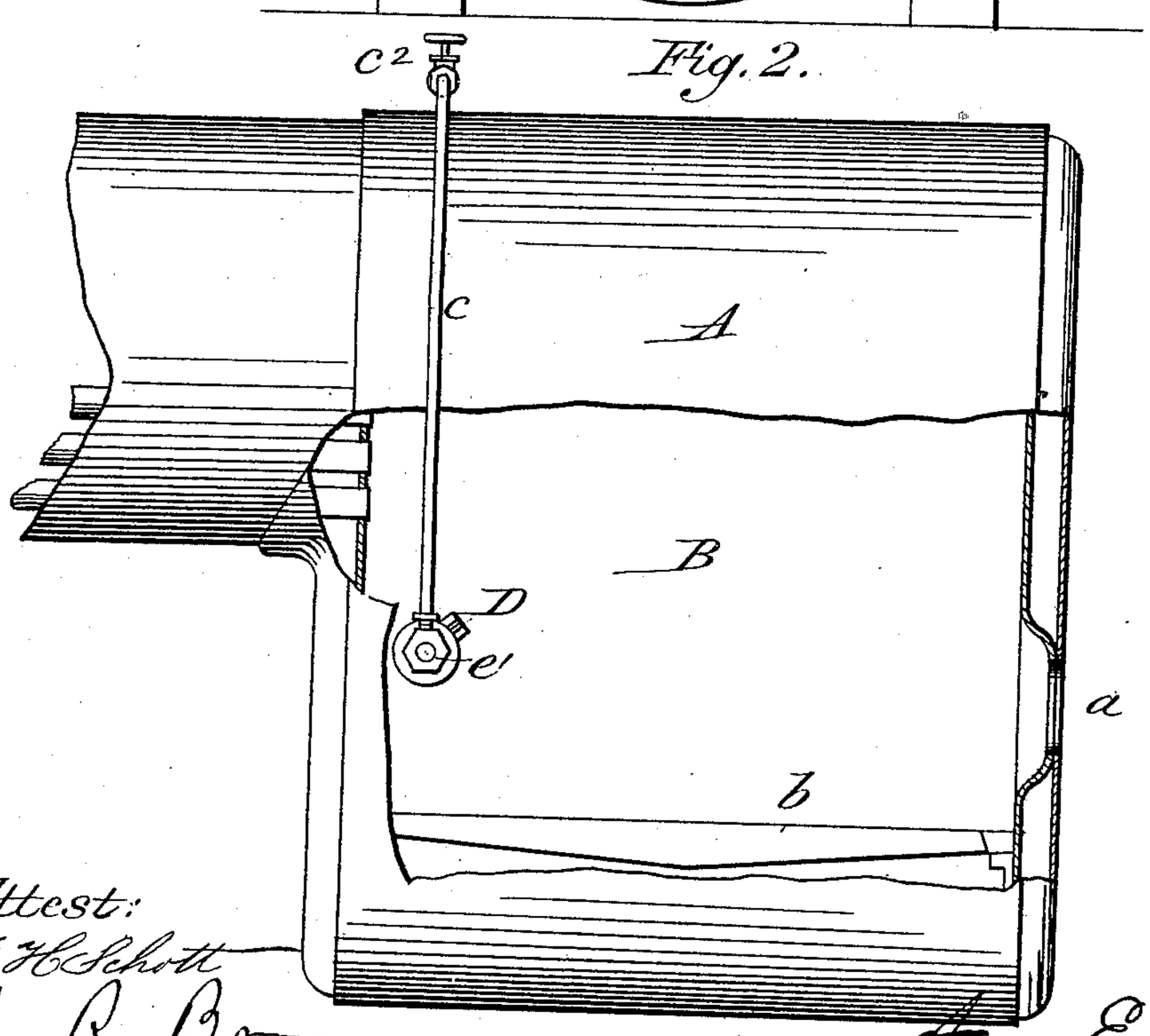


Fig. 2.



Attest:
F. H. Schott
A. R. Brown.

