(No Model.)

C. N. BACON.

STEAM BOILER AND FURNACE.

No. 454,446. Patented June 23, 1891.

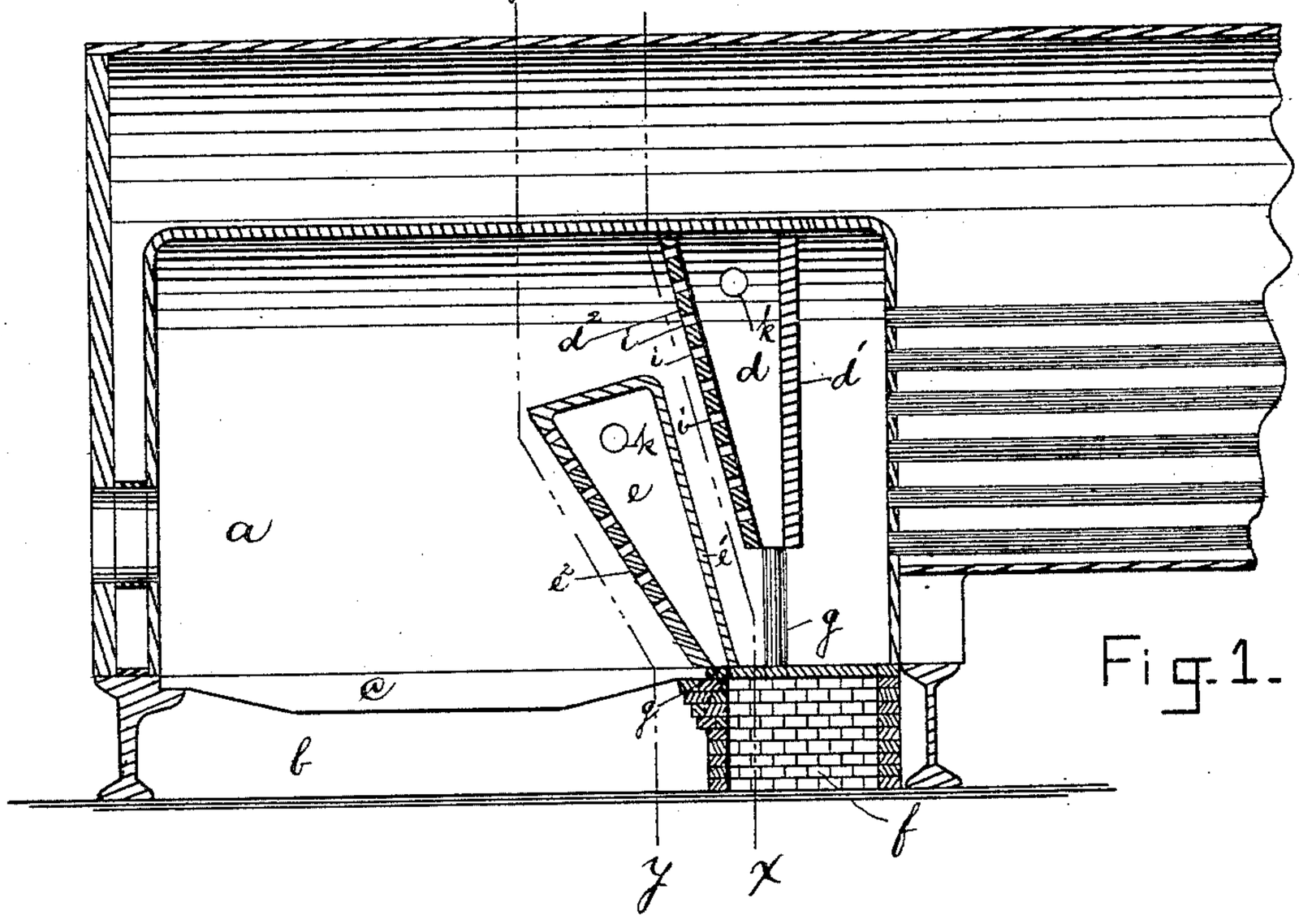

Fig. 1.

