

No. 676,689.

Patented June 18, 1901.

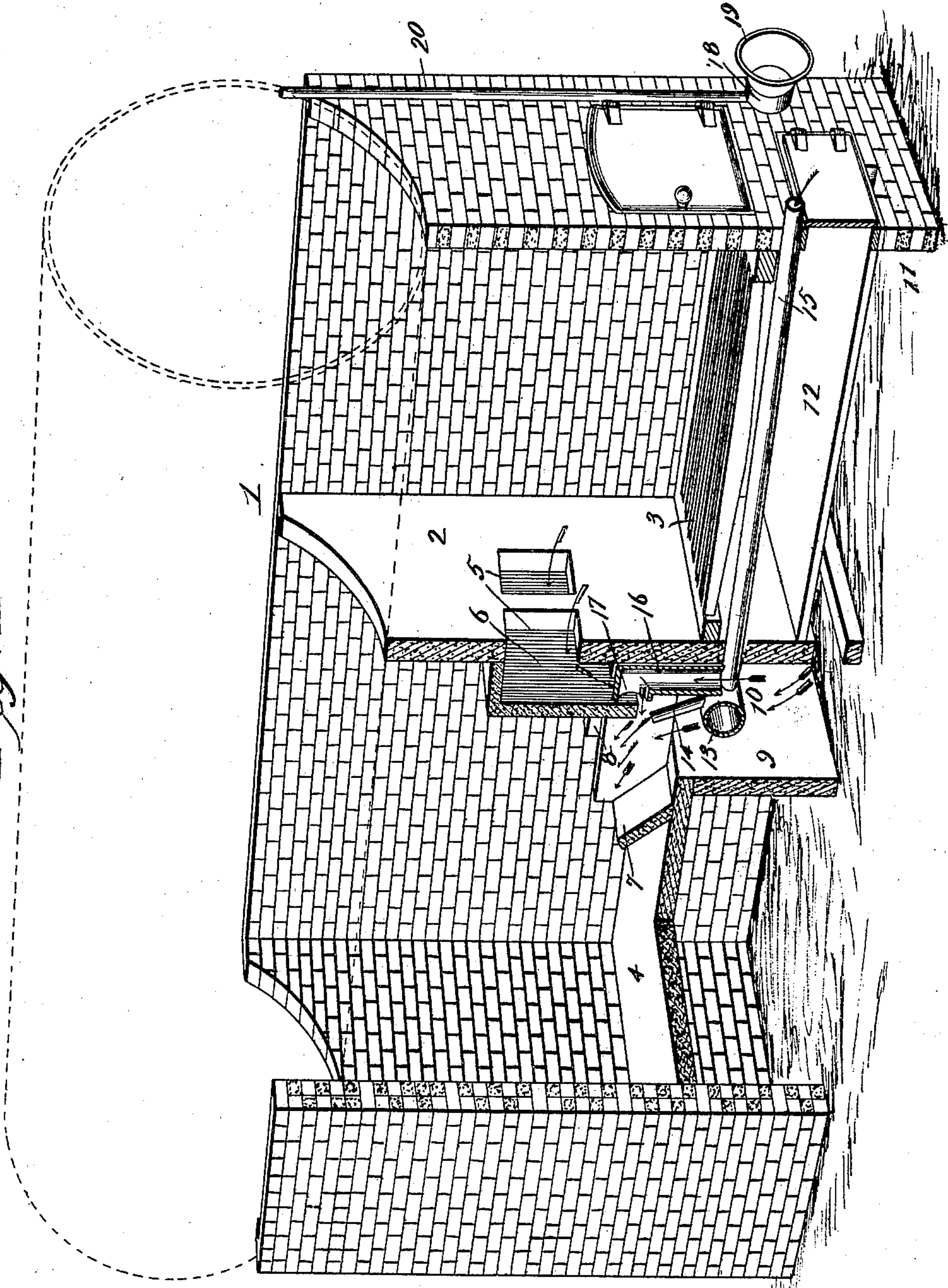
F. M. REED & S. C. SILVER.
SMOKE CONSUMING FURNACE.

