

U. CUMMINGS.
Furnaces.

No. 232,690.

Patented Sept. 28, 1880.

Fig. 1.

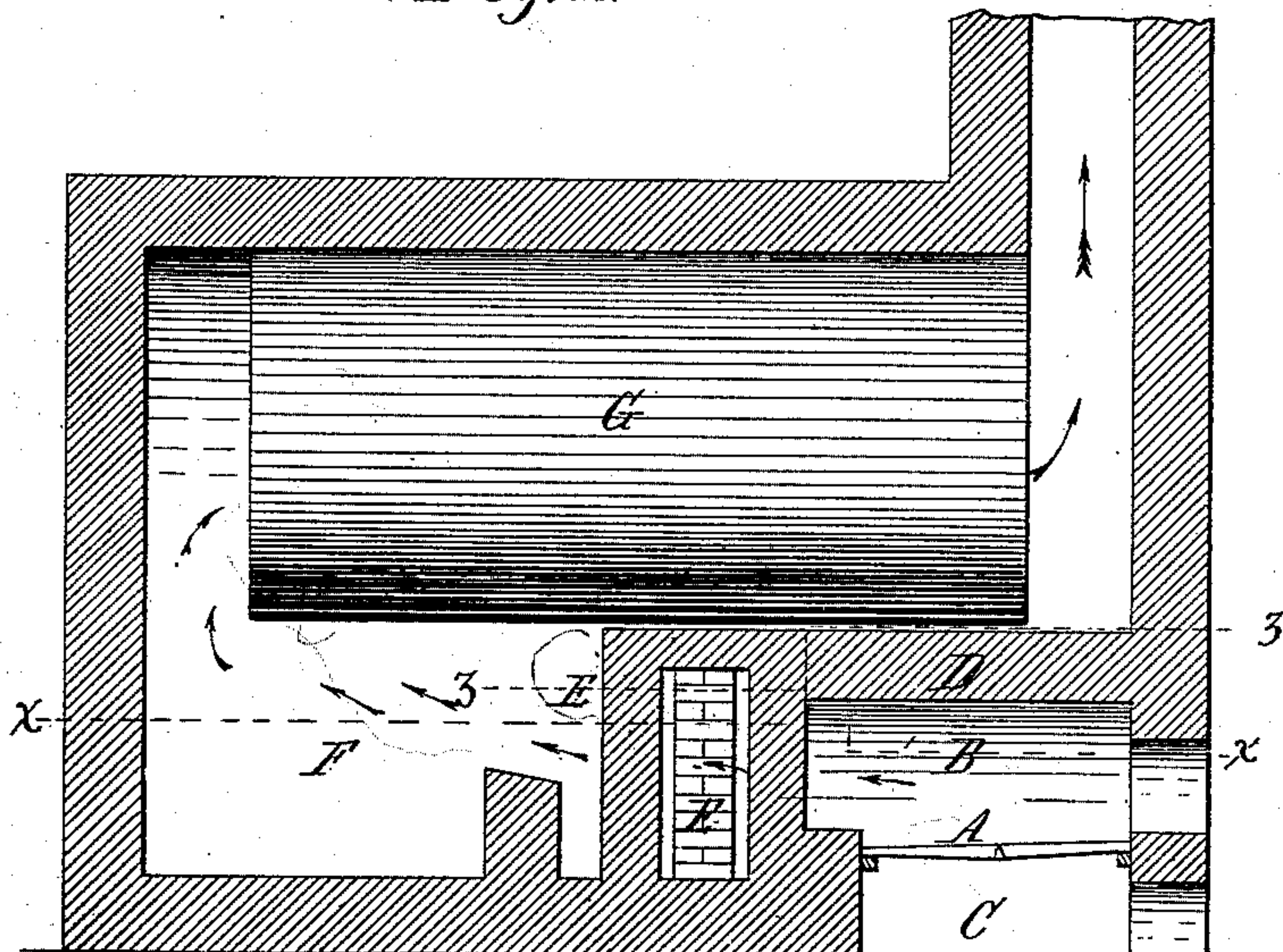


Fig. 3.

