

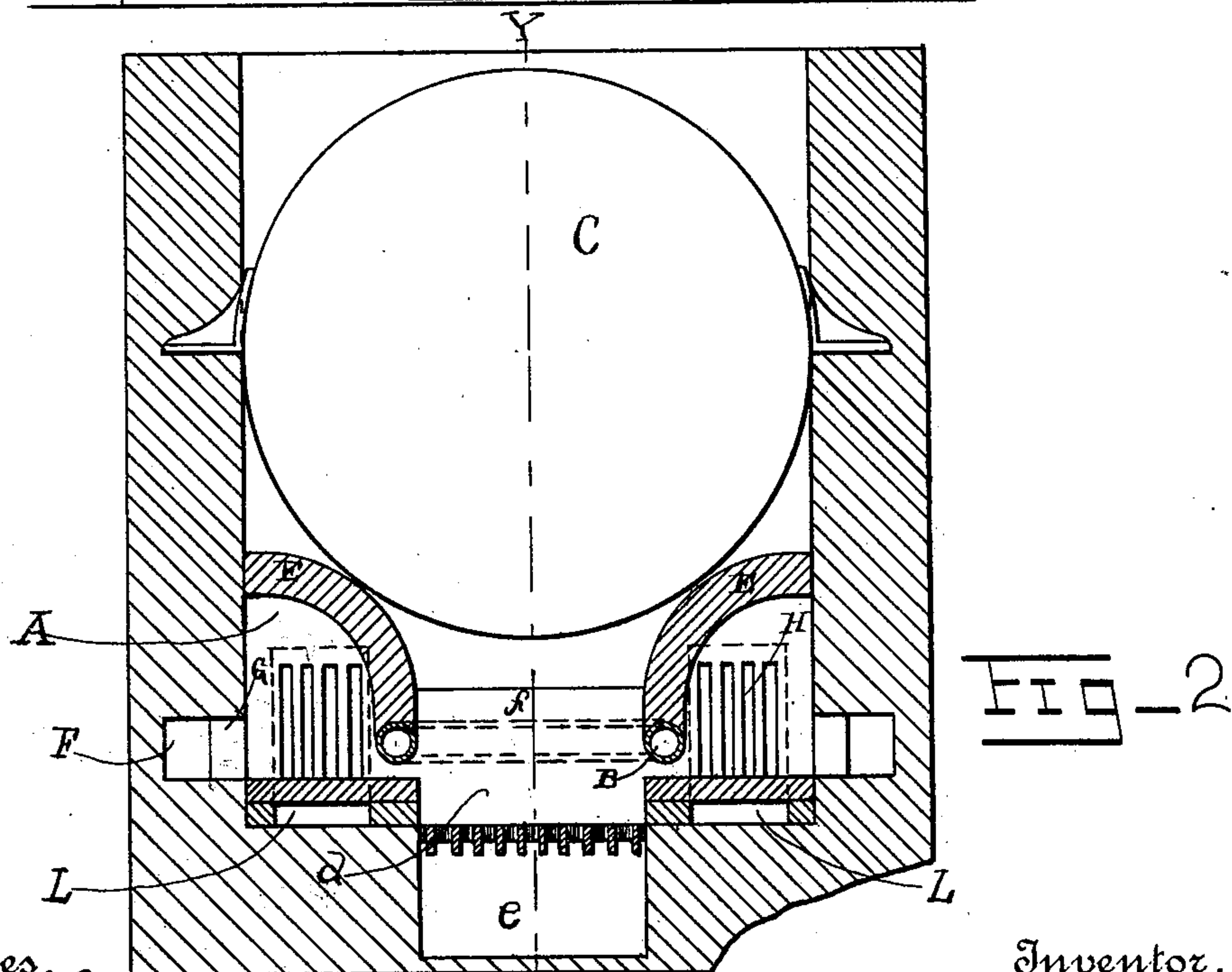
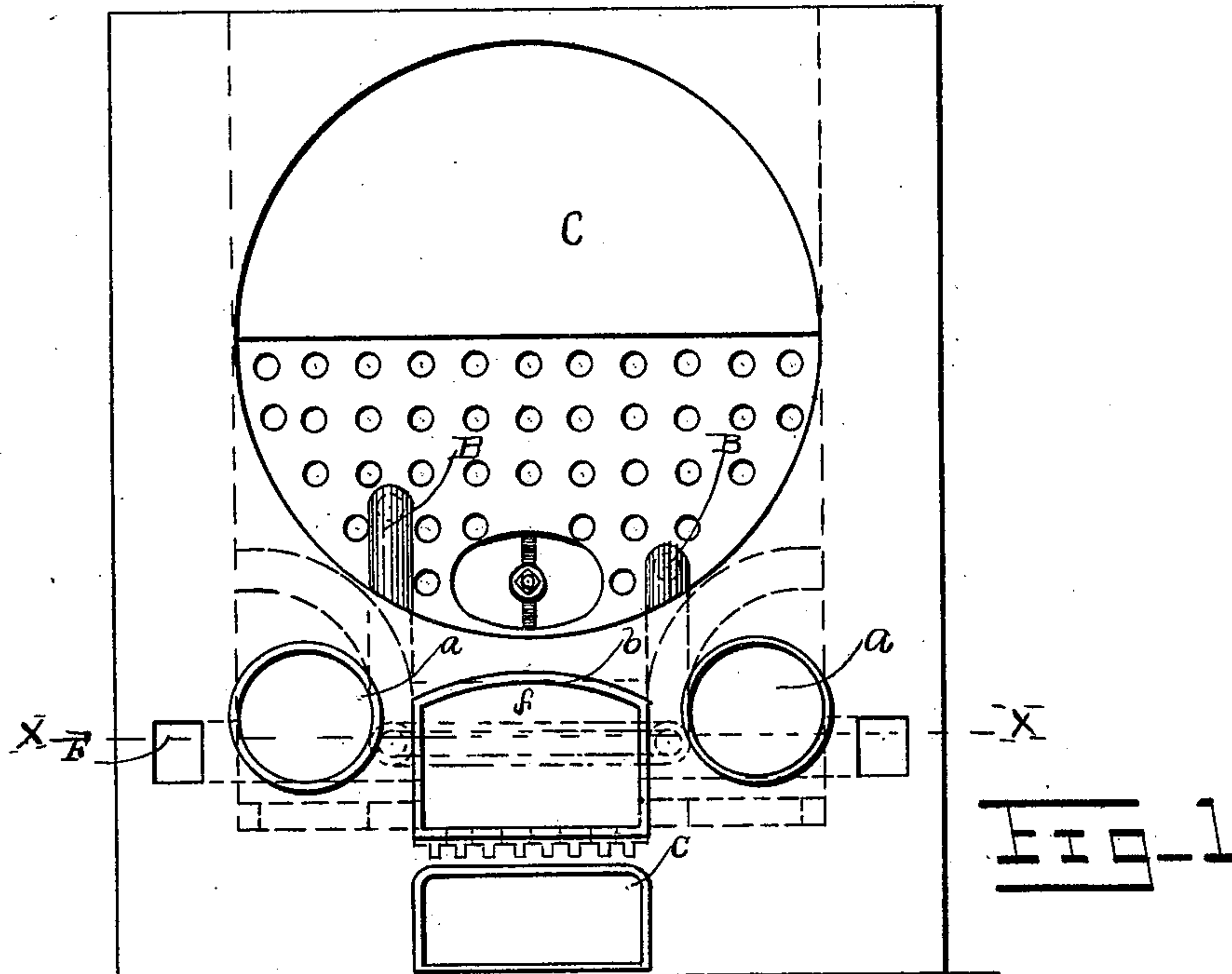
(No Model.)

