

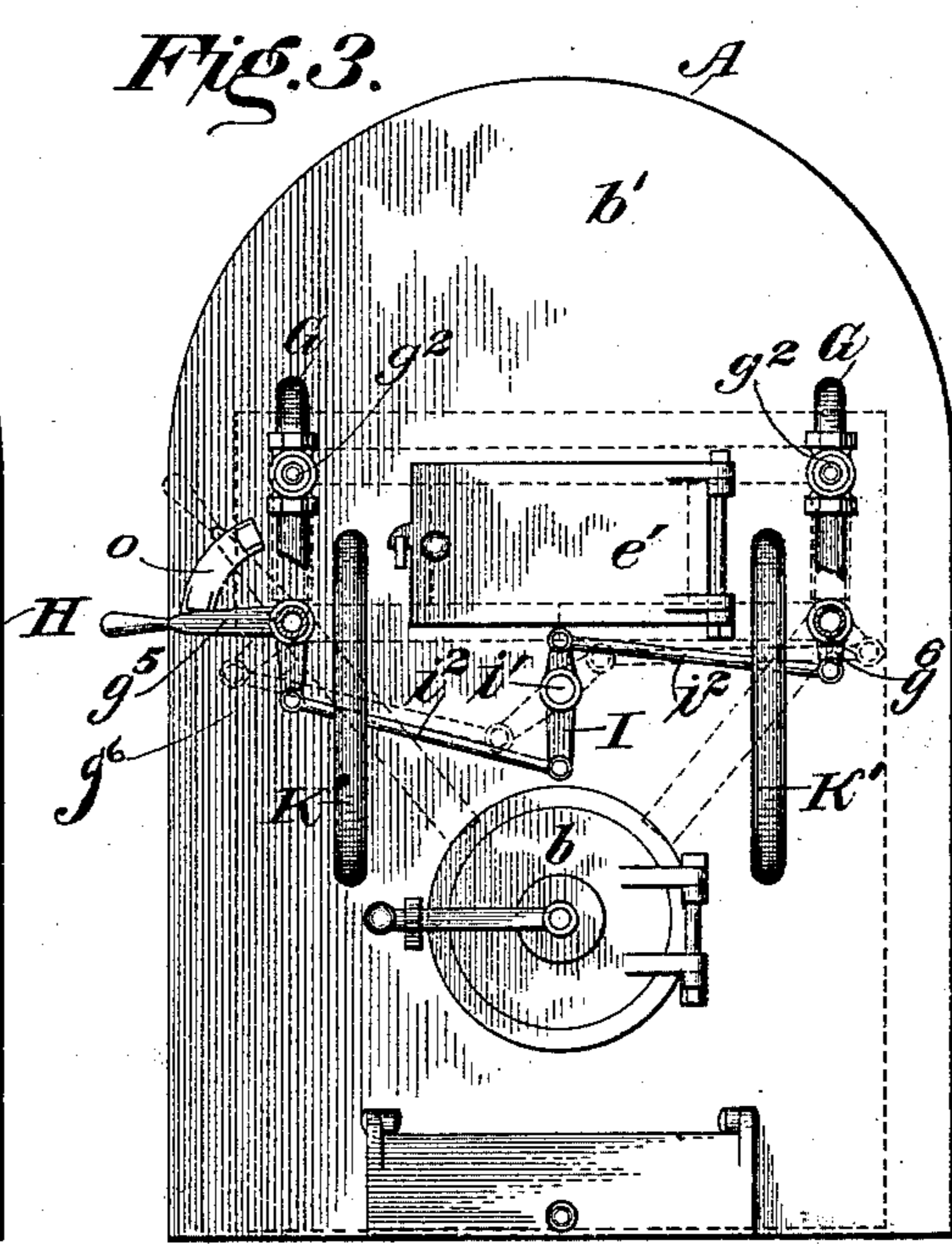