Inventor
James E. Baker
by J. H. Baker atty

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

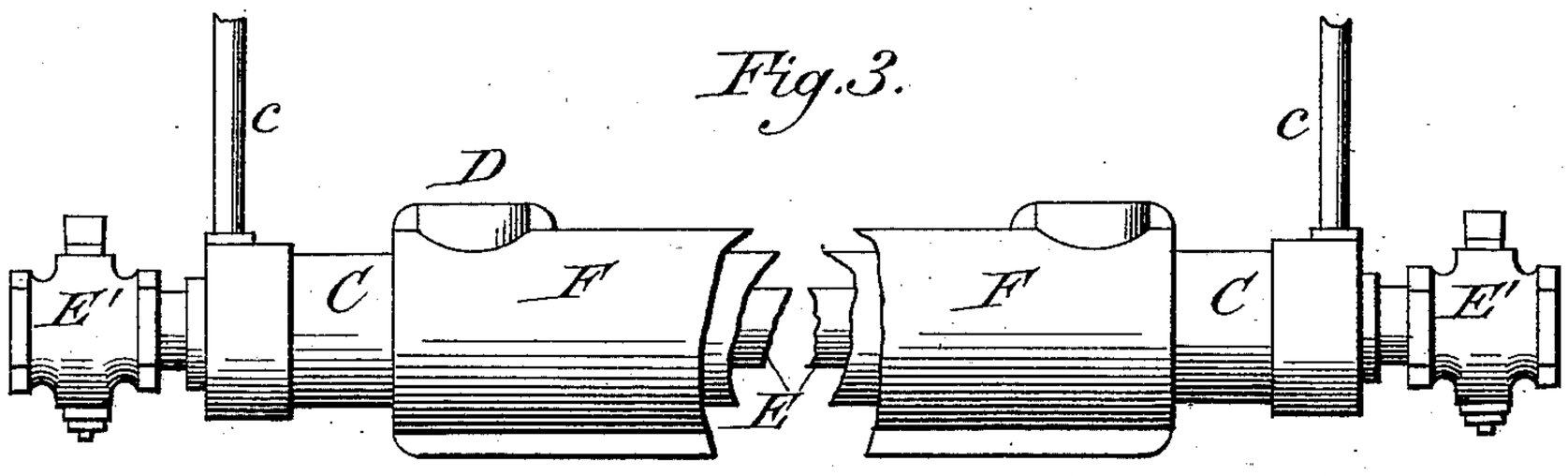


Fig. 5.

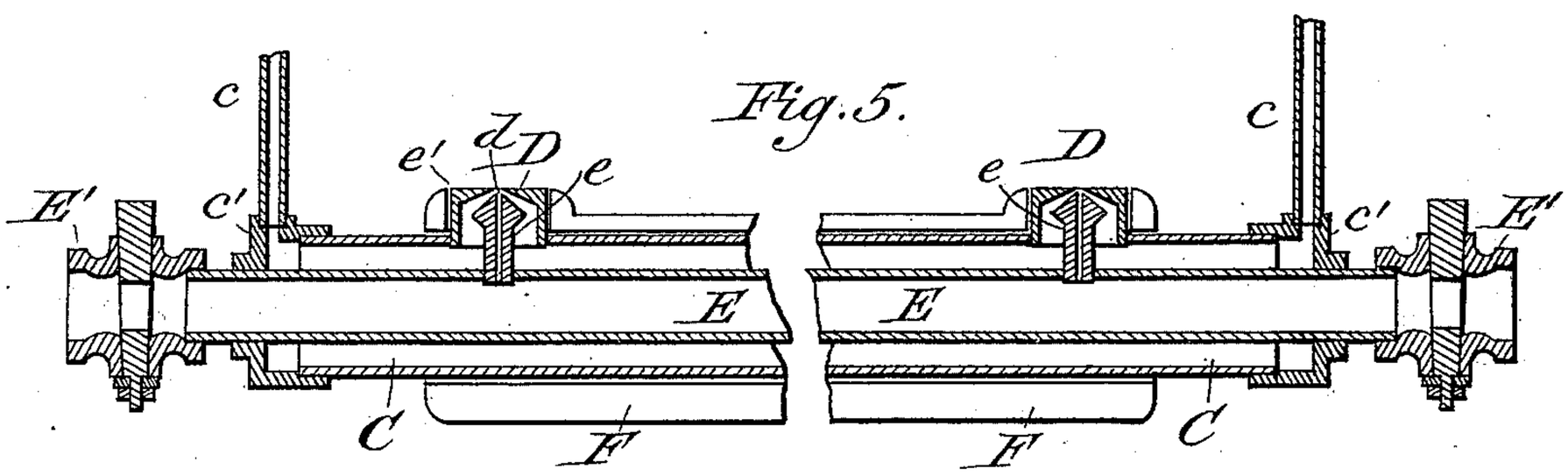
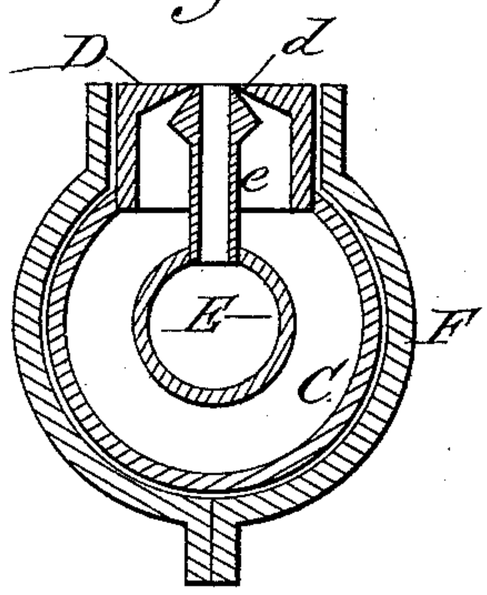


Fig. 4.



