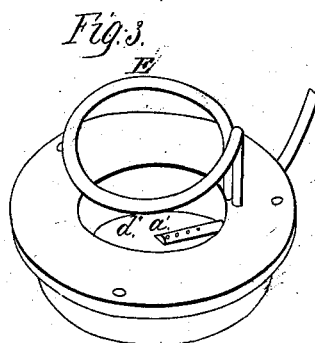
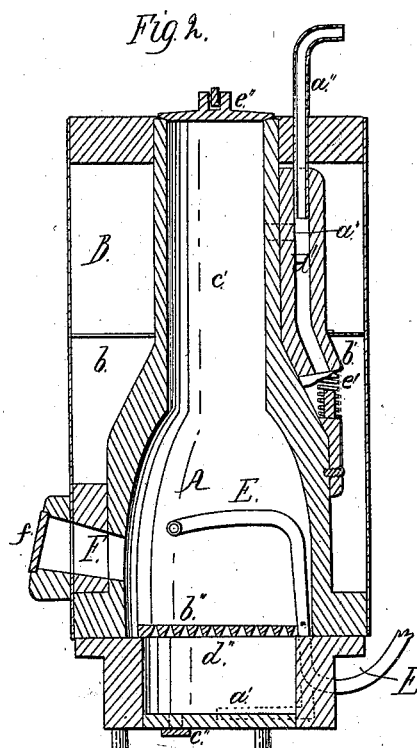
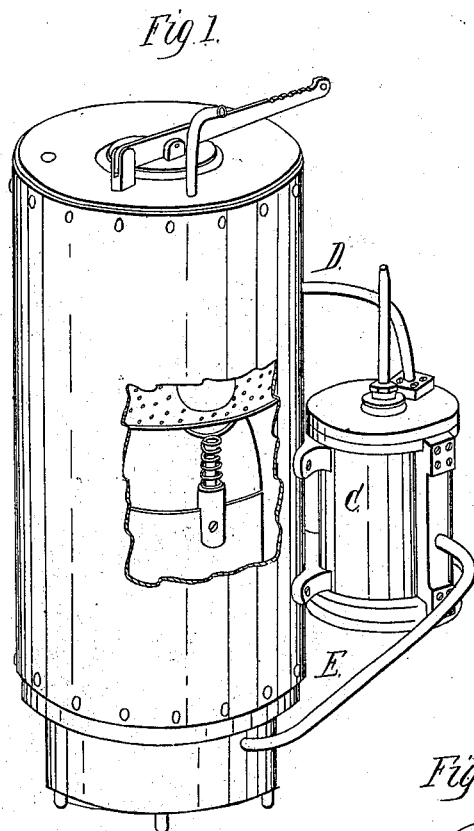


I. E. Craig,
Steam-Boiler Furnace,
No. 7,933, Patented May 30, 1865.



Witnesses:
W. H. Burnage,
J. Holmes.

Inventor:
Isaac E. Craig

UNITED STATES PATENT OFFICE.

ISAAC E. CRAIG, OF CLEVELAND, OHIO.

IMPROVEMENT IN STEAM-GENERATORS.

Specification forming part of Letters Patent No. **47,933**, dated May 30, 1865.

To all whom it may concern:

Be it known that I, ISAAC E. CRAIG, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Steam-Boilers, being an improvement on a patent granted to me and J. Madden, jointly; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the boiler. Fig. 2 is a vertical section. Fig. 3 represents the ash-pit detached from the boiler.

Like letters of reference refer to like parts in the different views.

My improvement relates to all that class of steam-boilers from which the products of combustion are worked off through the cylinder of the engine, and has for its object dispensing with the force-pump used to create a blast of air through the furnace, and to economize the power usually required in compressing air by means of the pump.

Fig. 1 represents the boiler referred to with my improvements annexed, the internal construction of which is shown in Figs. 2 and 3, that consists of a fire-box, A, steam-chamber B, and blower C, which connects with the steam-chamber by means of the pipe D and with the furnace or fire-box by means of the pipe E. The pipe E, after entering the fire-box, is coiled, as shown in Fig. 3, and terminates in the ash-box *d''* at *a'*.

b' represents the part of the boiler occupied with water.

c' is the flue leading upward from the furnace.

e'' is an air-tight covering for the top of the flue, which can be removed at pleasure.

e' is a check-valve at the lower end of the side pipe, *d'*, the upper end of which connects with the flue *c'*.

F is a fuel-throat, which is closed by the door *f*.

d'' is the feed-pipe, which discharges the water into the side pipe, *d'*.

c'' is the cover to an opening in the bottom of the ash-box.

The manner of operating this boiler as constructed is as follows: After opening the orifice in the bottom of the ash-box and uncovering the top of the flue, the fire is kindled in the furnace and burns from the natural draft of air until steam enough is generated to run the engine. The openings above and beneath the fire are then closed and the engine started, the engine being so geared that when in motion it will actuate the blower C. A current of steam is induced through the pipes D and E from the steam-chamber to the furnace, which, in passing through that portion of the pipe which lies in the furnace, is so superheated as to be decomposed, after which it is discharged from the openings *a'* beneath the grate, and in rising up through the fuel affords oxygen for the support of combustion. The products of combustion pass up the flue *c'*, down the side pipe, *d'*, and are discharged into the water, rising to the surface in the form of bubbles, and passing off to the engine along with the steam. The only function of the blower C is to maintain a circulation through the fire of steam, and as the pressure in the boiler and the fire-box is always about the same, but very little force is required to actuate the blower.

What I claim as my improvement, and desire to secure by Letters Patent, is—

1. The pipes D and E, when in combination with the boiler and furnace, as and for the purpose herein set forth.

2. The blower C, when in combination with the pipes D and E, together with the boiler and fire-box, substantially as set forth.

ISAAC E. CRAIG.

Witnesses:

W. H. BURRIDGE,
J. HOLMES.