

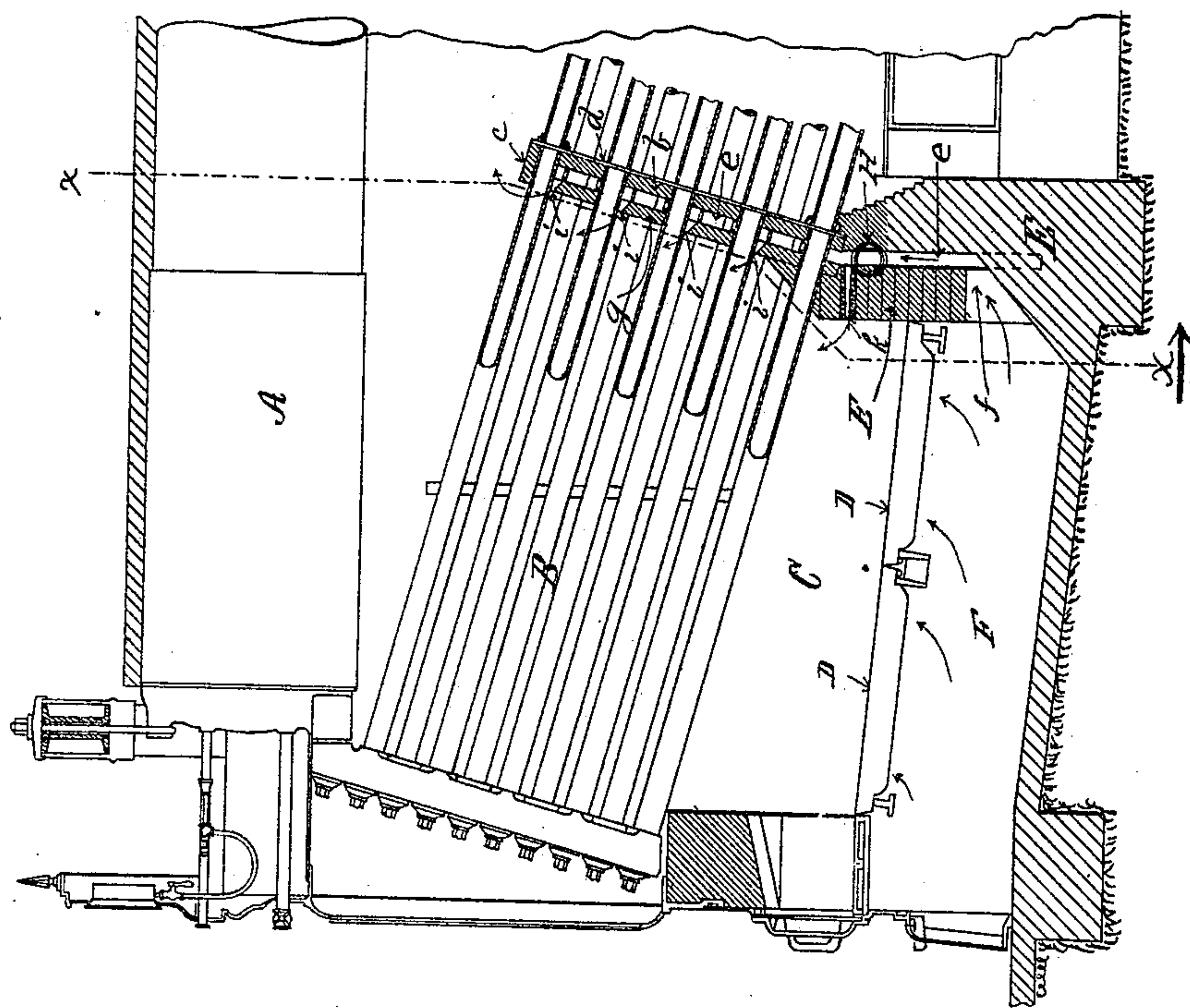
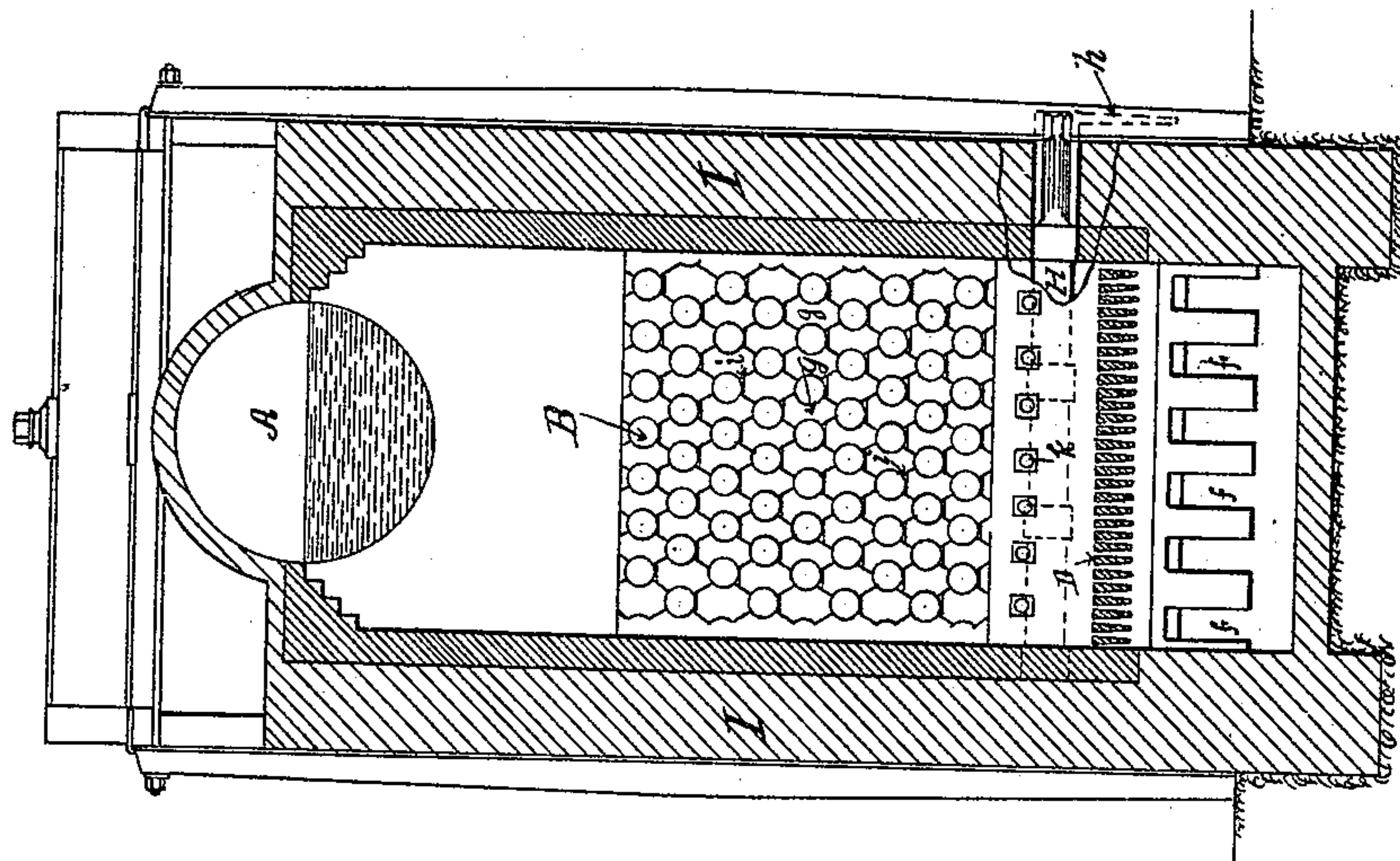
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3 Sheets—Sheet 1.