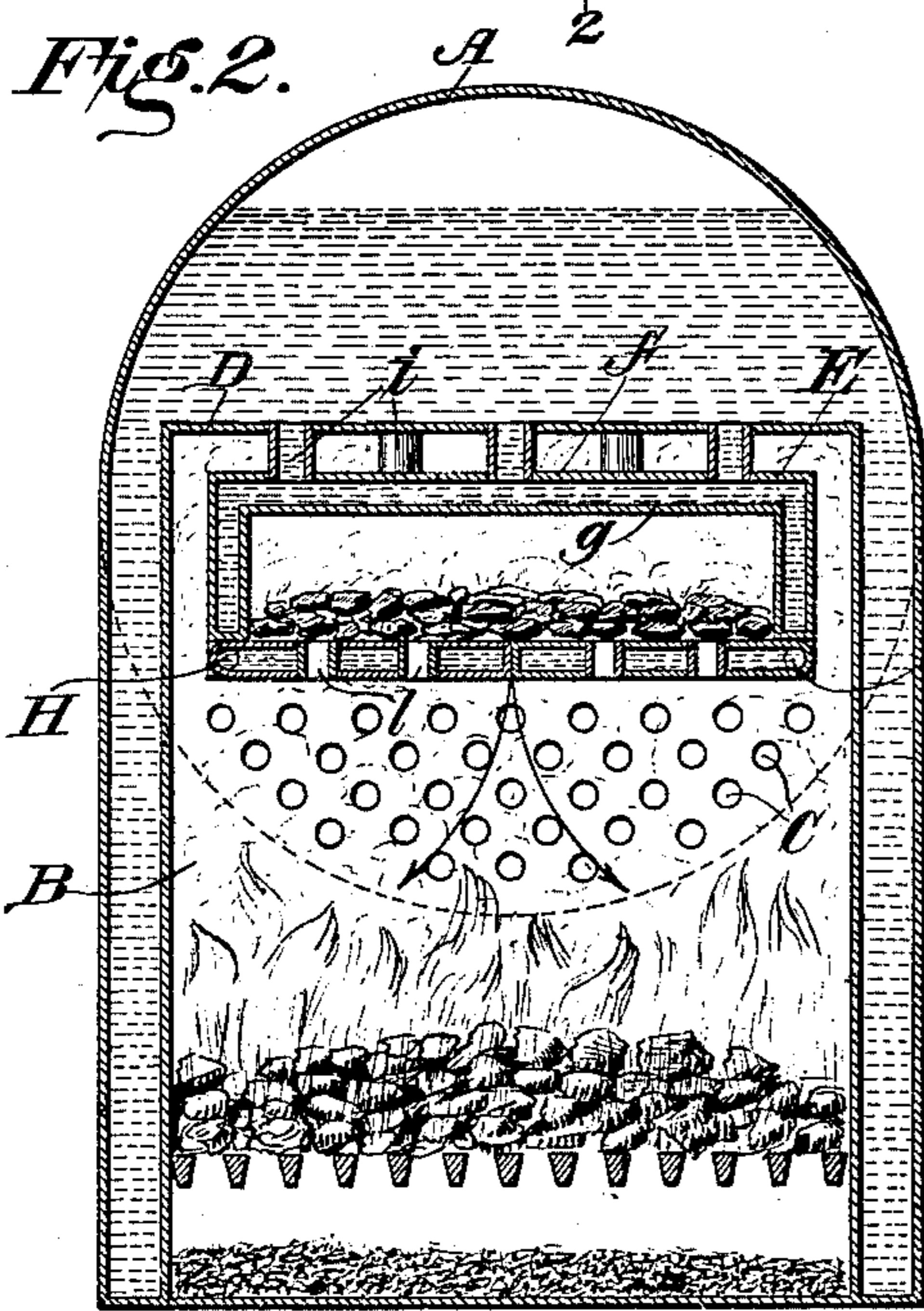