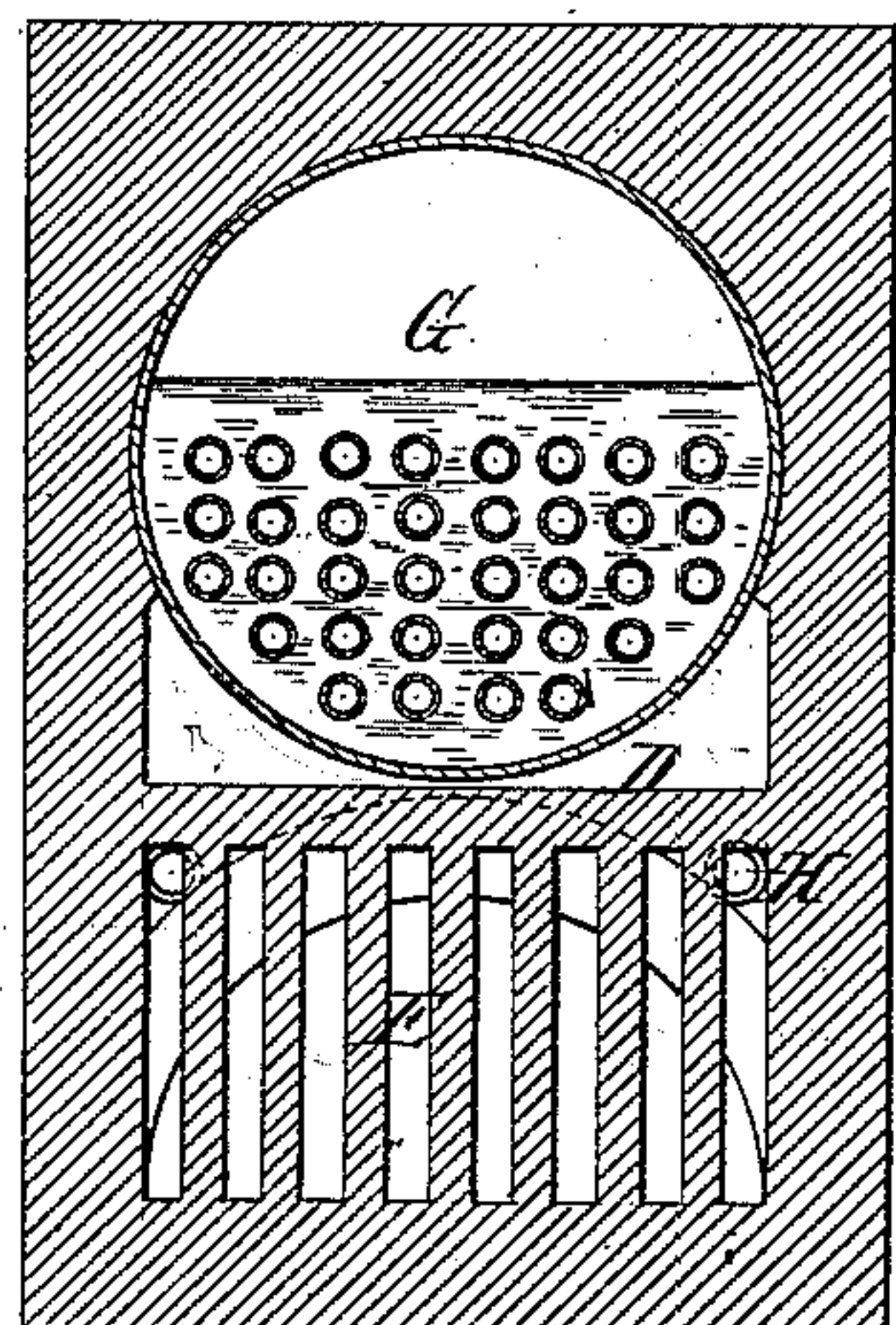


Fig. 2.