T. REESE, Jr. & H. W. SELLER.
SMOKE PREVENTING WATER TUBE BOILER FURNACE.

No. 448,076.

Patented Mar. 10, 1891.



WITNESSES

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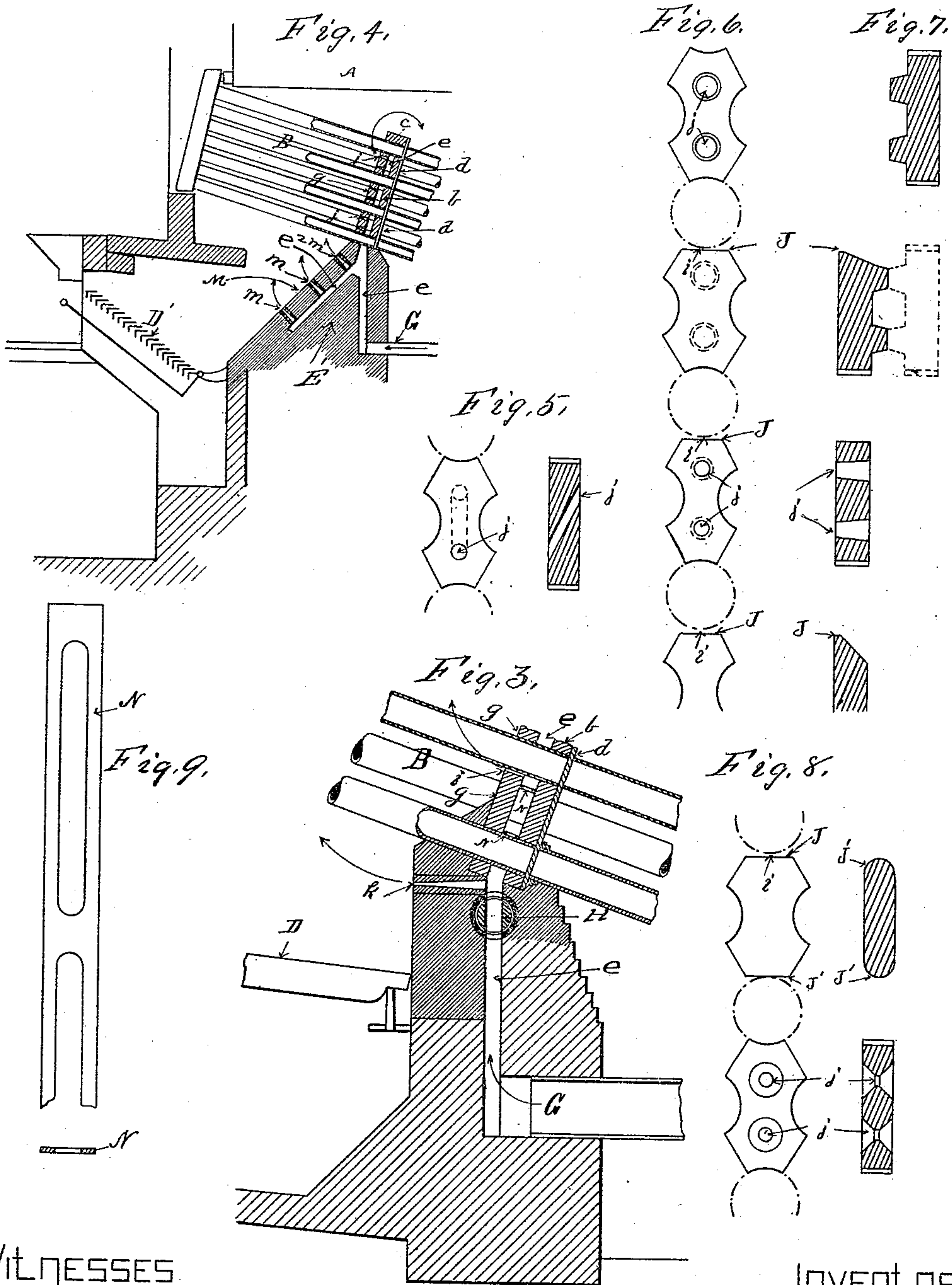
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SMOKE PREVENTING WATER TUBE BOILER FURNACE.