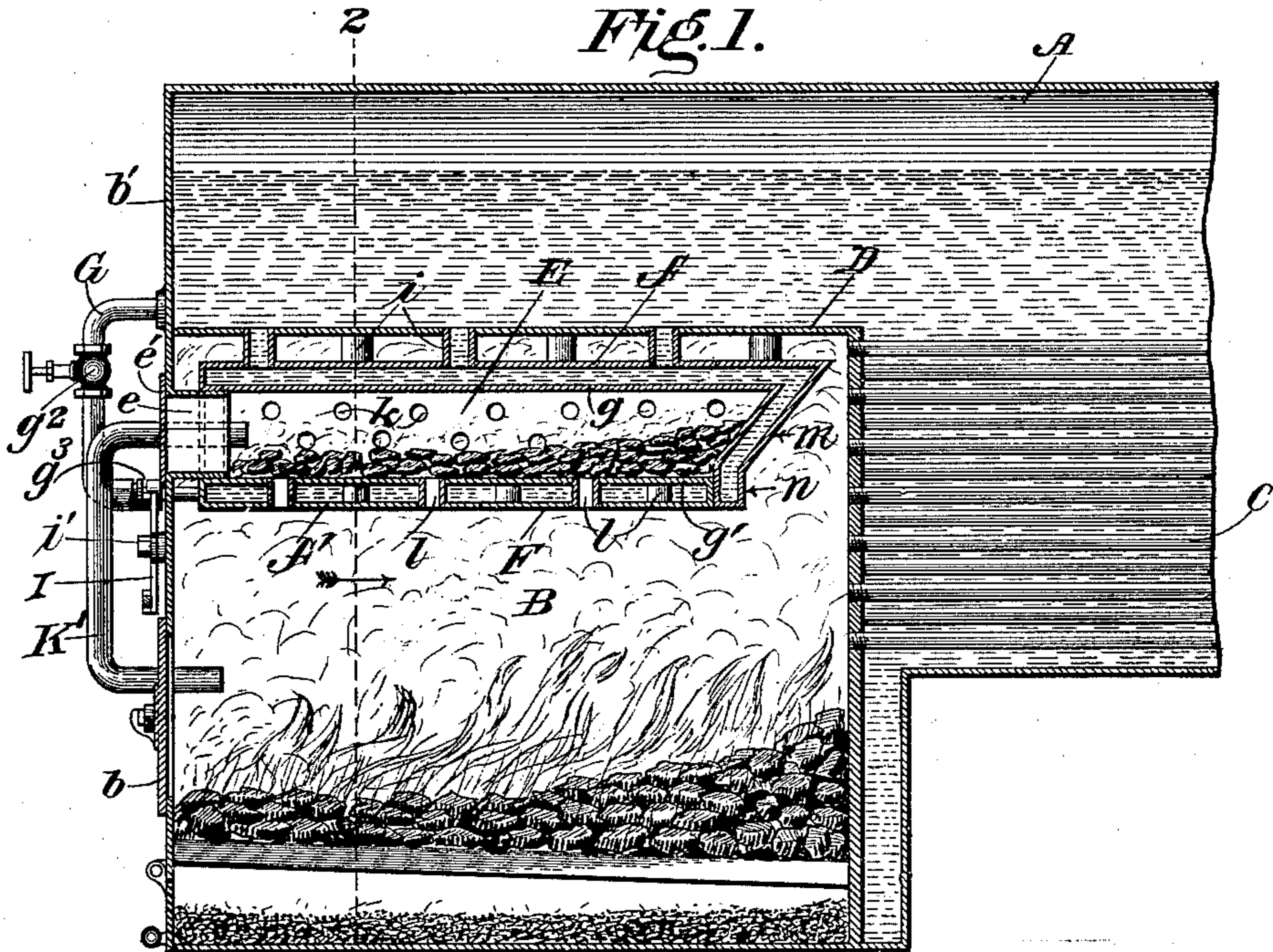
T. J. TILLER.