(Application filed Jan. 16, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses

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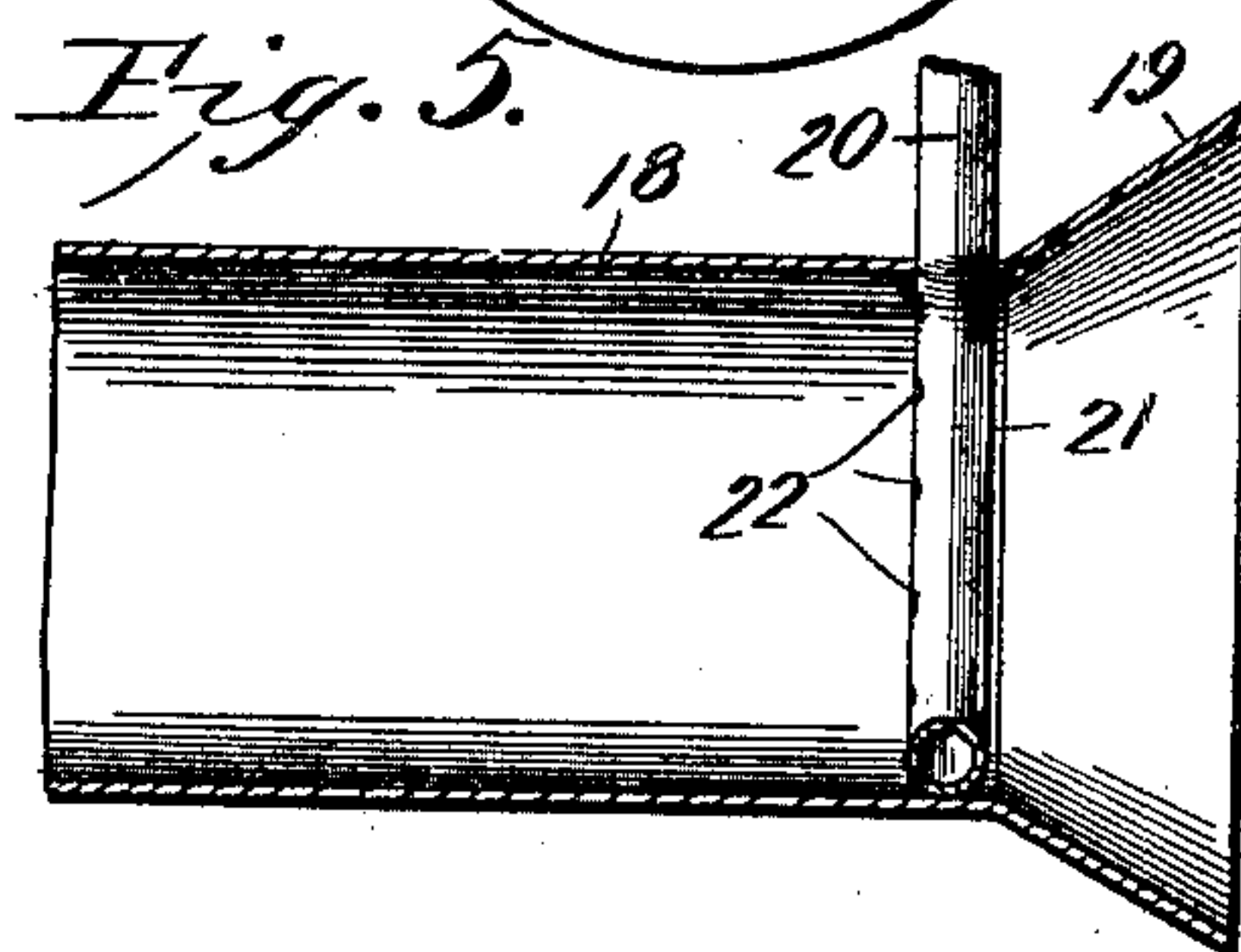
