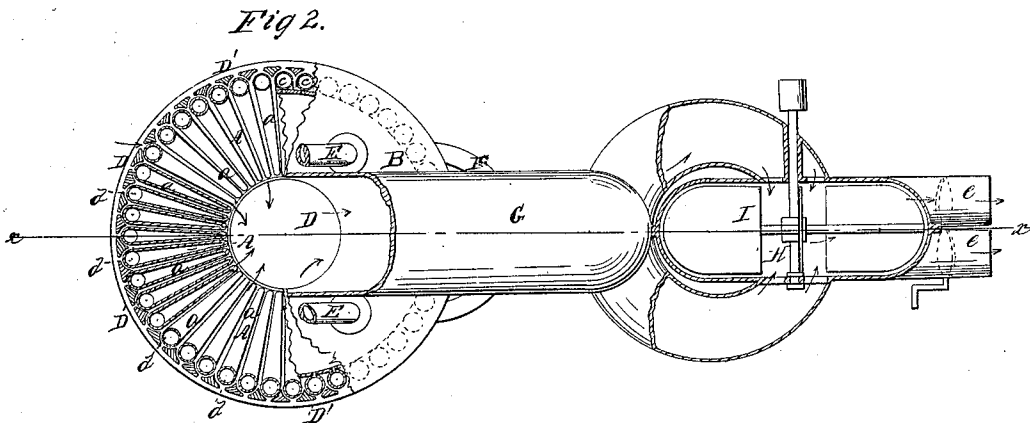
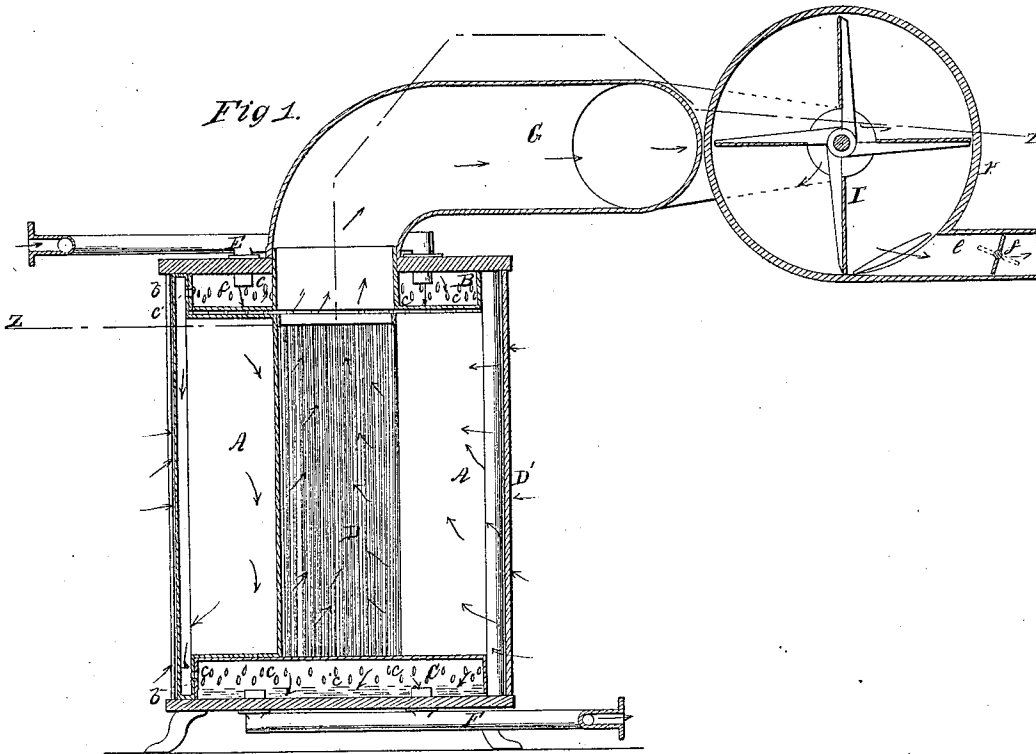


C. Fletcher,

Feeding Boiler Furnaces,

No 25,159

Patented Aug. 16, 1859.



Witnesses.

J. H. Bezenbacher
J. H. Woodruff

Inventor.
C. Fletcher

UNITED STATES PATENT OFFICE.

CALVIN FLETCHER, OF CINCINNATI, OHIO, ASSIGNOR TO ADDISON C. FLETCHER, OF SAME PLACE.

APPARATUS FOR SUPPLYING FURNACES WITH HOT AIR.

Specification of Letters Patent No. 25,159, dated August 16, 1859.

To all whom it may concern:

Be it known that I, CALVIN FLETCHER, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and Improved Method of Supplying Furnaces with Hot Air; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1, is a vertical section of my invention taken in the line *x, x*, Fig. 2. Fig. 2, is a section of ditto, taken in the line *y, y*, Fig. 1.