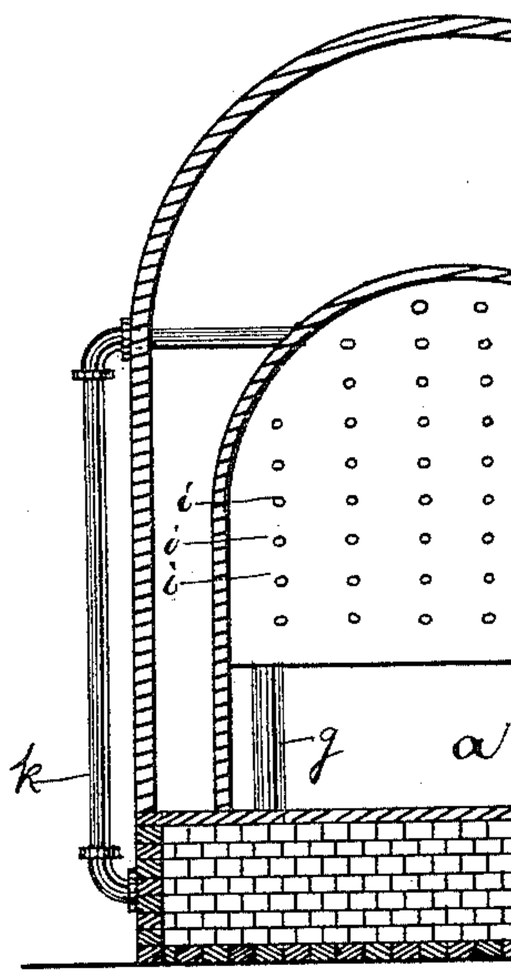

Fig. 2.

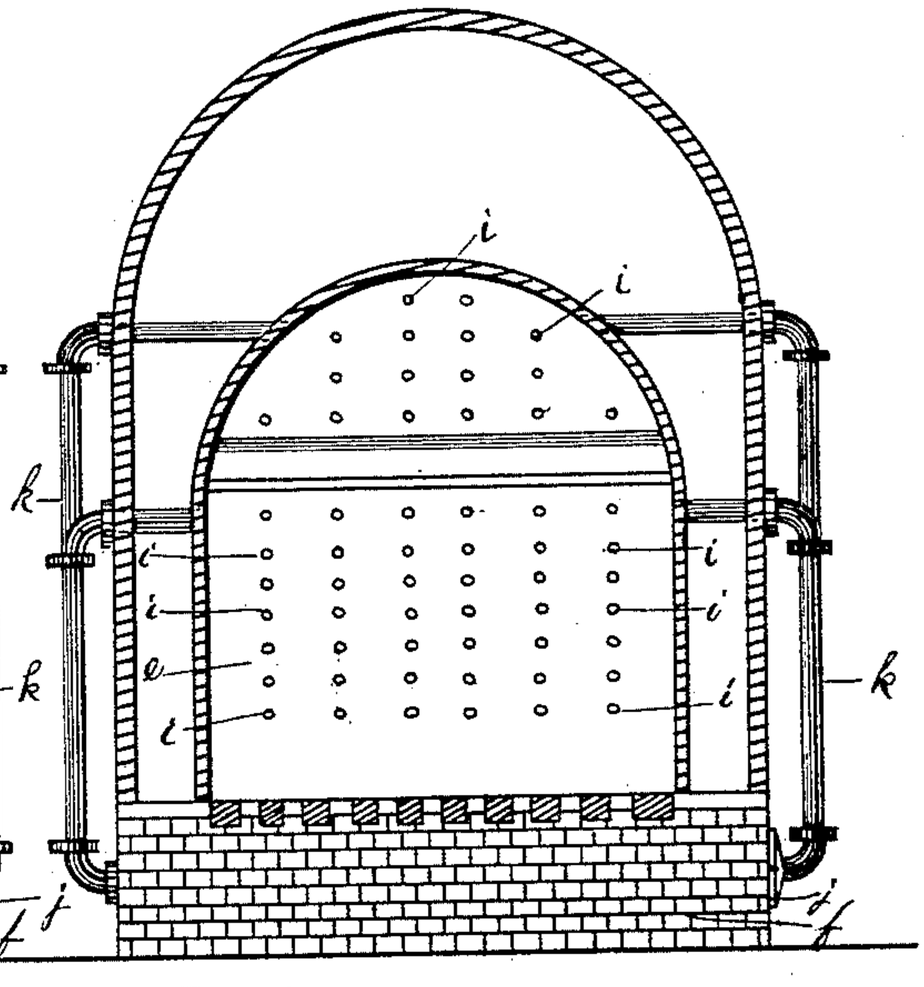

Fig. 3.