3 Sheets—Sheet 1.

J. BURNS.
SMOKE AND GAS CONSUMING FURNACE.

No. 403,874.

Patented May 21 1889.



Witnesses.
Geo. F. Landrum
W. K. Hays

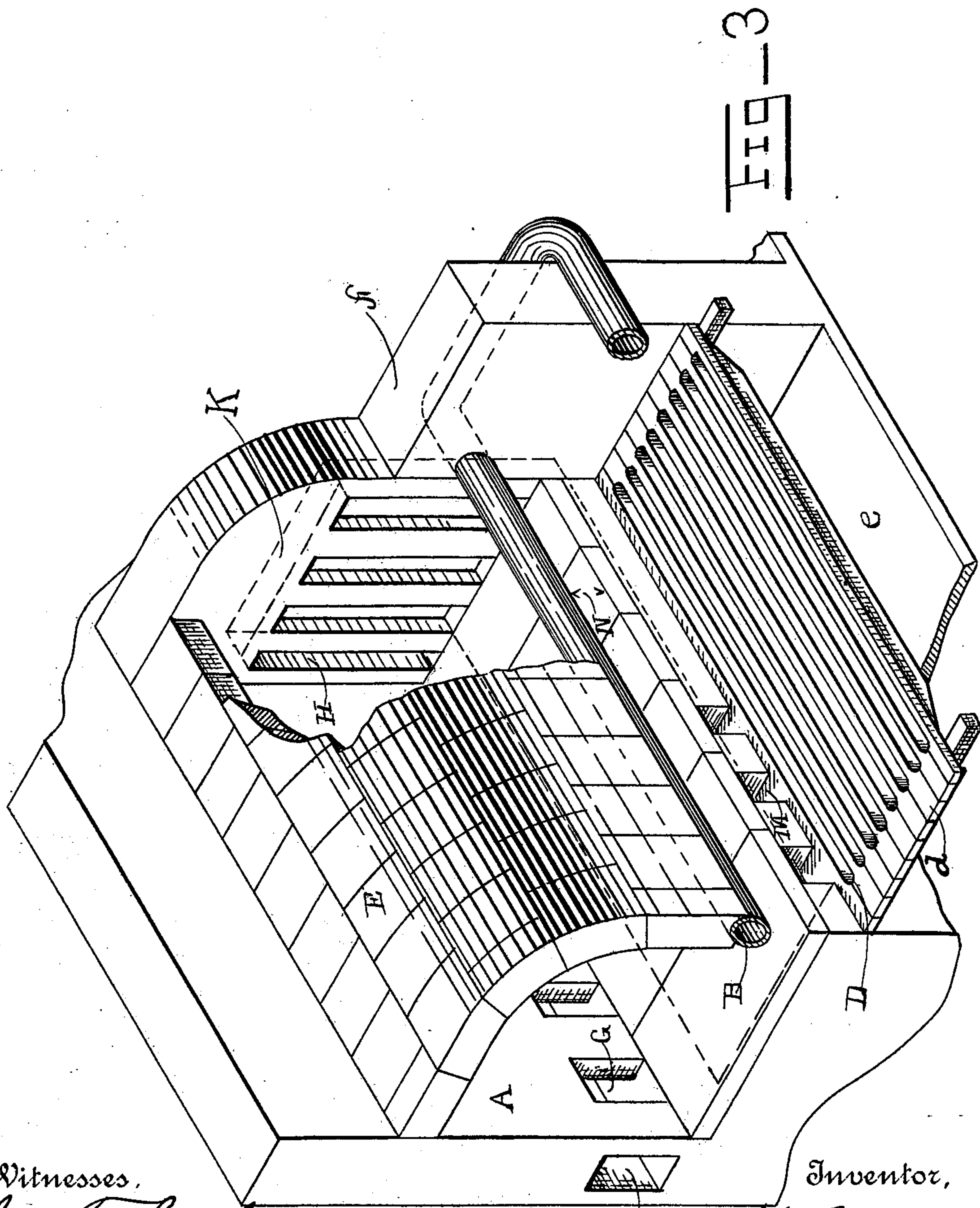
Inventor,
John Burns

By *J. F. Hilditch* Attorney.

(No Model.)