Similar letters of reference indicate corresponding parts in the two figures.

This invention consists in the employment or use of a series of metallic steam chambers communicating at each end with chambers, one to receive the escape steam from an engine and the other to receive the water of condensation, the above parts being used in connection with a fan and the whole arranged as hereinafter fully shown and described, whereby the boiler or other furnace may be supplied with a requisite amount of hot air, the smoke consumed and a perfect combustion of the fuel obtained.

The within described invention relates to an improvement on an air-heating device for which Letters Patent were granted to me bearing date June 12th, 1855.

The object of the within described invention is to obtain a greater heating surface than in the patented machine alluded to and also to facilitate the construction of the parts and render the device much more efficient.

To enable those skilled in the art to fully understand and construct my invention I will proceed to describe it.

A, represents a series of steam chambers, which transversely are of narrow wedge-shape and are connected at each end with a chamber, the upper one B, being of annular and the lower one C, of cylindrical form. The chambers A, are placed radially between the chambers B, C, and at such a distance apart as to allow spaces *a*, between them which are of equal width in consequence of the wedge-shape of the chambers A. This will be fully understood by referring to Fig. 2. The chambers A, are represented as being in a vertical position, and probably it would be preferable to have

them in such position, but still they may be placed horizontally if required or more convenient. The chambers A, communicate with the peripheries of the chambers B, C, by having each chamber A, provided at each end with a projecting part *b*, which extends over the peripheries of the chambers B, C, and communicate with them by apertures *c*, as shown clearly in Fig. 1. The chambers A, are of such a depth or extend inward sufficiently to leave a chamber D, the bottom of which is formed of the inner or upper plate of the chamber C.

Between the two chambers B, C, and all around the outer edges of the chambers A, wooden bars *D'*, are placed. These bars transversely are of tri-lateral form and they are so placed that a bar will be directly opposite each space *a*, and at such a distance from the outer edges of the chambers to form curved induction passages *d*, to the spaces *a*, as shown clearly in Fig. 2.

E, E, represent steam pipes which conduct the escape steam from an engine into the chamber B, and F, represents pipes which conduct the water of condensation from the chamber C, said water being conducted back again to the boiler.

To the upper plate of the chamber B, a pipe G, is attached and communicates with the chamber D. This pipe is divaricated at its outer end and communicates with a fan box H, at two opposite sides, at its center, as shown clearly in Fig. 2. The fan I, may be of the ordinary form and the box H, is provided with two eduction pipes *e, e*, which are provided each with a valve or damper *f*, one pipe *e*, conducting heated air below the grate of the furnace and the other conducts it above the grate.

The operation is as follows:—The apparatus is placed in any convenient position to the engine and boiler or other furnace. The fan I, is rotated by any proper means and a suction is produced through the pipe G, chamber D, and spaces *a*, between the steam chamber A, as indicated by the red arrows in Fig. 1. The pipes E, E, conduct the escape steam from the engine into the chamber B, the steam passing down into the chambers A, in which it is instantly condensed in consequence of the cold air passing through the spaces *a*, into the chamber D, which air becomes intensely heated thereby and is drawn up into the fan box H, and

ejected therefrom through the pipes *e, e*, above and below the grate of the furnace, the furnace being closed so that no air can pass into it except what is heated by the apparatus and ejected into it through the pipes *e, e*.
5 The wooden strips or bars *D'*, divide the currents of air as they pass into the spaces *a*, and serve to render the volume of air that passes through the apparatus more uniform
0 than it otherwise would be and in consequence of the strips being of wood they prevent any outward radiation of heat from the chambers *A*. The water of condensation is conducted from the chamber *C*, by
5 the pipes *F*, and by means of an ordinary force pump is returned to the boiler for continuous use.

By this invention it will be seen that the air to be heated is brought in contact with a
0 large heating surface and is quickly heated. The passage of the air through the apparatus is also very direct and passes in an unobstructed natural direction upward as indicated by the red arrows. The passage of
5 steam through the chambers *A*, and the

water of condensation in the pipes *F*, is indicated by the black arrows in Fig. 1.

The invention by the construction and arrangement herein shown, is rendered far more efficacious than the cylindrical steam
30 tube device formerly patented by me and previously alluded to.

I do not claim broadly the heating of air by bringing the same in contact with steam
35 tubes or chambers, for that has been previously done; but

I do claim as new and desire to secure by Letters Patent,

The specific arrangement as herein before described of the fan *I*, and the steam cham-
40 bers *A*, communicating with the chambers *B*, *C*, together with the inlet steam pipe *E*, the cold air passages *a*, hot air pipes *G, e, e*, and the pipes *F*, for the discharge of the
45 water of condensation for the purposes set forth .

CALVIN FLETCHER.

Witnesses:

I. H. WOODRUFF,
J. H. GETZENDANNER.