COKING AND STEAM PRODUCING ATTACHMENT FOR FURNACES.

(Application filed Dec. 10, 1900.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

M. E. Fowler
James R. Mansfield

INVENTOR:
THOMAS J. TILLER

BY

Alexander & Lowell
ATTORNEYS

No. 679,796.

Patented Aug. 6, 1901.

T. J. TILLER.

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(Application filed Dec. 10, 1900.)

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2 Sheets—Sheet 2.

Fig. 4.

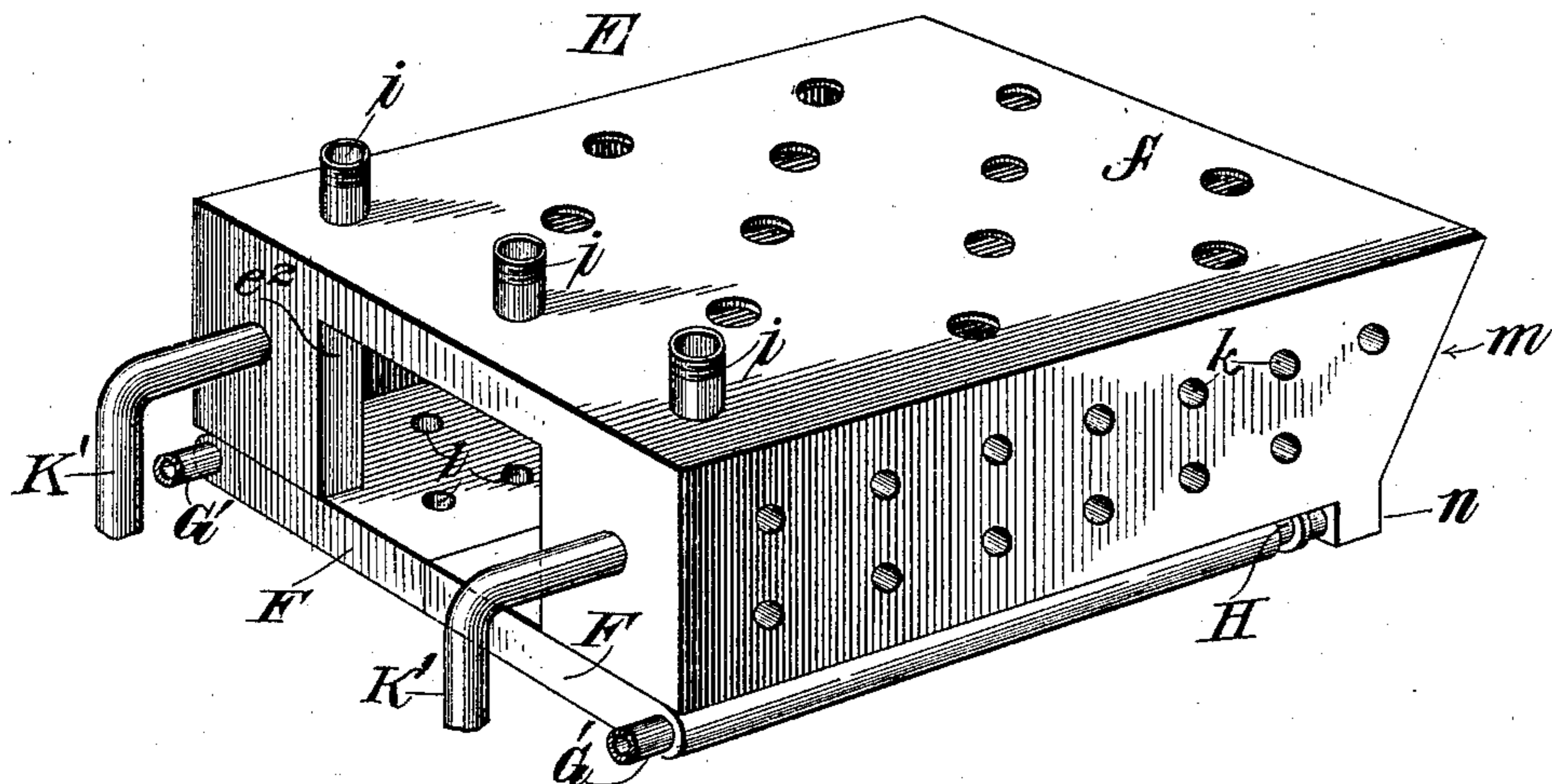


Fig. 5.

