E. L. Miller,

Steam-Boiler Furnace.

No. 4,626. Patented July 7, 1846.

Fig: 1.

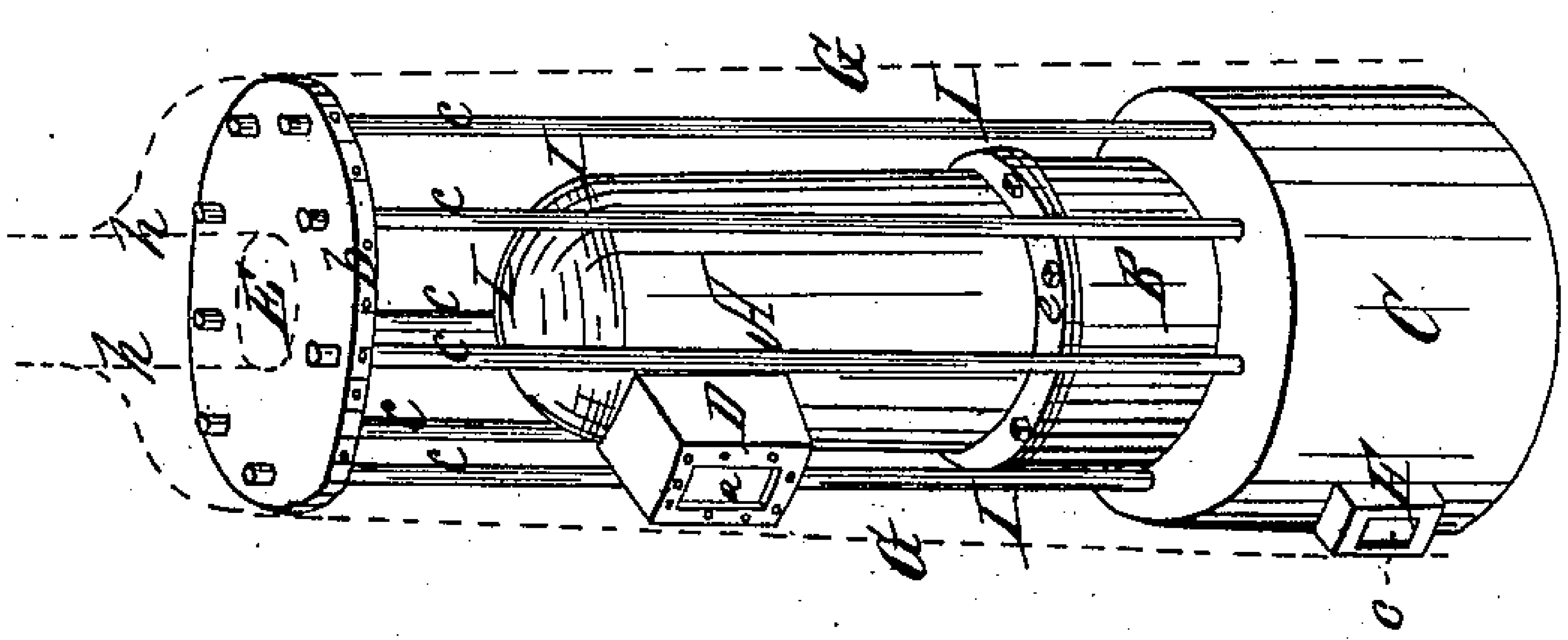
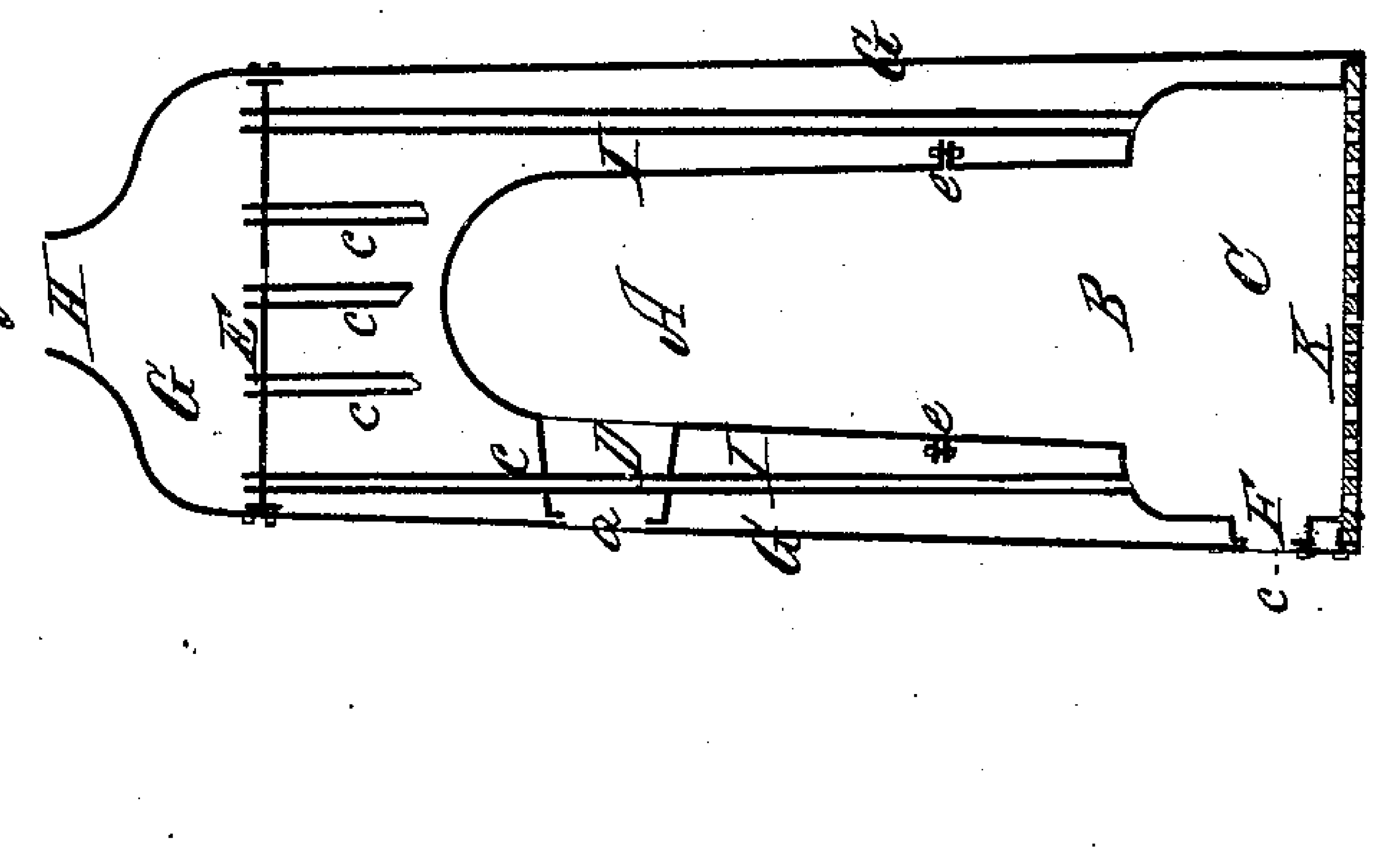