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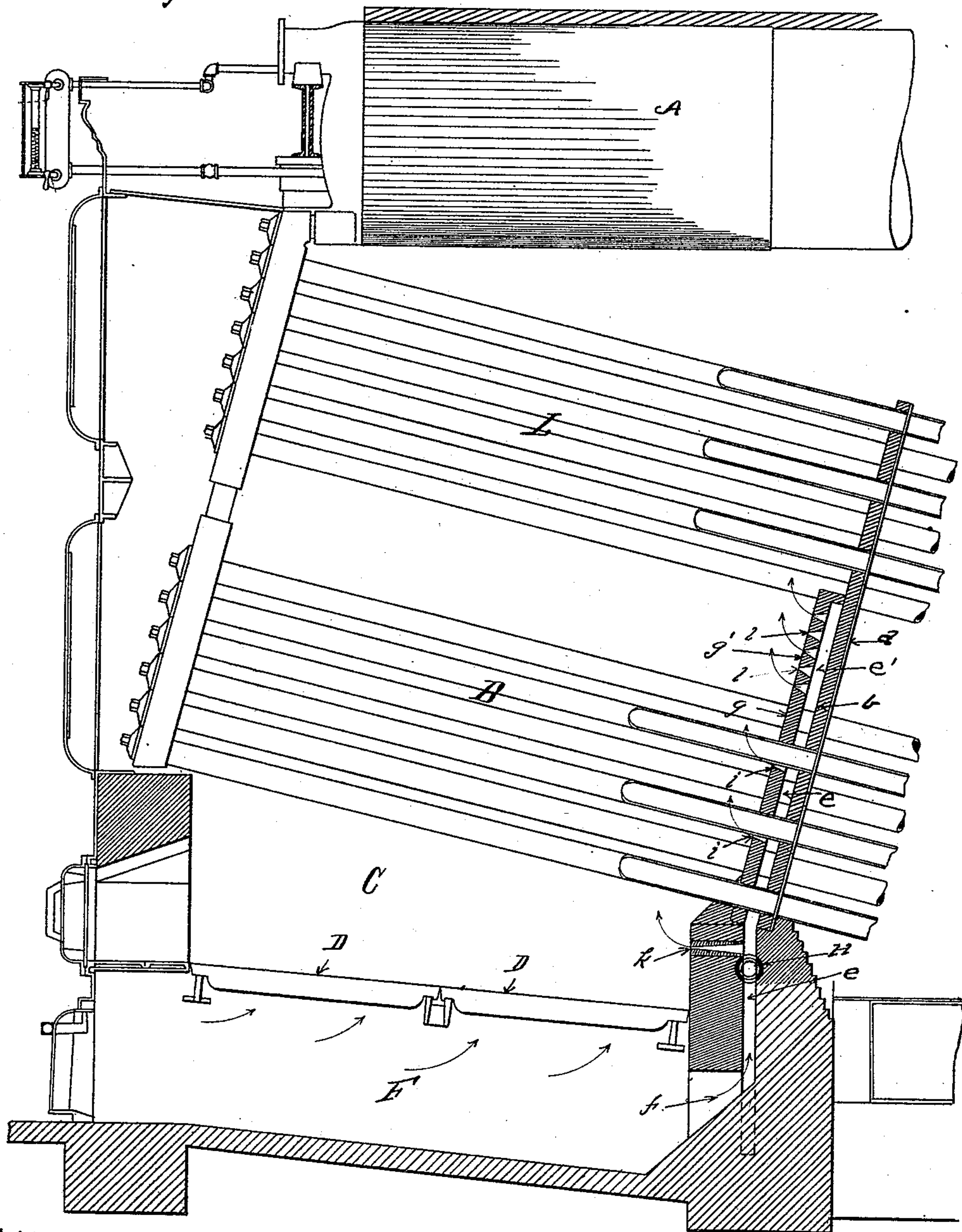
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Fig. 10.



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UNITED STATES PATENT OFFICE.