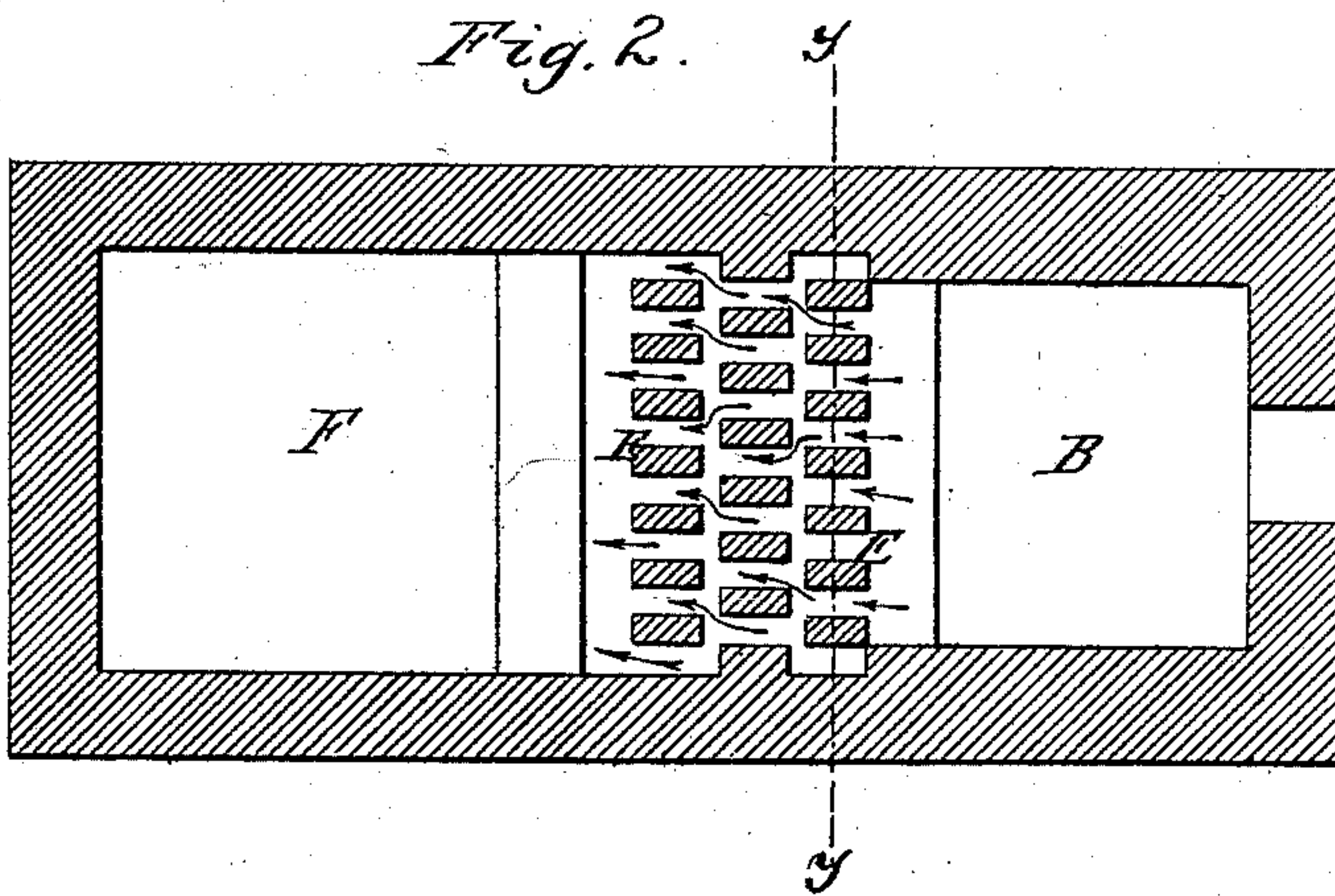