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UNITED STATES PATENT OFFICE.

CLOVIS N. BACON, OF BOSTON, MASSACHUSETTS.

STEAM-BOILER AND FURNACE.

SPECIFICATION forming part of Letters Patent No. 454,446, dated June 23, 1891.

Application filed September 27, 1889. Serial No. 325,304. (No model.)

To all whom it may concern:

Be it known that I, CLOVIS N. BACON, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Steam-Boilers and Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

The object of my invention is the consumption of gas and smoke in steam-boilers and furnaces by means of hot air admitted above the fuel, so as to utilize the gas which in ordinary boilers and furnaces is wasted. I accomplish that object by employing heating-chambers and hot-air pipes in connection with a fire-box and grate-bars, as hereinafter more fully described.

In Figure 1 I show a vertical longitudinal section of the boiler embodying my invention, and in Fig. 2 a vertical cross-section of the same on the line *x x*, Fig. 1, and in Fig. 3 the same on line *y y*, Fig. 1.

a is a fire-box, which I make longer and higher than ordinary fire-boxes.

b is the ash-box.

c is the grate-bars of the ordinary form.

From the crown-sheet or top of the fire-box *a* and near the rear end thereof depends the superheating air-chamber *d*. It is attached to the top of the chamber *a* and to its side walls. It may be constructed of fire-brick, soapstone, or any other suitable material, and is perforated with holes *i i*, through which the air is permitted to pass out, so as to mingle with the gas arising from the burning fuel. The front part d^2 of the chamber *d*, in which are the perforations *i i*, is placed at an angle to the rear wall *d'* thereof, as shown in Fig. 1.

e is a chamber placed in front of *d* and near the rear end of the grate-bars *c*. The rear wall *e'* is made of metal lined with fire-brick or fire-clay or any other suitable material, and the front wall e^2 contains perforations or holes *i i*.

The chamber *e* is to be placed at substantially the same angle as the front wall d^2 of the chamber *d* and at a suitable distance from it, so as to allow sufficient space for a draft. The top of the chamber *e* is made of metal and covered with fire-clay, fire-brick, or any other suitable material. It inclines forward and downward, as shown in Fig. 1, and is fastened to the side walls of the chamber *a*.

f is a heating-chamber formed of brick or any other suitable material and placed at the rear end of the grate-bars, extending both above and below the same, or it may be placed in any other suitable position. It is provided with doors *j*, fitted with slides, so as to regulate the passage of air through it.

g g are conducting-pipes, which take the hot air from the heating-chamber *f* and convey it to the chambers *d* and *e*. From thence the air passes out through the perforations or holes *i i* and mingles with the gas as it arises from the coal on the grate-bars *c*. In some cases, where there is not sufficient room for the pipes *g* without too much reducing the fire-space, it will be found desirable to make use of pipes *k k*, Fig. 2, particularly when my invention is applied to furnaces.

It will be seen that when the air-inlets in the door *j* are open a current of air rushes into the heating-chamber *f*, thence through the conducting-pipes *g* into the superheating-chambers *d* and *e*, and thence outward through the perforations or holes *i i*, mingling with the gas arising from the coal.

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

The fire-box *a*, the air-chamber *d*, having its front part d^2 provided with perforations *i i* and placed at an angle to its rear part *d'*, the chamber *e*, placed in front of the chamber *d* and near the rear end of the grate-bars *c* and having its rear wall *e'* substantially parallel to the front wall d^2 of the chamber *d*, the conducting-pipes *g*, and the heating-chamber *f*, substantially as and for the purpose above described.

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Witnesses:
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