

(No Model.)

J. GOOD.
STEAM BOILER FURNACE.

No. 409,784.

Patented Aug. 27, 1889.

Fig. 1.

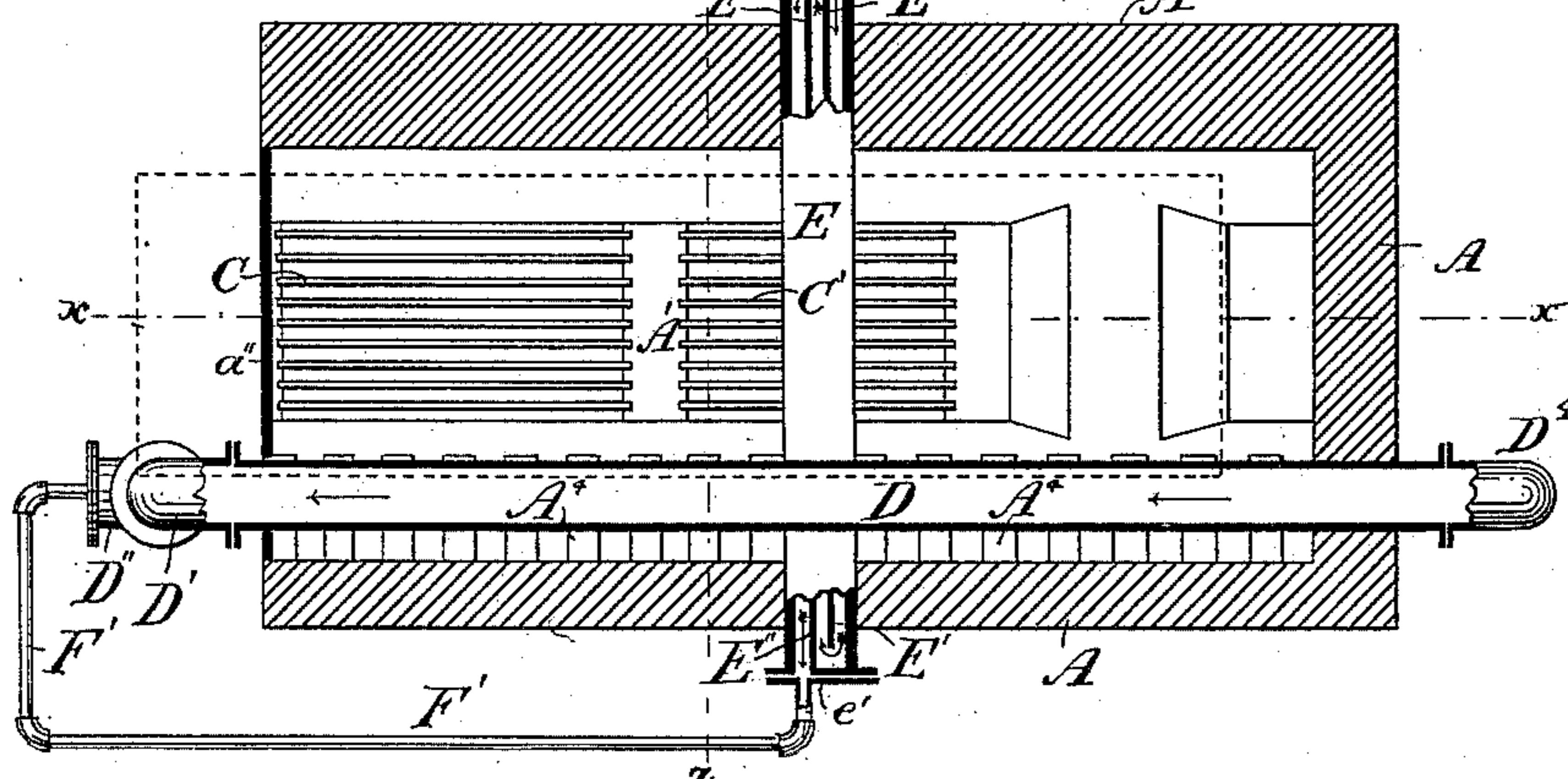