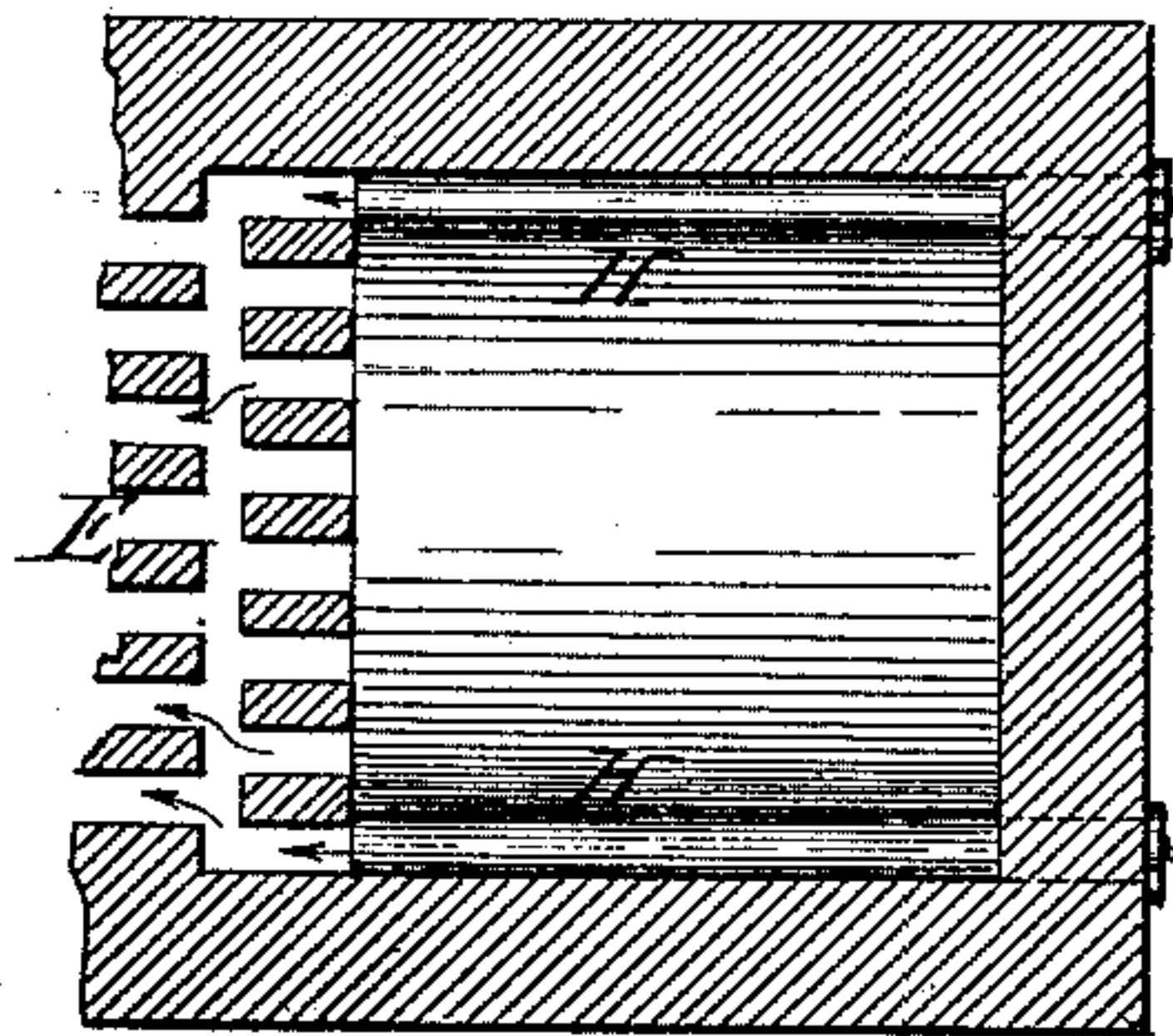