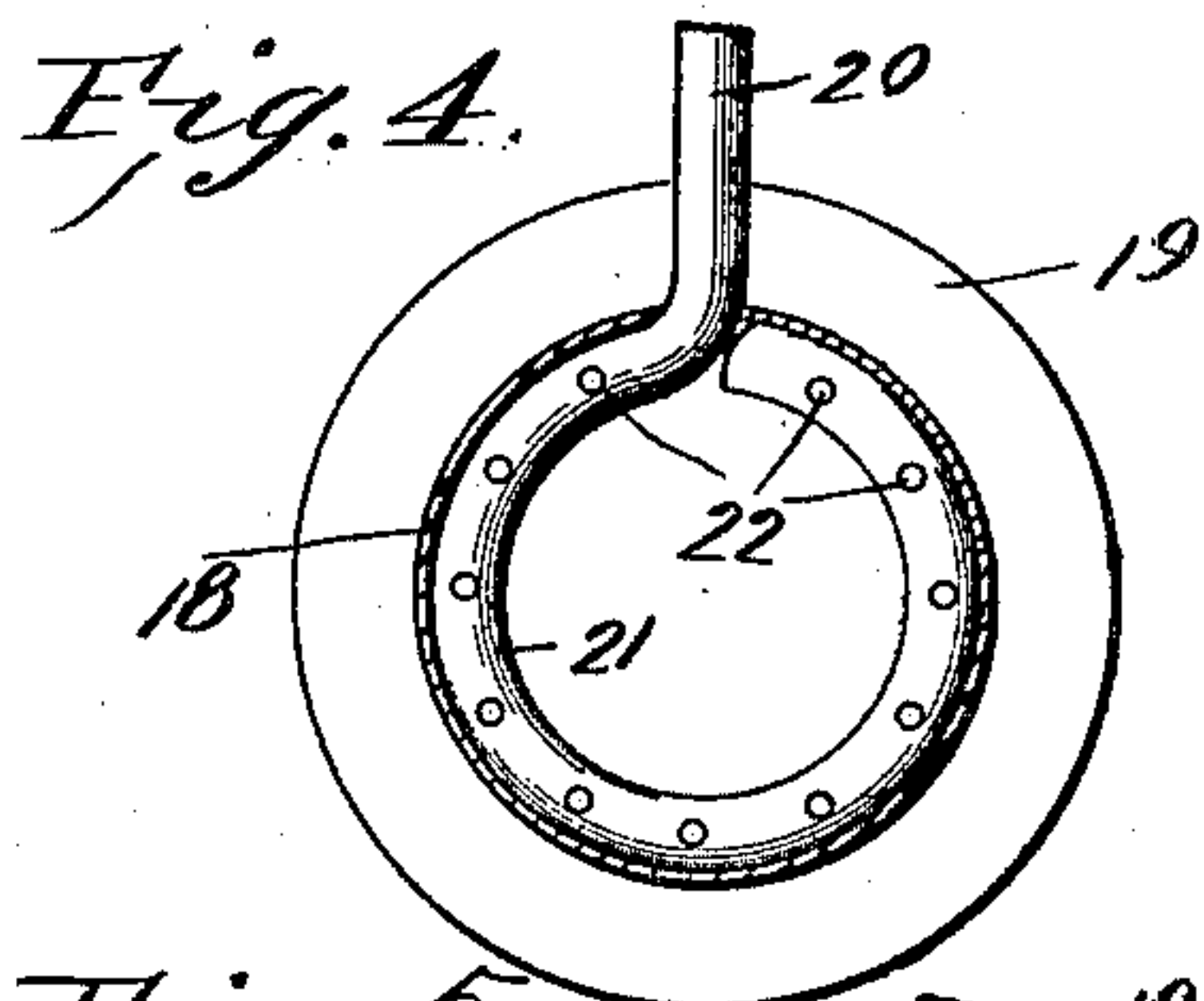
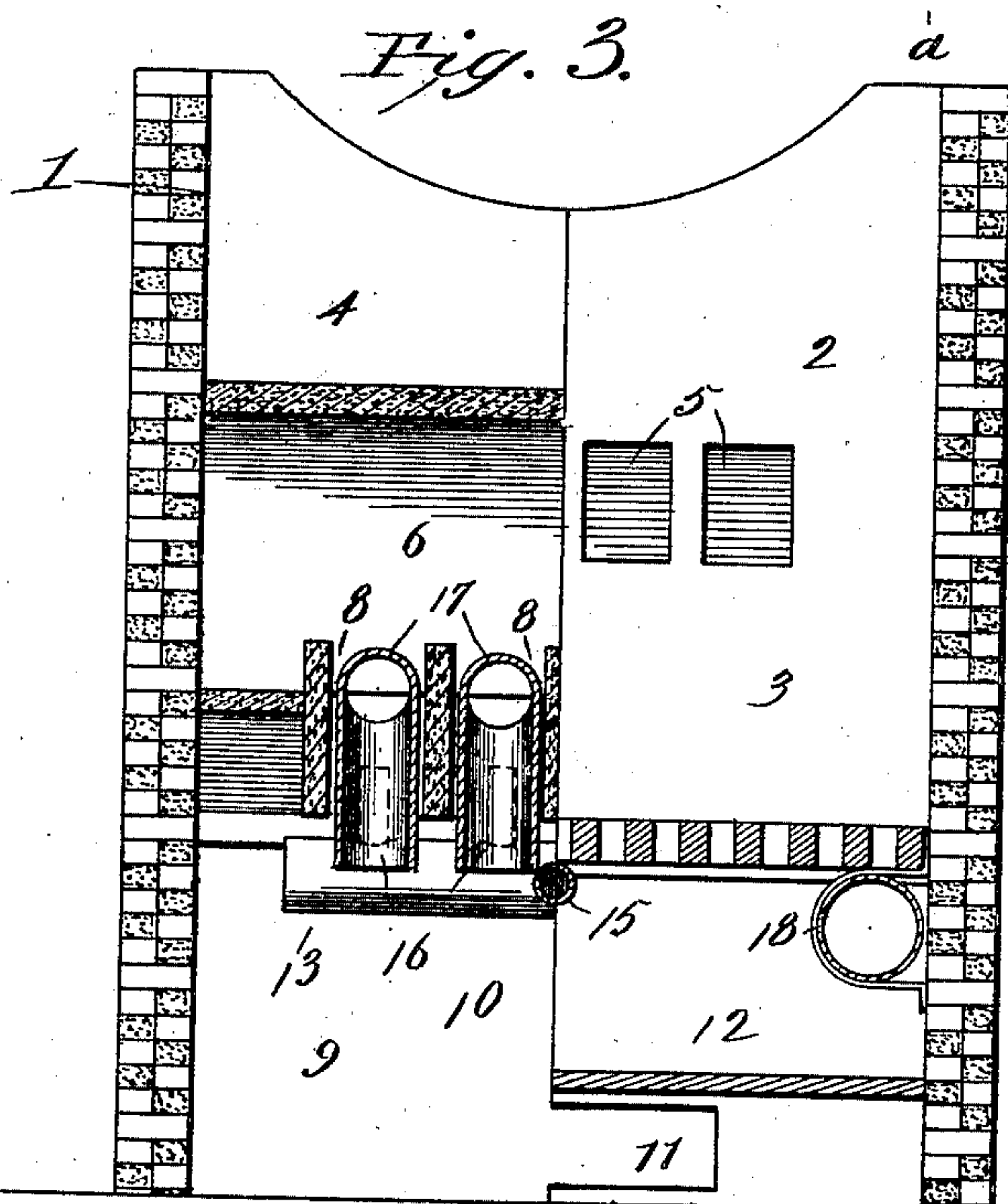
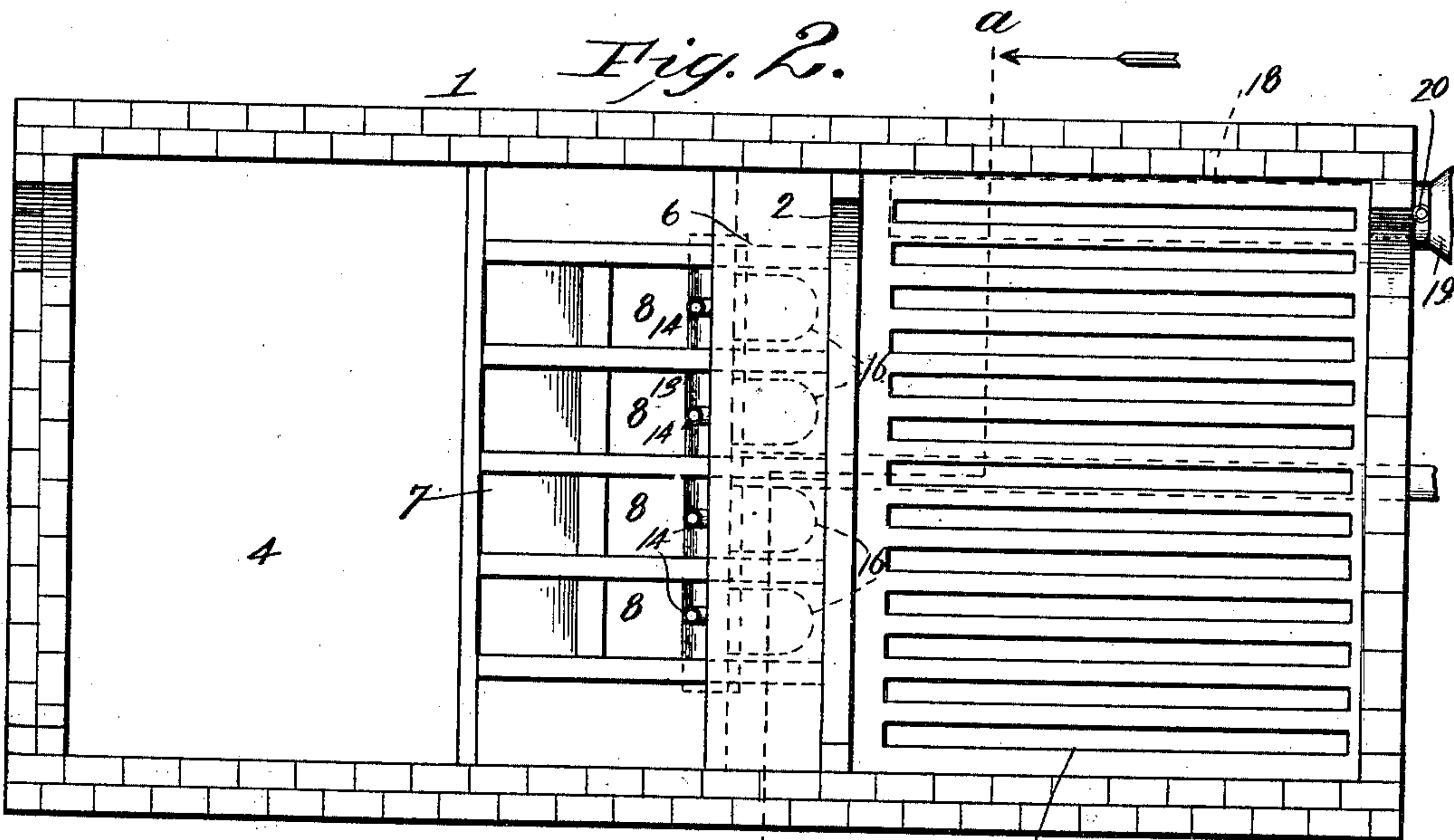
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2 Sheets—Sheet 2.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANKLIN M. REED AND SILAS C. SILVER, OF BROOKVILLE, INDIANA.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 676,689, dated June 18, 1901.