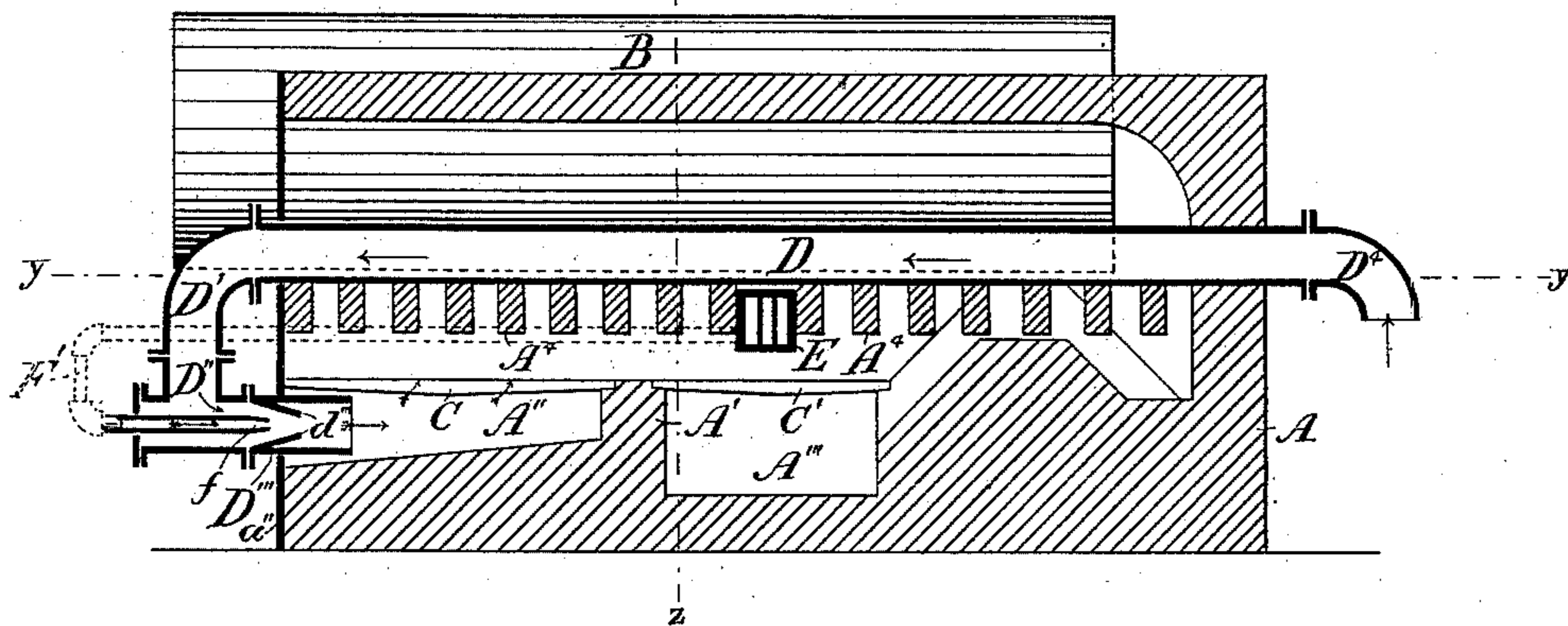
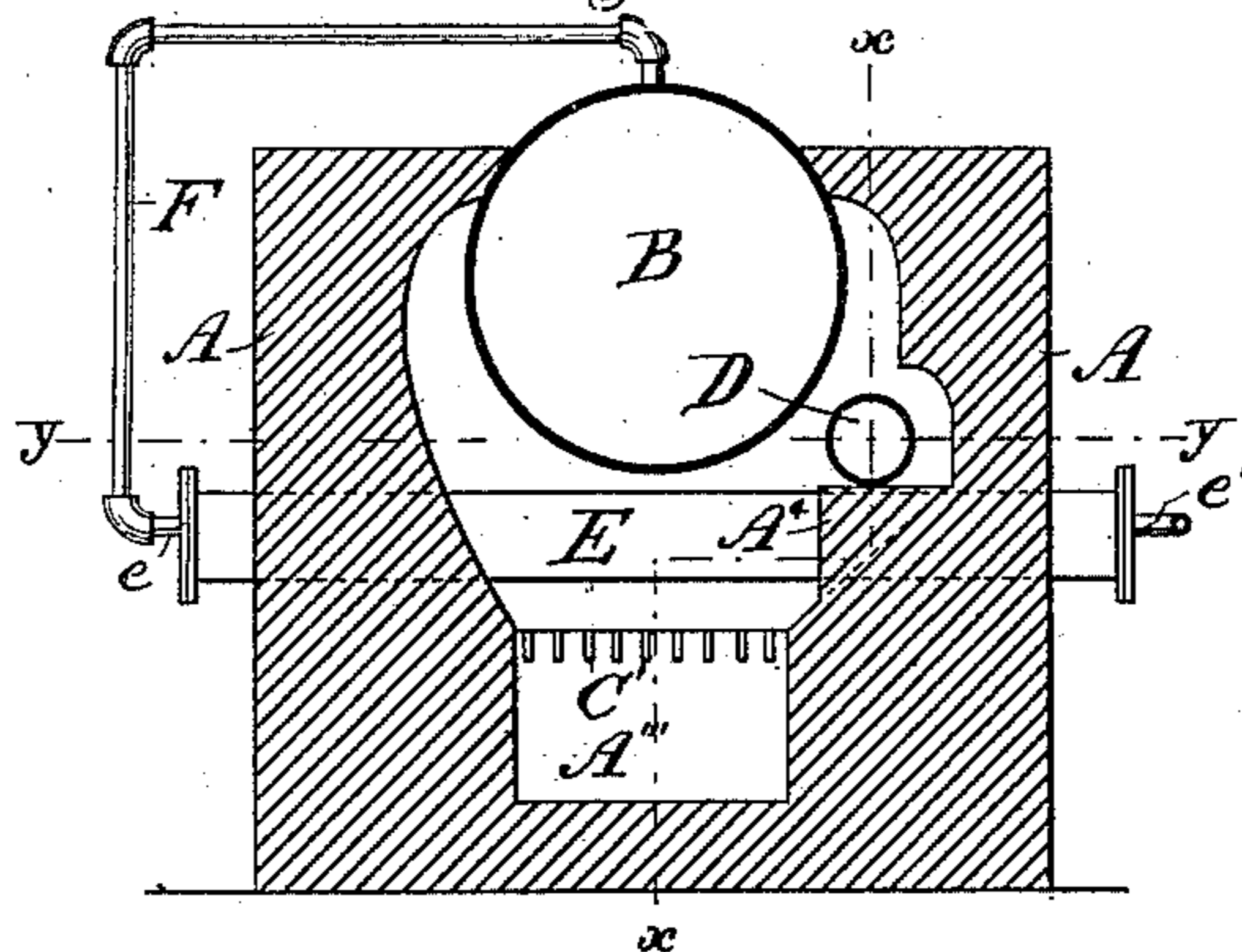