3 Sheets—Sheet 2.

J. BURNS.
SMOKE AND GAS CONSUMING FURNACE.
No. 403,874. Patented May 21 1889.



Witnesses,
Geo. F. Lasham
Wm. K. Hays

Inventor,
John Burns
By *J. F. Lasham* Attorney

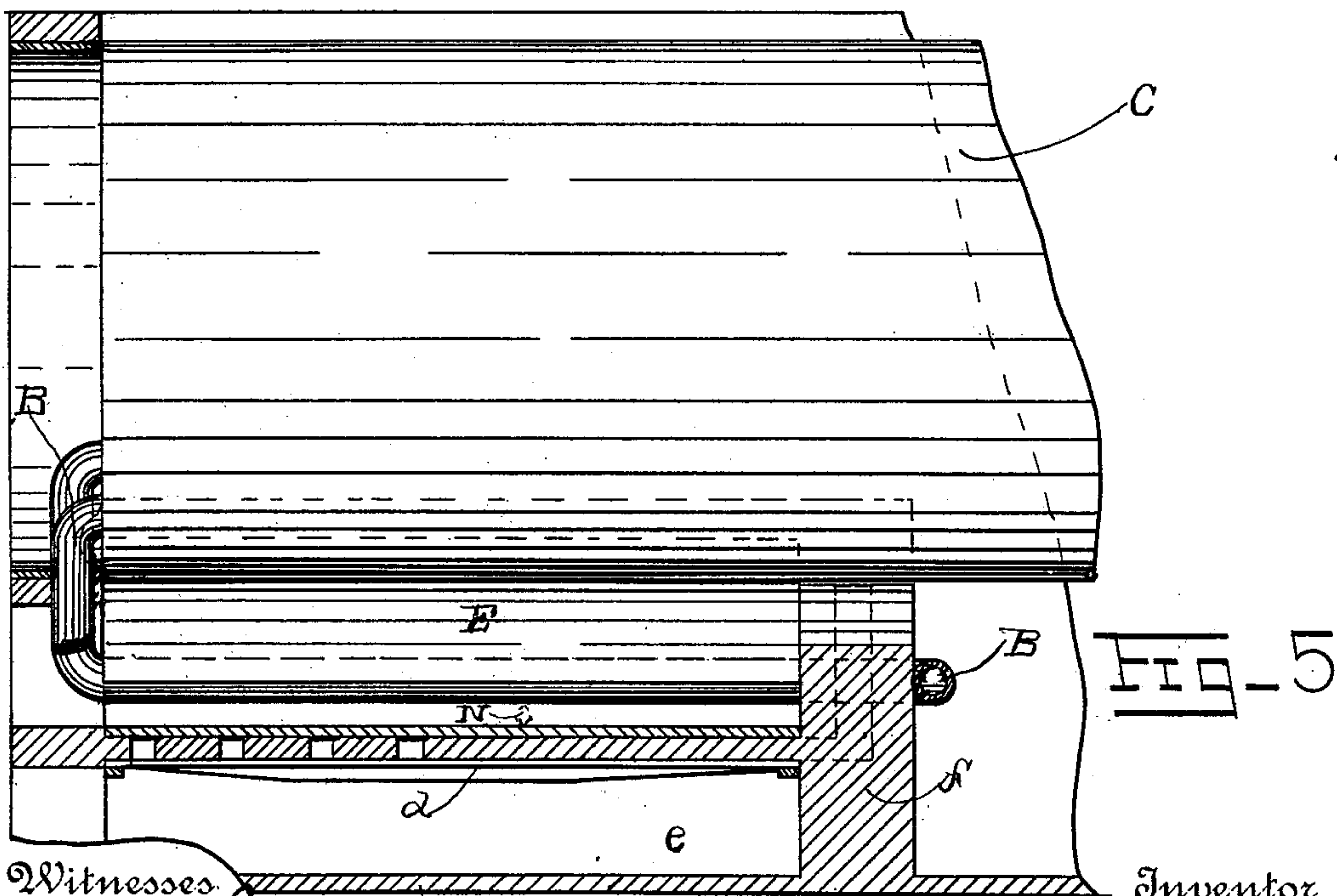
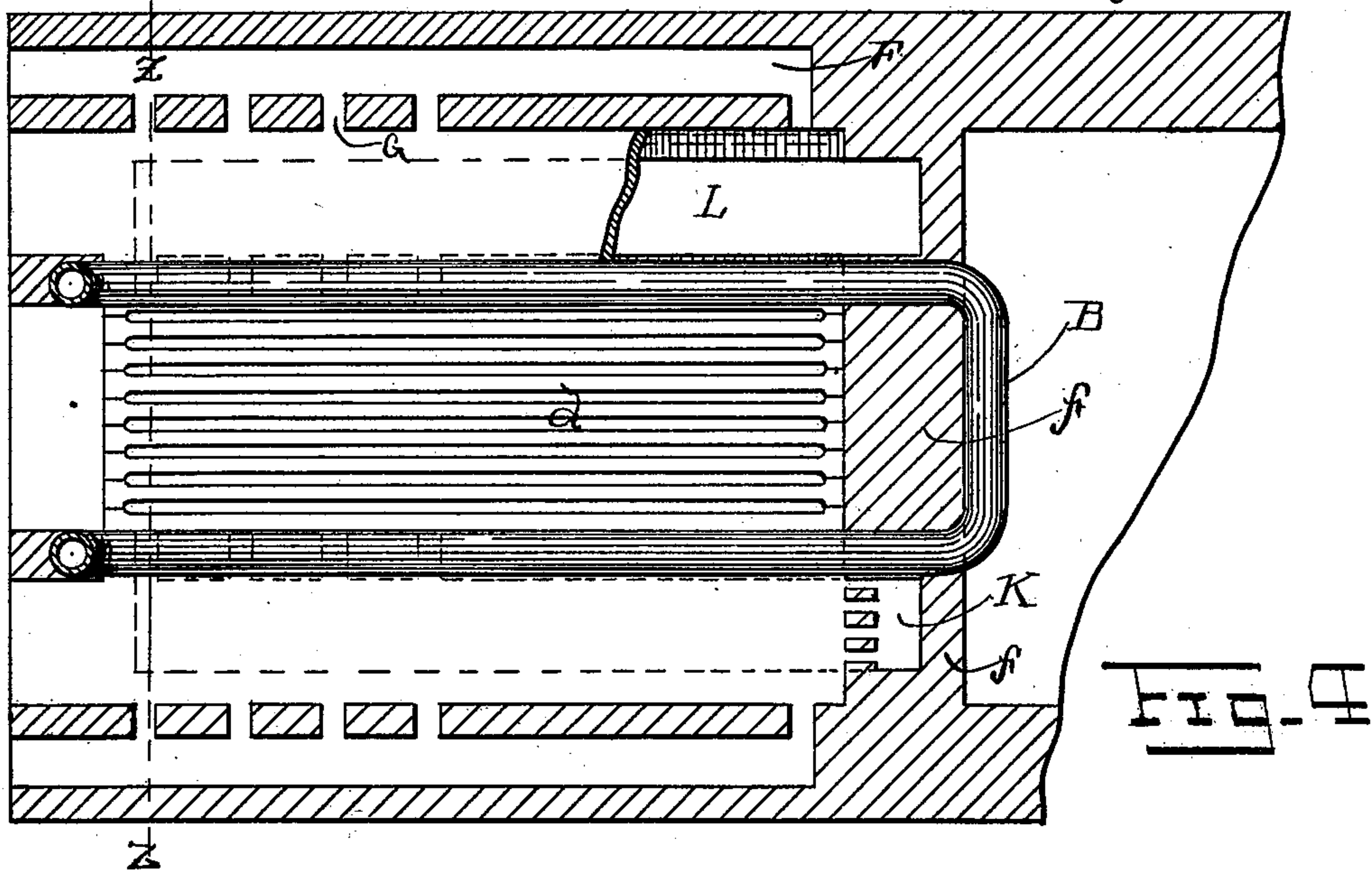
(No Model.)