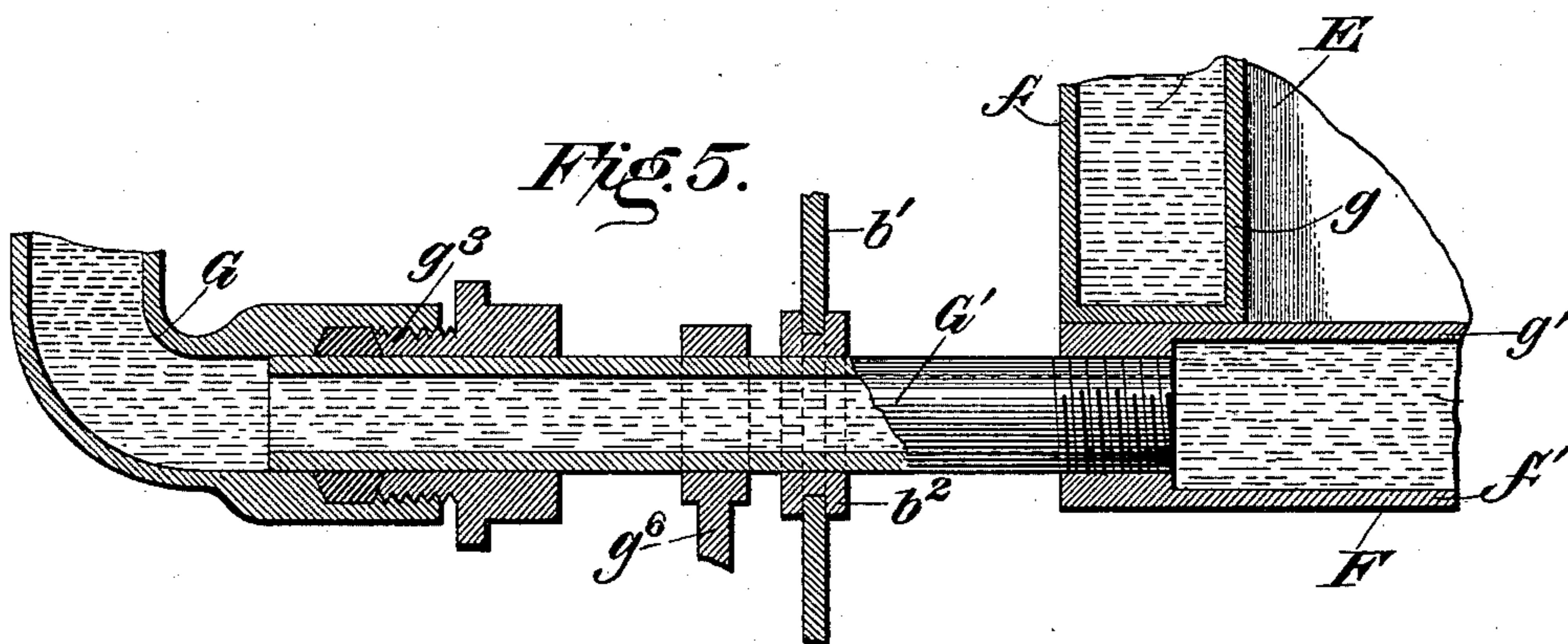
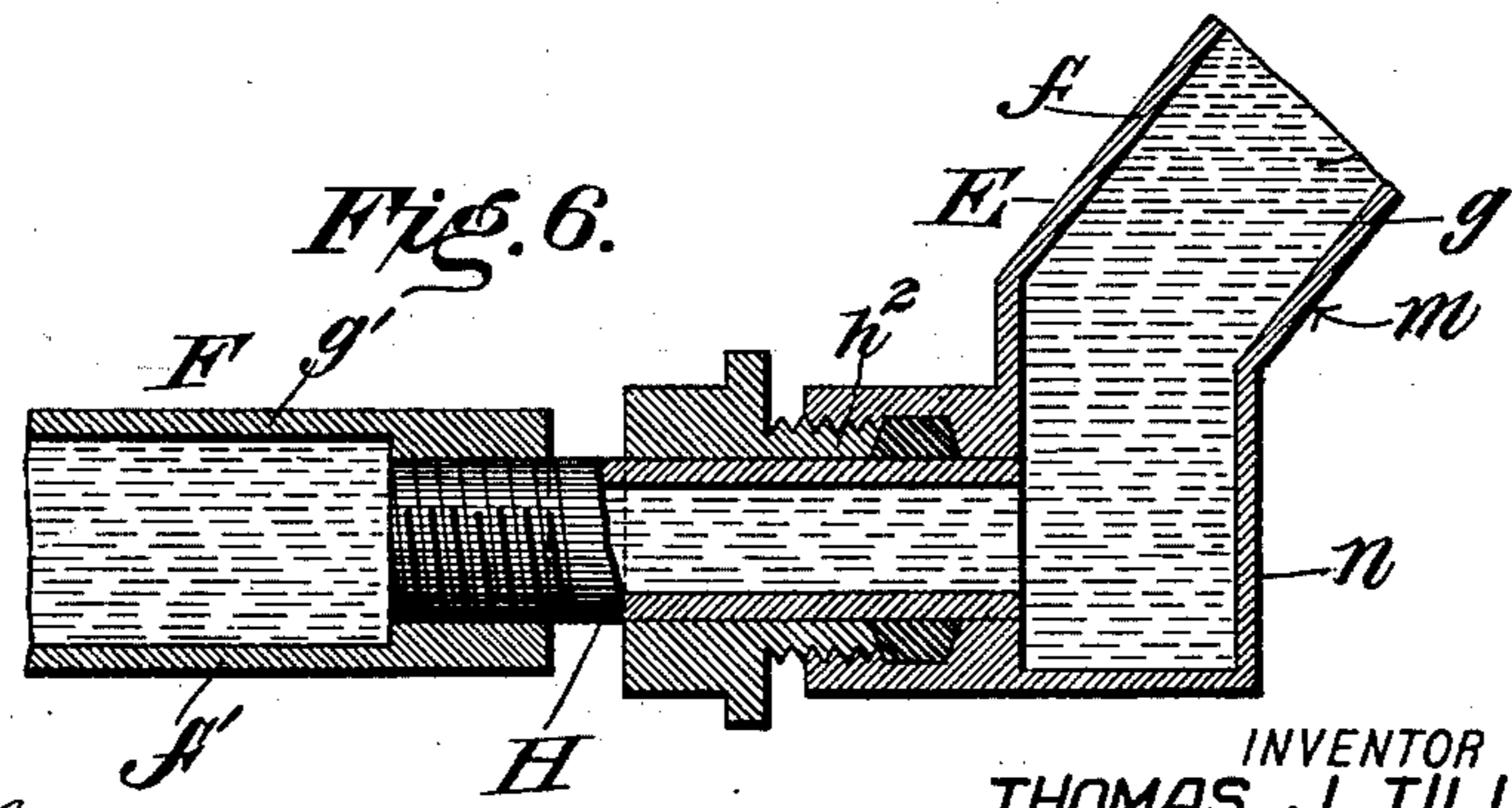


