

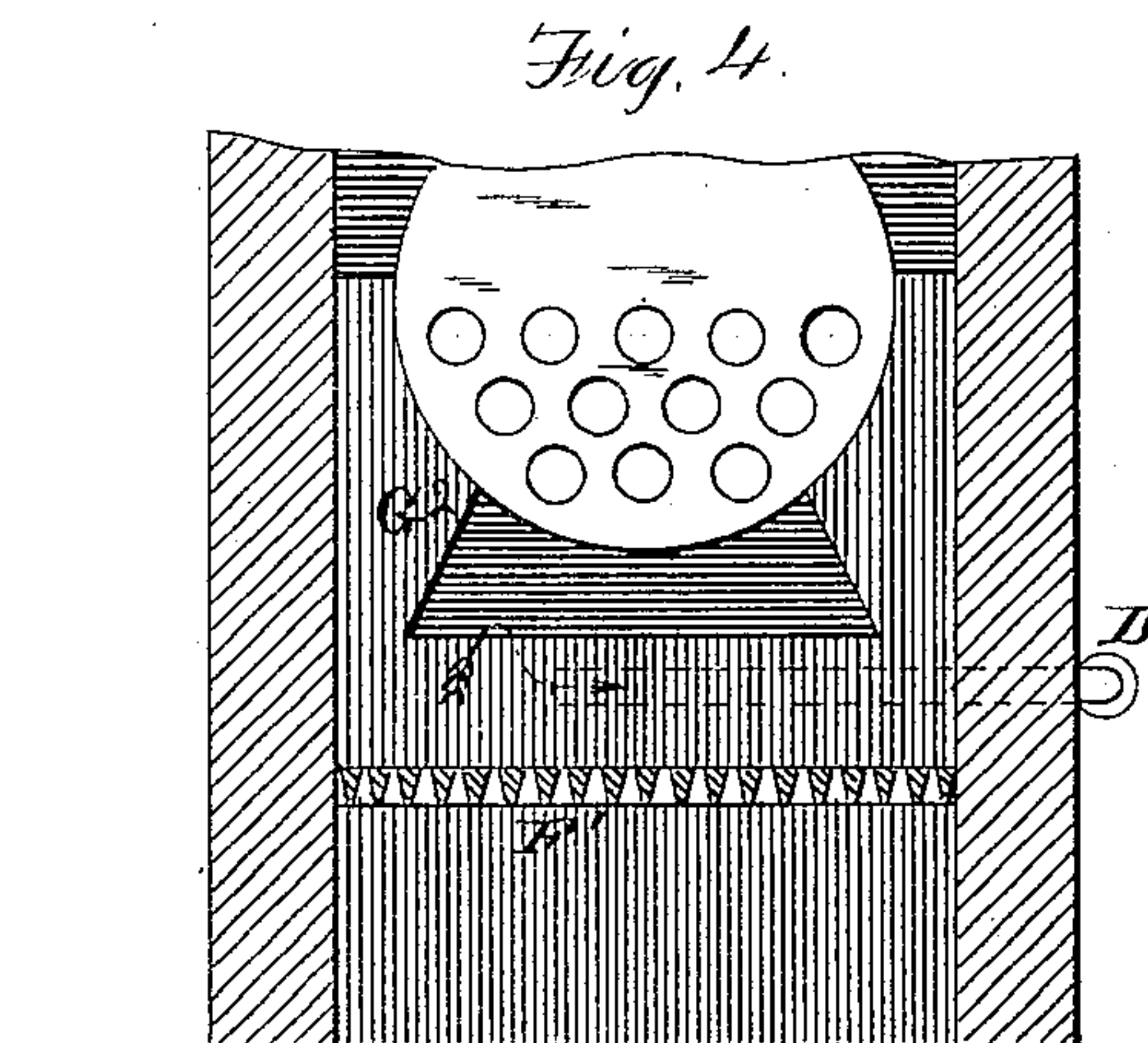