Fig: 2.



N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EZRA L. MILLER, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN BOILER-FURNACES.

Specification forming part of Letters Patent No. **4,626**, dated July 7, 1846.

To all whom it may concern:

Be it known that I, EZRA L. MILLER, of the city of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in a Boiler Furnace or Burner for Anthracite Coal or other Fuel, which may be applied to stoves and hot-air furnaces, as well as to boilers for generating steam, heating water or other liquids, &c.

My improvement, which I designate a "boiler-furnace," consists in making a new arrangement of the furnace or burner for producing the most active combustion of the fuel at or near the base of the fuel, and so near the grate-bars as always to insure the necessary supply of air to effect a perfect combustion, the combustible portion of the smoke and gases liberated from the fuel being consumed by passing through the most intense heat of the fire in their escape from the burner, and by combining with this arrangement a reservoir or chamber for fuel above the line of draft of sufficient capacity to contain fuel for any desirable length of time, which, as the combustion proceeds, settles into the base of the burner and thus becomes self-feeding until the fuel is consumed; and I hereby declare that the following is a full and exact description of the construction of the said furnace or burner, reference being had to the annexed engravings, making a part of this specification, in which—

Figure 1 is a perspective view of the furnace or burner with the outer shell or case removed, as shown by the dotted lines G G; and Fig. 2, a vertical section of the same, including the case.

I construct the furnace or burner of wrought or cast iron or any other suitable metal, the base C of which may be of any convenient form (the circular being preferable) and of such dimensions as will cause it to contain but a portion of the fuel necessary to use at a feed. The height of this section of the furnace or burner should not be more than six or eight inches, and may be lower, and it should be as much larger in diameter than section B of the fuel-chamber as to admit of inserting a number of small smoke flues or tubes *c c* near its upper circumference outside of section B of the fuel-chamber. The base C of the burner and section B of the fuel-chamber if made of cast-iron may be cast in one piece, with a flange around the top of B, through which it is bolted to a similar flange *e* around the bottom of top section A of the fuel-chamber, so as to make a joint which shall be smoke, water, or steam tight. The lower ends of the flues or tubes *c c* are inserted around the top and near the circumference of section C, and may be of any proportionate number, length, and diameter, passing through the head E into the main smoke cap or pipe H, or the draft may be taken out from any portion of the circumference of C.

When used as the furnace for a boiler, the outer shell G G is riveted or otherwise fastened to the flanges *b b* at the top and bottom and to the flanges of the feed and fire doors *a a* in such a manner as to be steam or water tight, making a water way or space I I, surrounding the smoke-tubes, burner, and feeder. When used as a stove or hot-air furnace, the outer shell G G may be omitted and the fire-surfaces exposed, or it may be retained and the smoke flues or tubes omitted, leaving the holes open where they are inserted in the top of section C for the passage of the draft or smoke into I I, which thus becomes a smoke instead of a water chamber, from which the smoke may be discharged through the head E by a pipe represented by the dotted lines *h h*, and the smoke-cap H omitted. For the purpose of ventilation and to increase the radiating-surface, when this arrangement is made, the furnace or burner may be surrounded by cold-air tubes open to the external air at both ends, which are inserted in a bed-plate beneath the ash-pit, where they receive the cold air, pass through an intermediate bed-plate at the base of section C, through the smoke-chamber I I, and terminate in the head E. By this arrangement the heat is radiated from the outer shell G G and from the inner surface of the cold-air tubes at a much more mild and equable temperature than when the fire-surfaces are directly exposed.

Within the fire-door *a*, at F, I use a hollow cast-iron stopper or dumb plate with a handle, to be removed when making use of the door, and this door, the feed-door, and a door in the ash-pit beneath the burner should

each be closely fitted with a register to admit or exclude the air either above, below, or opposite the fuel, as may be desired.

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

The peculiar manner, as fully described and set forth in the above specification, of constructing the base of the fuel-chamber with an offset or enlargement so as to admit of taking out the smoke flues or tubes through it in or near a vertical direction at the top of the burner and around the circumference of the fuel-chamber, and by these means adapting it to a furnace for boilers as well as to stoves and hot-air furnaces.

E. L. MILLER.

Witnesses:
B. H. STRATTON,
CHS. WILLIAMS.