Fig. 6.



WITNESSES:

McFouler
James R. Mansfield

INVENTOR
THOMAS J. TILLER

BY

Alexander & Lowell
ATTORNEYS

UNITED STATES PATENT OFFICE.

THOMAS J. TILLER, OF RICHMOND, VIRGINIA, ASSIGNOR OF THREE-FOURTHS TO WYATT L. GOODE, RICHARD N. GOODE, LOUIS GOLDBACK, JOS. KENDLER, AND H. BERNSTEIN, OF SAME PLACE.

COKING AND STEAM-PRODUCING ATTACHMENT FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 679,796, dated August 6, 1901.

Application filed December 10, 1900. Serial No. 39,325. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. TILLER, of Richmond, in the county of Henrico and State of Virginia, have invented certain new and
5 useful Improvements in Coking and Steam-Producing Attachments for Furnaces; and I hereby declare that the following is a full, clear, and exact description thereof, reference
10 being had to the accompanying drawings, which form a part of this specification.

This invention is an improved coking and gas-producing attachment for boiler-furnaces, particularly adapted for locomotive and steamboat furnaces; and its object is to
15 provide a coking chamber or oven which may be suspended within the fire-chamber of the furnace and which is preferably provided with hollow walls and a hollow water grate or bottom to prevent its burning out
20 and to make the oven also serve as a water-heater for the water circulating within its walls. In operation coal is introduced into the coking-oven formed by this attachment and reduced to coke by the heat within the
25 fire-chamber, and the generated gases are conducted into the fire-chamber and there burned, and when the coal has been coked it is dumped directly onto the grate in the fire-chamber and there consumed in the ordi-
30 nary manner, while fresh coal is placed in the oven to be gasified and coked, as before.

My present invention possesses many advantages over the coke-producing boiler-furnaces heretofore known and may be eco-
35 nomically adapted to locomotive and other boiler furnaces now in use. Locomotives to which this apparatus may be applied or attached can thus be fired with coke and will make their own coke by the same fire which
40 is used to generate the steam, the gases generated in the coking-oven being burned in the fire-chamber, and thus in a measure the coal is caused to coke itself, and the thick black smoke and waste gases ordinarily generated
45 upon the addition of fresh fuel to the fire will be almost, if not quite, wholly avoided, with a resultant increased economy of fuel.

The invention therefore consists in the novel construction and combination of parts
50 hereinafter described and claimed, and the

accompanying drawings illustrate the best embodiment of the invention now known to me as applied to a locomotive-boiler furnace.