Fig. 4.



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UNITED STATES PATENT OFFICE.

URIAH CUMMINGS, OF BUFFALO, NEW YORK.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 232,690, dated September 28, 1880.

Application filed October 1, 1879.

To all whom it may concern:

Be it known that I, URIAH CUMMINGS, of the city of Buffalo, in the county of Erie and State of New York, have invented new and
5 useful Improvements in Furnaces, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to a furnace which may be employed in connection with steam
10 and other boilers, and for various other purposes, and which is so constructed that a complete combustion of the fuel is effected before the flame comes in contact with the surfaces which are to be heated thereby.

15 In burning fuel under a steam or other boiler in a furnace of ordinary construction, the flame comes in contact with the comparatively cool surface of the boiler, and the heated carbon, which is diffused in the flame, is cooled there-
20 by and forms soot, and the lighter particles of fuel, gaseous and solid, which are mixed with the flame, are prevented from being oxidized by the cooling which results from their contact with the cool surface of the boiler, and
25 form smoke.

The object of my invention is to effect a complete combustion of the various component parts of the fuel by preventing them from coming in contact with the surfaces to be
30 heated until after the combustion is completed; and it consists of a furnace in which the combustion-chamber is separated from the surfaces which are to be heated by an arch or cover of fire-brick or analogous material ar-
35 ranged over the grate so as to form the top of the combustion-chamber, and a series of vertical pillars arranged in the passage or outlet through which the gases escape from the combustion-chamber, as will be hereinafter more
40 fully set forth.

In the accompanying drawings, Figure 1 is a sectional elevation of my improved furnace applied to a steam-boiler. Fig. 2 is a horizontal section in line *x x*, Fig. 1. Fig. 3 is a
45 cross-section in line *y y* of Fig. 2. Fig. 4 is a horizontal section in line *z z*, Fig. 1.

Like letters of reference designate like parts in the several figures.

50 A represents the grate, B the combustion-chamber above the same, and C the ash-pit below the same.

D is an arch or cover, constructed of fire-brick or analogous material, and arranged above the grate so as to form the top of the combustion-chamber.

55 E are vertical pillars, constructed of the same material as the arch D, and arranged in the passage through which the gases escape from the combustion-chamber B into the heating-chamber F, below the boiler G or other appa-
60 ratus to be heated.

As shown in the drawings, the pillars E are arranged in three transverse rows, the pillars in one row being opposite the gas-passages between the pillars in the next adjacent row. 65

The burning fuel upon the grate A imparts a high degree of heat to the arch D and the pillars E, and the flame is thereby prevented from coming in contact with the comparatively cool surface of the boiler or other apparatus
70 to be heated.

In escaping from the combustion-chamber B toward the chimney, the gases have to pass through the narrow spaces between the highly-heated pillars E, whereby the gases are heated
75 to such a degree that a complete oxidation of all the combustible material is effected before the gases are permitted to come in contact with the boiler.

The highly-heated arch D and pillars E ra-
80 diate a large portion of their heat upward, where it is absorbed by the boiler or other apparatus in connection with which the furnace is employed.

H represents one or more air-tubes arranged
85 longitudinally in the arch D for admitting air to the interior of the furnace. The outer ends of the tubes H communicate with the external air, and are provided with suitable registers, whereby the admission of air to the tubes H
90 can be regulated, and the inner ends of the tubes H open between the pillars E. The air which is drawn into these tubes by the chimney-draft becomes heated in passing through the heated tubes, and is discharged into the
95 air-passages between the pillars E, where it commingles with the highly-heated gases, and insures a complete combustion of the same.

My improved furnace is constructed at very small expense, and it can be operated by at-
100 tendants of ordinary skill with the same ease and convenience as ordinary furnaces.

I claim as my invention—

5 A furnace constructed with an arch or cover, D, forming the top of the combustion-chamber, and vertical pillars E, arranged in several transverse rows in the passage through which the gases escape from the combustion-chamber between the latter and the object to be heated, the pillars in one row being opposite the gas-passages between the pillars in the

next adjacent row, the arch being so extended 10 that the flame is compelled to come in contact with the highly-heated arch and pillars before it comes in contact with the surface to be heated, substantially as set forth.

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