Application filed January 16, 1901. Serial No. 43,523. (No model.)

To all whom it may concern:

Be it known that we, FRANKLIN M. REED and SILAS C. SILVER, citizens of the United States, residing at Brookville, in the county of Franklin and State of Indiana, have invented a new and useful Smoke-Consuming Furnace, of which the following is a specification.

Our invention is an improved smoke-consuming furnace for steam-boilers, the object of our invention being to effect improvements in the construction of the furnace whereby the smoke and gases are caused to be consumed therein, thus effecting an economy of fuel and obviating the smoke nuisance.

Our invention consists in the peculiar construction and combination of devices herein-after fully described and claimed.

In the accompanying drawings, Figure 1 is a sectional perspective view of a smoke and gas consuming furnace constructed in accordance with our invention. Fig. 2 is a horizontal section or top plan view of the same. Fig. 3 is a vertical transverse sectional view of the same, taken on planes indicated by the line *a a* of Fig. 2. Figs. 4 and 5 are detail sectional views of the draft-tube.

The furnace 1, which is here shown as constructed of masonry, but which may be constructed of any suitable material, is provided with a bridge-wall 2, which separates the fire-box 3 from a chamber 4, which we term the "consuming-chamber." The bridge-wall is provided with a series of ports 5 at a suitable height above the grate. On the rear side of the bridge-wall, in the front side of the consuming-chamber, is a retort or chamber 6, which communicates with the interior of the fire-box through the ports 5. Said retort or chamber 6 is preferably made of fire-clay, but may be constructed of any other suitable material. In the front side of the consuming-chamber, in rear of the bridge-wall, is a mixing-chamber 7, which in the form of our invention here shown comprises a series of longitudinally-disposed passages 8, which are open on their upper sides, communicate at their front ends with the retort or chamber 6, and communicate in rear of the vertical rear wall of the latter directly with the consuming-chamber. A transversely-disposed wall 9, which is in rear of the lower portion of the