In the drawings, Figure 1 is a longitudinal section through part of a locomotive-boiler
55 furnace, showing the coking attachment in longitudinal section. Fig. 2 is a transverse vertical section on line 2 2, Fig. 1. Fig. 3 is a front end elevation of the boiler, showing the water connections between the boiler and
60 the coking-oven. Fig. 4 is a perspective view of the coking-oven detached. Figs. 5 and 6 are enlarged longitudinal sectional views of the water hinge connections of the dumping bottom of the oven. 65

A designates a boiler-furnace of the ordinary locomotive type, having a fire-chamber B and smoke-tubes C leading from said chamber through the water-space. The chamber is provided with an ordinary grate to sup-
70 port the fire, as shown.

The coking-oven E is arranged in the upper part of the fire-chamber and, as shown, is rectangular in form and has hollow walls formed by metallic sheets *f* and *g*, which may
75 be suitably connected by intermediate stays. The bottom of the oven is formed by two hollow plates or grate-pieces F F, which are each supported upon hollow trunnions G' and H. The trunnions G' extend through the front
80 plate *b'* of the fire-chamber and are rotatably connected to the lower ends of pipes G, which extend to and are connected with the water-space of the boiler, as shown, and valves *g*²
85 are placed in pipes G for regulating the circulation of water. Leakage is prevented between the pipes G and trunnions G' by means of glands *g*³. Enlarged bearings *b*² may be provided for the trunnions G' where they pass through the outer wall *b'*. The trunnions H
90 are rotatably journaled in hollow extensions *n* of the sides of the oven, as shown, and leakage is prevented by means of glands *h*². The oven is suspended in the fire-box by means of tubular hangers, which connect its top with
95 the water-space of the boiler above the fire-chamber, and thus free circulation of water through the walls and bottom-plates of the oven is provided for. A suitable number and
100 arrangement of hangers *i* may be employed

to hang the oven in position from the plate D, and it may be additionally supported, if required, in any desired way. The upper and lower walls f' g' of the plates F may be stayed
 5 in any suitable manner. As shown, tubular stays l are employed, and like stays k may be used in the sides of the oven, or solid stays may be used, if desired, especially in the sides, or the latter may be left imperforate. The
 10 front end of the oven is left open; but in this opening e^2 is fitted a collar e , which is also fitted to an opening in the front plate b' of the fire-chamber, and through this opening coal may be introduced into the coking-oven,
 15 and this opening may be closed by a door e' , which is shown of conventional construction and is preferably made to close tightly. In kindling the fire fuel may be introduced into the fire-chamber B through the door b , as
 20 usual. The inner end of the oven is slanted rearwardly and upwardly, as at m , leaving free way for the escape of the heated products of combustion through the tube C.

K' K' are pipes by which the gases from the
 25 oven are conducted into the fire-chamber to be consumed.

As the bottom plates F of the oven are hinged, it is necessary to provide means for operating them. As shown, levers g^6 are connected to the trunnions G' and in turn are
 30 connected by rods i^2 to the opposite ends of an intermediate lever I, which is pivoted on a stud i' , projecting from the plate b' . To one of the levers g^6 may be attached a hand-
 35 lever g^5 , by which the system of levers may be operated, so as to either close the doors in the position shown in full lines, Fig. 3, or to open the doors in the position shown in dotted lines in said figure. A stop O is attached
 40 to plate b' in position to be engaged by lever g^5 and hold the same in the position to which it is adjusted.

In operating the apparatus fire is kindled in the fire-chamber B through the door b in
 45 any suitable manner, and coal is introduced into the coking-oven E through the door e' . The coal is coked in the oven by the heat in the fire-chamber, and the gases escaping from the oven are conducted back to the fire-cham-
 50 ber through pipes K' and consumed therein. When the coal in the oven is coked, it may be dumped into the fire-chamber to maintain combustion therein, while fresh coal is placed in the coking-chamber. It will be observed
 55 that not only is the coal coked in the coking-chamber, but that the hollow walls of the latter are used to heat the water, and thus the coking-oven is prevented from being rapidly destroyed by the heat, as it might be if the
 60 walls were solid. Obviously by burning the coke instead of fresh coal in the fire-chamber the black smoke and soot which are always generated whenever fresh coal is thrown upon the fire of a boiler-furnace is avoided and a
 65 clean fire is maintained, such as is found in coke-burning furnaces, and the invention will

therefore be of great utility on railways, where the smoke and cinders of ordinary coal-burning locomotives are such a great annoyance
 70 and detriment. The invention also economizes fuel by burning the gases generated in the coking-oven during the heating of the coal therein, which ordinarily would be carried off with the products of combustion and wasted.