Attest:

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A. R. Brown.

Inventor:

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per H. C. Dodge Atty

UNITED STATES PATENT OFFICE.

JAMES E. BAKER, OF CHICAGO, ILLINOIS.

DEVICE FOR PROMOTING COMBUSTION IN FURNACES.

SPECIFICATION forming part of Letters Patent No. 282,035, dated July 31, 1883.

Application filed September 9, 1882. (No model.)

To all whom it may concern:

Be it known that I, JAMES E. BAKER, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Devices for Promoting Combustion in Furnaces, of which the following is a full and clear description.

This invention relates to devices for obtaining perfect combustion in furnaces for steam-boilers or other purposes; and it consists in the combination and arrangement, with a furnace, of two pipes, one within the other, provided with nipples for injecting air and steam into the flame, substantially as will be hereinafter more fully described.

In order to enable others skilled in the art to avail themselves of the benefits of my invention, I will now proceed to describe its construction and operation, referring to the accompanying drawings, in which—

Figure 1 is an end view of a boiler, partly broken away, showing my invention in practice. Fig. 2 is a side elevation of the same. Fig. 3 is a front view of my invention removed from the boiler. Fig. 4 is an enlarged cross-section of the same, and Fig. 5 is a longitudinal section.

A represents a steam-boiler, of which B is the furnace, provided with a door, *a*, and grate-bars *b*, of the usual or any desired form.

On one side of the furnace I pass transversely through the shell a pipe, C, which is, on the outside, connected at each end by a pipe, *c*, with the top of the boiler, the steam-dome, or any place from which the steam is to be drawn. The ends of this pipe are closed by caps c' c', and the pipes *c c* are provided with a stop-cock, c^2, to regulate the quantity of steam admitted, or to shut it off entirely.

The pipe C is provided at suitable intervals with nozzles D, which are conical in form on the inside and provided with a small opening, *d*, for the escape of steam.

Within the steam-pipe C, and passing through the caps c', is an air-pipe, E, provided with suitable regulating-cocks, E′, at each end. This pipe E is also provided with nozzles *e e*, which correspond in number and position with those on the pipe C. These nozzles have a small vent-passage, e', and extend into the nozzles D nearly to their outer ends, leaving only a very small space for the escape of steam, with which the air mingles as it passes out. These pipes C E are preferably made of wrought-iron, and to prevent their being burned I inclose the pipe C within the furnace in a casing, F, of cast-iron or other suitable material, having openings for the passage of the nozzles D, as shown in the drawings.

When the fire in the furnace is started and steam has been raised in the boiler, I open the cocks c^2 and E′, allowing the steam and air to enter the pipes C E. When the steam passes into the pipe within the furnace it becomes superheated, and the air in pipe E, being surrounded by steam, also becomes very hot, and the two are mixed while being passed out into the flames, producing an intense heat, which thoroughly consumes all the products of combustion, leaving nothing to pass off in the form of smoke or gas.

It will be understood that the device shown in the drawings may be somewhat altered in detail without departing from the spirit of my invention—such as the placing of the pipe C wholly within the shell and running the pipe *c* to it through one of the smoke-flues, or the substitution of fire-brick for the cast-iron protector F. The device may also be located in a furnace at any position required for the different forms of furnaces and boilers, and forms a very efficient, cheap, and easily-regulated device, producing the best results.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a furnace, the combination of an inner air-pipe and an outer steam-pipe, both provided with nozzles, by which the steam and air are mixed while being injected into the flames, substantially as shown and described.

2. The combination, in a device for promoting perfect combustion in a furnace, of the outer steam-pipe, C, provided with nozzles D, having small orifices *d*, with the inner air-pipe, E, having nozzles *e*, arranged within the nozzles D, whereby the steam and air pass together into the furnace, substantially as shown and described.

3. The combination, with the boiler A and furnace B, of the outer steam-pipe, C, connected to the steam-space of the boiler by a supply-pipe, *c*, having regulating-cocks, and the inner air-pipe, E, extending through the shell of the furnace, and provided with cocks E′ E′, the pipes C and E being concentric, and having nozzles through which the steam and air are mixed and injected into the flues, substantially as shown and described.

4. A device for supplying steam and air to furnaces, consisting, essentially, of the outer steam-pipe, C, having nozzles D and connecting steam-pipe *c*, provided with a stop-cock, c^2, the inner air-pipe, E, having cocks E′ E′, and nozzles *e*, extending within the nozzles D, and the jacket F, all constructed and arranged to operate, substantially as herein set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES E. BAKER.

Witnesses:

C. L. CARMAN,

W. C. MCARTHUR.