3 Sheets—Sheet 3.

J. BURNS.
SMOKE AND GAS CONSUMING FURNACE.

No. 403,874.

Patented May 21 1889.



Witnesses

John T. Larkin
J. M. K. Hays

Inventor,

John Burns

By J. H. Edwards Attorney

UNITED STATES PATENT OFFICE.

JOHN BURNS, OF ROCHESTER, NEW YORK, ASSIGNOR OF ONE-HALF TO
ROWLAND W. FREDERICKS, OF LOCK HAVEN, PENNSYLVANIA.

SMOKE AND GAS CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 403,874, dated May 21, 1889.

Application filed July 20, 1888. Serial No. 280,455. (No model.)

To all whom it may concern:

Be it known that I, JOHN BURNS, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Smoke and Gas Consuming Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Heretofore great objection has arisen to the use of furnaces using bituminous coal in and near cities and towns, owing to the fact that the smoke arising from their use discolored buildings and rendered the neighborhood unpleasant to reside in.

The object of my invention is to overcome this objection by constructing a furnace for consuming the gases and smoke arising from the consumption of bituminous coal. My furnace will be constructed in such a manner that the smoke and gases arising from said combustion within the furnace will be consumed, and thereby prevented from escaping; and to this end my invention will gain the advantage of keeping the fires in a good combustible order continually on account of being fed with the gas arising from the coal used, the gas from the coke being allowed to pass out from the coking-chamber through flues and returned to the fire in the fire-box through connecting-flues, and is there consumed, together with coke drawn from the coking-chamber, through openings provided for that purpose.