By providing the oven with hollow walls, as shown, and connecting the same with the water-heating space of the boiler it is obvious
 75 that the water-heating surface is greatly enlarged, and as the coking-oven is located in the hottest part of the fire-box the water in the walls thereof will be very highly heated,
 80 and thus become a very efficient auxiliary to increase the steaming capacity of the boiler, water being admitted freely into the hollow
 85 walls through the pipe connections and steam also readily escaping back into the boiler through the same.

Having thus described my invention, what I therefore claim as new, and desire to secure
 90 by Letters Patent thereon, is—

1. The combination with a boiler-furnace, of a coking-oven suspended in the fire-chamber, said oven being provided with hollow
 95 plates forming its bottom, means for dumping said plates, and connections for circulating water through said plates, substantially as described.

2. The combination with a boiler-furnace, of a coking-oven suspended in the upper part
 100 of the fire-chamber and provided with hollow bottom-plates hinged on tubular supports, and connections for admitting water through said supports into said plates, substantially as described.

3. The combination of a boiler-furnace, a coking-oven suspended in the fire-chamber
 105 thereof and having hollow walls, water connections between the hollow walls of the oven and the water-space of the boiler, means for introducing coal into the oven, and means for dumping the coke from the oven into the fire-chamber, substantially as described.

4. The combination of a boiler-furnace, a coking-oven suspended in the fire-chamber
 115 thereof and having hollow walls and hollow dumping bottom-plates, water connections between the hollow walls of the oven and plates, and the water-space of the boiler, means for introducing coal into the oven, means for con-
 120 ducting the gas from the oven into the fire-chamber, and means for dumping the bottom-plates to discharge the coke from the oven into the fire-chamber, substantially as described.

5. The combination with a boiler-furnace, of a coking-oven suspended in the upper part
 125 of the fire-chamber, said oven being provided with hollow plates forming its bottom, said plates being hinged on tubular supports, and
 130 connections for admitting water through said supports into said plates; with means for in-

roducing coal into the oven, and connections between the hollow bottom-plates and the water-space of the boiler, for the purpose and substantially as described.

5 6. The combination with a boiler-furnace, of a coking-oven suspended in the upper part of the fire-chamber, said oven having hollow walls, and being provided with hollow plates forming its bottom, said plates being hinged
10 on tubular supports, and connections for admitting water through said supports into said plates; with means for introducing coal into the oven, pipes for conducting gases generated in the oven into the fire-chamber, and
15 connections between the hollow walls of the oven and the water-space of the boiler, for the purpose and substantially as described.

7. The combination with a boiler-furnace, of a double-walled coking-oven suspended in
20 the fire-chamber, said oven having a dumping bottom formed of opposite hollow plates having hollow trunnions, and means for closing or opening said plates, pipes connecting the space between the walls of the oven; with
25 the water-space of the boiler; pipes for conducting gases generated in the oven back into the fire-chamber, and pipes connecting the trunnions of said bottom-plates with the water-space of the boiler, all substantially as and
30 for the purpose set forth.

8. The combination of a boiler-furnace, a coking-oven in the fire-chamber thereof hav-

ing opposite hollow bottom-plates provided with hollow trunnions extending through the front wall of the fire-chamber, levers con- 35 nected to the said trunnions, an intermediate pivoted lever, and links connecting said levers to the opposite ends of said pivoted lever whereby said bottom-plates are opened or closed simultaneously, and water connections 40 between said plates and the boiler, all substantially as and for the purpose described.

9. The combination of a boiler-furnace, a hollow-walled coking-oven in the upper part of the fire-chamber thereof having opposite 45 hollow plates forming its bottom, the levers connected to the trunnions of said plates, the links connecting said levers to the opposite ends of an intermediate pivoted lever whereby said plates are opened or closed simulta- 50 neously, pipe connections between the hollow walls of the oven and the water-space of the boiler, and pipe connections between the water-space of the boiler and the hollow bottom-plates, and means for conducting gases from 55 the oven into the fire-chamber, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

THOMAS J. TILLER.

Witnesses:

C. P. CARDWELL,

ALEX. STUART GIBSON.