Fig. 3.



Witnesses:
 Chas. Haley.
 L. N. Legendre.

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UNITED STATES PATENT OFFICE.

JOHN GOOD, OF NAPANEE, ONTARIO, CANADA, ASSIGNOR OF ONE-HALF TO
JAMES E. HERRING, OF SAME PLACE.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 409,784, dated August 27, 1889.

Application filed May 4, 1889. Serial No. 309,659. (No model.)

To all whom it may concern:

Be it known that I, JOHN GOOD, of Napanee, in the Province of Ontario, Dominion of Canada, have invented certain new and useful

Improvements in Steam-Boiler Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part hereof.

My invention, which will be hereinafter fully set forth and claimed, relates to furnaces for steam-boilers of that class in which steam and heated air are used as auxiliaries.

The object of the invention is a furnace by which great economy of fuel is obtained both by using a very low and inexpensive quality of coal and in the consumption of a small quantity of the same.

Figure 1 is a longitudinal section of my improved apparatus on line $x x$, Figs. 2 and 3, showing the boiler in elevation. Fig. 2 is a horizontal section of the same on line $y y$, Figs. 1 and 3. Figs. 3 is a transverse section of the same on line $z z$, Figs. 1 and 2.

Sections of this iron and metal work are shown in plain thick solid lines.

B is a steam-boiler placed in a brick setting A, which may be the ordinary setting, except as far as my improvements necessitate modification of the same.

C is a fire-grate of any desired construction and form of grate-bars, and C' is a smaller secondary or supplementary grate placed beyond and the front end supported upon the bridge A', separate closed ash-pits A'' and A''' being formed under each. In the ash-pit A''' an opening provided with a damper for the admission and regulation of an air-supply is desirable.

D is a capacious air-pipe set to one side and under the boiler and so that the products of combustion may freely play around it, an open setting A⁴ or any other convenient form being used. The pipe D is open at the rear to provide a free entrance to the air, but may have bends or elbows—such as D''''—attached to give any desired turn to the air-inlet. At the front the pipe D is connected by an elbow D' to the stem of an inverted-T pipe D'', placed opposite the ash-pit C, and to the trunk of said T-pipe is connected a short pipe D'''

containing a tapering nozzle d''' and penetrating the ash-pit front a'' , which is made approximately air-tight and projects in said ash-pit A'' and under the grate C.

E is a steam-superheater placed transversely under the boiler and consisting of a strong cast-iron box divided by two partitions E' E'', of which one stops short of the delivery end and the other of the supply end into a continuous return-passage, starting at the supply end e and terminating at the delivery end e' , each of which is closed with a steam-tight cover e and e' , provided with a nozzle for connection with a steam-pipe. The supply end e is connected to a steam-pipe F, taking steam from the boiler, and the delivery end e' with a steam-pipe F', leading to the front of the boiler and passing through the trunk of the T-pipe D'' into the short pipe D''' and nozzle d''' , in which it terminates in a nozzle f , forming a jet-exhauster.

Plain arrows indicate the direction of the air and feathered arrows the direction of the steam or steam converted into gas.

The apparatus operates as follows: Steam is passed from the boiler by the pipe F into the superheater E, where it is superheated and converted into a permanent gas, commonly termed "water-gas." Thence it passes by the pipe F', through the T pipe D'', into the nozzle d''' , where it forms an exhauster to the air-pipe, capable of forming a powerful vacuum. Air is drawn by the exhauster into and through the pipe D, D', D'', and D''', becoming heated therein and discharged, mixed with the water-gas under the grate C, through which and the incandescent fuel upon it it passes and is ignited by the latter. To prevent the escape of a portion of the same and from the solid fuel upon the grate unconsumed, the secondary grate C' is used, which is kept covered with incandescent fuel and directly over which the superheater E is placed, said secondary grate having practically the effect of a smoke-consumer. As the water-gas itself forms a considerable portion of the fuel, comparatively little coal is consumed, and this may be of the lowest quality, screenings being preferred.

I claim as my invention—

In a steam-boiler furnace, the combination

of the air-pipe D, passing longitudinally through the flue and having its front end returned and entering the air-tight ash-pit, and provided with a nozzle d''' , the superheater
5 E, placed transversely under the boiler, steam-pipe F, connecting the superheater with the boiler, pipe F', connecting the discharge end of the superheater and passing through the front end of the air-pipe and terminating in the nozzle d''' , forming a jet-ex-
10 hauster, the grate C and secondary grate C',

and the air-tight ash-pits A'' and A''', substantially as set forth.

In testimony whereof I have signed, in the presence of the undersigned witnesses, at Nap- 15
anee, Ontario, the 30th day of March, 1889.

his
JOHN X GOOD.
mark

Witnesses:

A. L. MORDEN,
JAMES E. HERRING.