THOMAS REESE, JR., OF NEWARK, NEW JERSEY, AND HARRY W. SELLER, OF
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SMOKE-PREVENTING WATER-TUBE-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 448,076, dated March 10, 1891.

Application filed November 19, 1890. Serial No. 371,961. (No model.)

To all whom it may concern:

Be it known that we, THOMAS REESE, JR., and HARRY W. SELLER, citizens of the United States, residing, respectively, at Newark, in the
5 county of Essex and State of New Jersey, and at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Gas-Consuming and Smoke-Preventing Water-Tube-Boiler Furnaces; and we do hereby declare the following
10 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, reference being had to the accompanying drawings, and to the letters of
15 reference marked thereon, forming part of this specification.

Our invention consists in the improvements in gas-consuming and smoke-preventing
20 boiler-furnaces hereinafter set forth and explained, and illustrated in the accompanying drawings, in which—

Figure 1 is a view in elevation, partly in section, of our improved gas-consuming and
25 smoke-preventing boiler-furnace. Fig. 2 is a transverse section of the same on the line $x x$ in Fig. 1, looking in the direction of the arrow. Fig. 3 is a sectional view of a modification of the same, showing the air-supply entering
30 from the rear of the bridge-wall. Fig. 4 is a sectional view of the same applied to an automatically-stoking furnace. Figs. 5, 6, 7, and 8 show detail views of forms of brick adapted to be used in our invention between the wa-
35 ter-tubes. Fig. 9 shows sectional views of a metal shell adapted to be used in our invention between the water-tubes in lieu of brick. Fig. 10 shows a view in elevation, partially in section, of our invention applied to a
40 double-deck water-tube boiler.

Like letters refer to like parts in all the figures.

In the construction of our invention shown in the drawings, A is the steam-drum, and B
45 the water-tubes of the boiler, and C the fire-box having ordinary grate-bars D therein.

The water-tubes B in the boiler of the type shown are usually placed at an inclination of, say, fifteen degrees from the front to the rear
50 of the boiler. At the rear end of the fire-box

we construct a bridge-wall E, having a vertical air-passage e therein, communicating at its lower end either with the draft-opening f from the rear end of the ash-pit F, as shown in Figs. 1 and 9, or with a pipe or pipes G, ex-
55 tending from the rear of the bridge-wall E and out at the rear end of the combustion-chamber or out at the sides of the boiler-setting I, as may be desired. Near the top of this passage e is placed a valve H, extending
60 the entire width longitudinally of the passage e in the bridge-wall. This valve may be made so as to be rotated by means of a handle h , secured thereto outside of the wall I of the boiler-setting, as shown, so that the air-
65 passage e may be closed more or less, as may be desired, to regulate the air-supply and facilitate combustion of the gases generated from coal on the grates D; or any other form of cut-off valve may be used in lieu of the
70 construction shown, if desired.

In the face of the bridge-wall E, below the lower tier of water-tubes, are preferably made a series of small openings k , communicating with the vertical passage e above the valve
75 H, through which air can be supplied to the furnace directly above the bed of coal upon the grate-bars D. From the point where the bridge-wall E contacts with the lower tier of inclined water-tubes B the passage e is con-
80 tinued upward at right angles to the tubes B. The rear wall b of this passage is preferably made of fire-brick of such shape as will fill the spaces between the tubes B, and is preferably supported by plates of iron d of suit-
85 able shape to allow the tubes B to pass through openings therein. The front side of the passage e is constructed, preferably, of fire-brick g , (types of different shapes of which are shown in Figs. 5, 6, 7, and 8,) these brick
90 being provided with air-exit openings made by cutting a small portion of the upper ends of the brick away where they contact with the tubes above them, as shown at J in Figs. 6, 7, and 8, so as to leave small air-exit openings
95 i between the upper ends of the brick and the under sides of the tube by cutting both the upper ends and lower ends of the brick away, as shown at J', Fig. 8, or by making
100 small openings through the bodies of the

brick, as illustrated at *j* in Figs. 5, 6, 7, and 8, or by means of hollow plates *N*, Fig. 9, one or all of these forms of air-exit openings being used with equal facility, when desired, in the construction of the front wall *g* of the passage *e* between the tubes *B*.