Figure 1 shows front elevation of furnace with furnace-doors, coking-oven doors, boilers, and circulating water-pipe connection, and ash-pit door. Fig. 2 shows section on line of $z z$ of Fig. 4. Fig. 3 shows isometric section with coking-oven broken away, showing flues H and bottom of coking-oven A, flues G, bridge-wall f , section of circulating water-pipe B, communicating space N between fire-box and coking-oven A, grate-bars d , and ash-pit e , with portion broken away. Fig. 4 shows section on line $x x$ of Fig. 1. Fig. 5 shows section on line $y y$ of Fig. 2.

To carry out my invention, a coking-chamber, A, having a close bottom, is constructed or formed between the arch E and the wall of

the furnace, as shown in Figs. 1, 2, 3, 4, and 5. This arch is supported by means of a circulating water-pipe, B, connected with boiler C to insure the circulation of water through said pipe B for the purpose of keeping said pipe B cold, the higher point of said arch resting against the side wall of said furnace. By this means the lower end of said arch is protected from the action of the heat, &c., and thereby its durability very greatly increased. The close bottom of said coking-chamber prevents air from passing up through the coking coals and essentially aids in securing good results. The pipe B is located about six inches above the bottom of the coking-chamber A, forming connecting-space N between coking-chamber A and fire box or chamber D. Said opening N is provided for the purpose of removing coke from the coking-chamber A to fire-box D for consumption thereof after the gases arising from the coking process have been separated from the coke. A sufficient quantity of air is admitted to flue F and passes from said flue F through flues G into coking-chamber A over the bituminous coal in coking-chamber A. The air so admitted through flues F and G unites with the gas and smoke formed in coking-chamber A and ignites the same. The product of said combustion and said gases and smoke not consumed passes from coking-chamber A through flues or openings H into flue K, formed in the end of coking-chamber A and communicating with flue L under the bottom of coking-chamber A. Connection is made from flue L to fire-box D by flues M, through which the said smoke and gas pass and come in contact with the coals burning in the fire-box D, passing through said fire of coal, thereby completely consuming the smoke and gas passing. The products of combustion are carried through the furnace to chimney provided for same.

The operation of this device is as follows: Charge coke through fire-box door to a height above the flues opening into fire-box from the flue under the coking-ovens and ignite same. The heat arising from said fire will heat the arches of the coking-oven to the requisite heat to cause the light hydrocarbon to arise from the coal that is in the coking-chamber. Said coal is supplied to said coking-

chamber through doors in iron front and located on each side of central fire-box. When the main fire-box needs replenishing, introduce a poker or rake through central or fire-box door to and through space N into coking-chamber and rake the coke that is made in said coking-chamber through space N upon the grate-bars of central fire-box. After the coke, is removed through space N into fire-box, then charge the coking-chamber with fresh coal, and so continue the operation as long as desirable.

Having fully described my invention, what I desire to claim and secure by Letters Patent is—

1. A coking-oven within a furnace formed by an arch resting on a circulating water-pipe connected to the boiler and the side wall of the furnace, and having space N communicating with the fire-chamber, in combination with communicating flues and openings entering the fire-chamber above the grate-bars and below the space N, substantially as herein described.

2. A flue within a furnace with a coking-oven located above it and openings and flues connecting said flue and coking-oven, in combination with flues or openings entering the fire-chamber above the grate-bars, for the purpose substantially as herein described.

3. The combination, with a furnace, of a boiler, C, connecting with circulating water-pipe B, supporting fire-brick arch E of coking-chamber A, forming communicating space N between the fire-box D and coking-cham-

ber A, and flues M, L, K, and H, connecting coking-chamber A and fire-box D, substantially as set forth.

4. The combination, with a furnace, of a boiler, C, connecting with circulating water-pipe B, supporting the fire-brick arch E of coking-chamber A, forming communicating space N between fire-box D and coking-chamber A, with flues M, L, K, and H, connecting coking chamber A and fire-box D, and flues F and G, substantially as set forth.

5. In a furnace, as described, having a coking-chamber and fire-chamber with communicating space N between them, the combination of the coking-chamber A, flues H and K, and the connecting-opening M, entering the fire-chamber above the grate and below the opening N, substantially as described.

6. A coking-oven within a furnace having a close bottom to prevent air from passing up through the coal coking therein, in combination with a water-pipe connected to the boiler for the circulation of water therein and an arch supported thereon and constituting the side and top of the coking-chamber and forming a communicating space, N, between the furnace and the coking-chamber, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN BURNS.

Witnesses:

JNO. F. LAEDLEIN,
N. HAWLEY.