bridge-wall, forms in connection therewith a transversely-disposed air-flue 10, which in the form of our invention here shown communicates with an air-passage 11 under the ash-pit 12. The said air-flue communicates with the front ends of the plurality of passages in the mixing-chamber at the lower sides thereof. A transversely-disposed steam-pipe 13 is located in the said air-flue 10 and is provided on its upper side with a series of rearwardly-inclined branch pipes or nozzles 14, one of which is disposed in the front end of each of the passages 8 of the mixing-chamber at a point immediately in rear of the retort or chamber 6. The said steam-pipe 13 is supplied with steam from the boiler or other suitable source by a pipe 15. Also disposed in the air-flue 10 are a series of suction-pipes 16, the upper portion of each one of which is disposed in the front end of one of the passages 8 of the mixing-chamber. The upper portions of the said suction-pipes extend also into the lower open side of the retort or chamber 6, and said pipes are provided at their upper ends with rearward-extending elbows 17, which communicate with the said retort or chamber 6 and also with the front ends of passages 8 of the mixing-chamber.

In operation the smoke, unconsumed gases, and other products of combustion pass from the fire-box to the consuming-chamber through the ports 5 in the bridge-wall, downward through the retort or chamber 6 into the front portions of passages 8 of the mixing-chamber, and rearward and upward through the latter into the consuming-chamber. The flames from the fire-box also pass therefrom into the consuming-chamber, taking the course hereinbefore described. The smoke and gases are superheated in the retort or chamber 6, as will be understood, and become commingled with air and steam in the combustion-chamber, whereby the same are rendered highly combustible and their combustion insured, the same being consumed in the consuming-chamber, and hence the fuel is utilized to the fullest extent and the smoke nuisance abated.

The suction-pipes 16 greatly facilitate and promote the mixing of the air with the smoke and gases at the point where the retort or chamber 6 communicates with the mixing-

chamber, the currents caused by the draft from the fire-box to the consuming-chamber through the retort 6 and mixing-chamber exerting a suction on the air in the air-flue 10, and hence causing air from said flue 10 to pass through the said pipes 16 and become commingled with the smoke and products of combustion as the same pass the open rear ends of the elbows 17 of said pipes.

10 In the embodiment of our invention we also provide a draft-tube 18, which discharges into the air-space in the ash-pit under the grate and is provided at its outer end with a funnel 19. A steam-pipe 20 leads from the boiler to the said draft-pipe at a point immediately in rear of the funnel, where said steam-pipe 20 is provided with a coil 21, disposed in said draft-pipe. Said coil 21 is provided on its inner side with a series of ports or orifices 22, which serve to direct jets of steam inward through the draft-pipe 18, thereby causing the said pipe to supply an increased quantity of air to the fire-box, and hence promote combustion therein.

25 Having thus described our invention, we claim—

1. In a smoke-consuming furnace, a fire-box, a consuming-chamber, a retort and mixing-chamber establishing communication between said fire-box and consuming-chamber, an air-flue communicating with said mixing-chamber, and steam-pipes discharging into said mixing-chamber in rear of said retort, substantially as described.

35 2. In a smoke-consuming furnace, a fire-box, a consuming-chamber, a retort and mixing-chamber establishing communication between said fire-box and consuming-chamber, an air-flue communicating with said mixing-

chamber, and draft-pipes extending upward from said air-flue, communicating with the latter at their lower ends, and at their upper ends discharging into the lower portion of the retort and into the front end of the mixing-chamber, substantially as described.

45 3. In a smoke-consuming furnace, a fire-box, a consuming-chamber, a retort and mixing-chamber establishing communication between said fire-box and consuming-chamber for the passage of smoke and unconsumed gases and products from the said fire-box to said consuming-chamber, an air-flue communicating with said mixing-chamber, and a suction-pipe leading from said air-flue and discharging into said mixing-chamber, the discharge of said suction-pipe being disposed also in said retort, for the purpose set forth, substantially as described.

4. In a smoke-consuming furnace, a fire-box, a consuming-chamber, a retort and mixing-chamber establishing communication between said fire-box and consuming-chamber for the passage of smoke and unconsumed gases and products from the said fire-box to said consuming-chamber, means to supply air to the said mixing-chamber at a point below the discharge of said retort, and means to supply steam to said mixing-chamber at a point in rear of said retort, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

FRANKLIN M. REED.
SILAS C. SILVER.

Witnesses:

JOHN C. ELLIS,
EDYTHE L. BALSLEY.