The upper end of the passage *e* is preferably closed above the upper tier of tubes *B* by a course of brick *c*, so that the air can pass out only through the openings *k* in the front of the bridge-wall and through the openings in the brick between the tubes *B*.

In Fig. 4 this invention is shown as applied to a water-tube boiler having a self feeding and stoking furnace. In this case the furnace-grate and bridge-wall are modified in shape and construction to adapt them to the changed conditions, the grate-surface *D'* and the front *M* of the bridge-wall *E'* being inclined toward each other. In this form of the invention no regulating-valve is shown, as it may be dispensed with, if desired, the passage *e* in the bridge-wall and between the bank of tubes *B* being the same construction as hereinbefore described; but from the passage *e*, commencing near the top of the bridge-wall *E'*, an inclined passage *e²* extends down under the inclined front face *M* of the bridge-wall, and small openings *m* are made extending from the passage *e²* through the front *M* of the bridge-wall, so that air may be supplied to the furnace through these openings.

In Fig. 9 this invention is shown as applied to what is known as a "double-deck water-tube boiler." In this case the air-passage *e* has an extension *e'* extending above the lower bank of tubes *B* and to the lower pipe in the upper bank of tubes *L*, the rear wall *b* of the passage extending up to the upper tier of the bank of water-tubes *L*, so as to form a bridge-wall over which the products of combustion must pass, the front wall *g'* of the portion *e'* of the passage *e* extending from the upper tier of tubes *B* to the lower tier of tubes *L* and being perforated with a series of holes *l*, through which air passes to aid combustion.

It will be observed that forced-draft mechanism may be utilized in the operation of this invention with the same facility as the natural draft, if desired. Fuel-gas or fuel-gas and air intermixed may also be supplied to the furnace through the passage *e* and *e'* and the boiler heated thereby alone or in conjunction with ordinary fuel placed on the furnace-grates in the usual way, if desired. The construction of the rear portion of the boiler and of the combustion-chamber back of the bridge-wall is not shown or described,

as they form no part of this invention, any desired form of construction thereof being utilized therein.

The operation of this invention is so obvious to those skilled in the art to which it appertains that further description thereof is deemed unnecessary. Therefore,

Having fully described our invention, so as to enable others to construct and use the same, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination, in a gas-consuming and smoke-preventing boiler-furnace, of a bridge-wall having an upward hollow extension forming an air chamber or passage therein, said chamber extending up to the top tier of the bank of water-tubes used in said boiler, with a series of openings through the front wall of said bridge-wall, through which air or gas can be supplied to the fire in front of the bridge-wall below and between the tubes from the air chamber or passage in the bridge-wall, substantially as and for the purpose set forth.

2. The combination, in a gas-consuming and smoke-preventing boiler-furnace, of a bridge-wall having an upward hollow extension forming an air chamber or passage, said chamber extending up to the top tier of the first bank of water-tubes, and also having a rear wall extending up to the top tier of the upper bank of water-tubes composing said boiler, so as to form a bridge-wall extending to the top of one or more banks of tubes, with a series of holes perforated in the front wall of said bridge-wall below and between the water-tubes, through which air or gas can be supplied from the air passage or chamber within the bridge-wall to the fire in front thereof, substantially as and for the purpose set forth.

3. The combination, in a gas-consuming and smoke-preventing boiler-furnace, of a bridge-wall having an upward hollow extension forming an air chamber or passage therein, said chamber extending up between the bank or banks of water-tubes in said boiler and having the front wall thereof provided with openings for supplying air or gas to the fire in front of said bridge-wall, with a valve for regulating the supply of air to the air chamber or passage in the bridge-wall, substantially as and for the purpose set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

THOMAS REESE, JR.
HARRY W. SELLER.

Witnesses:

D. R. NORVELL,
T. A. BEALL.