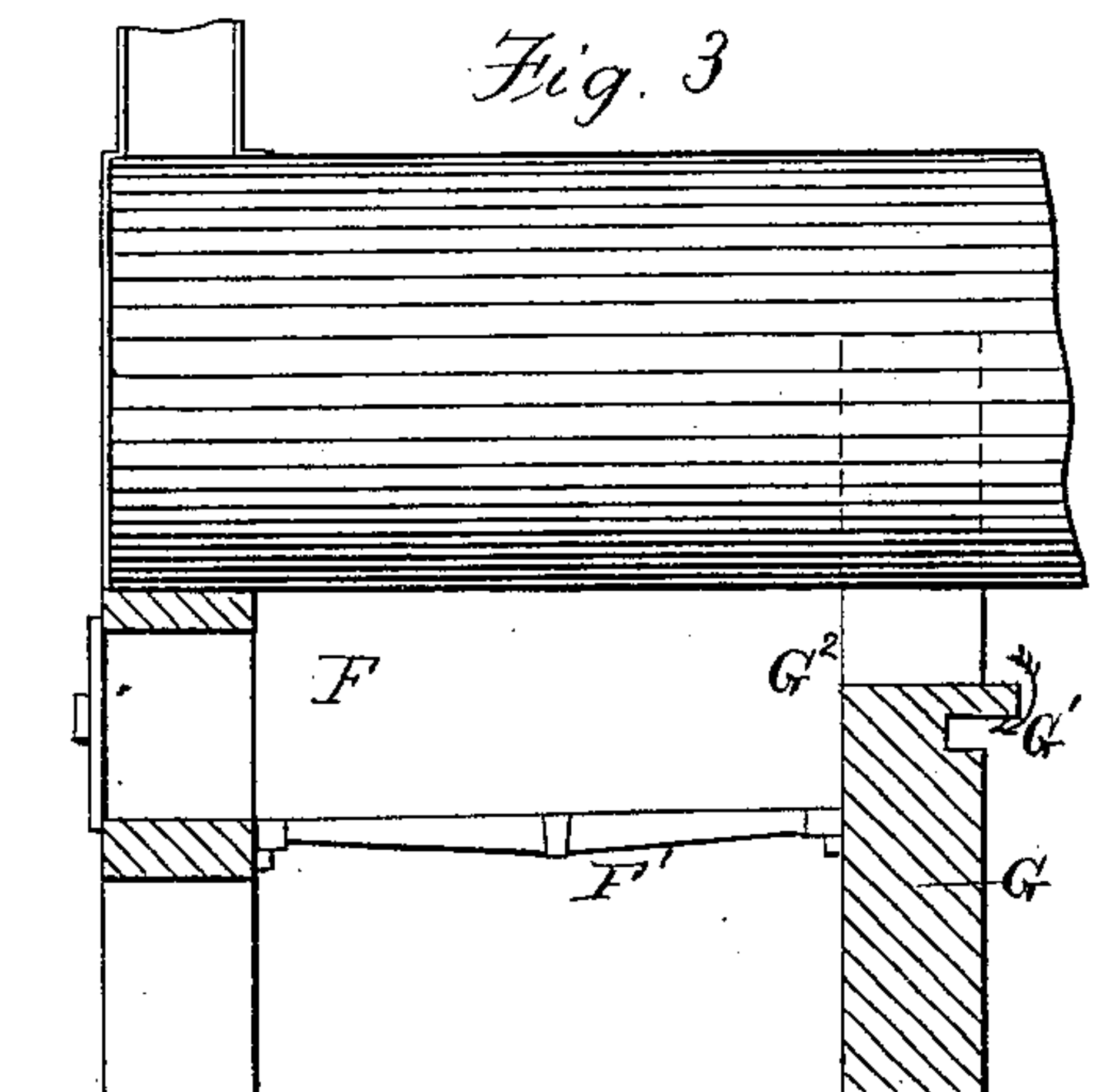
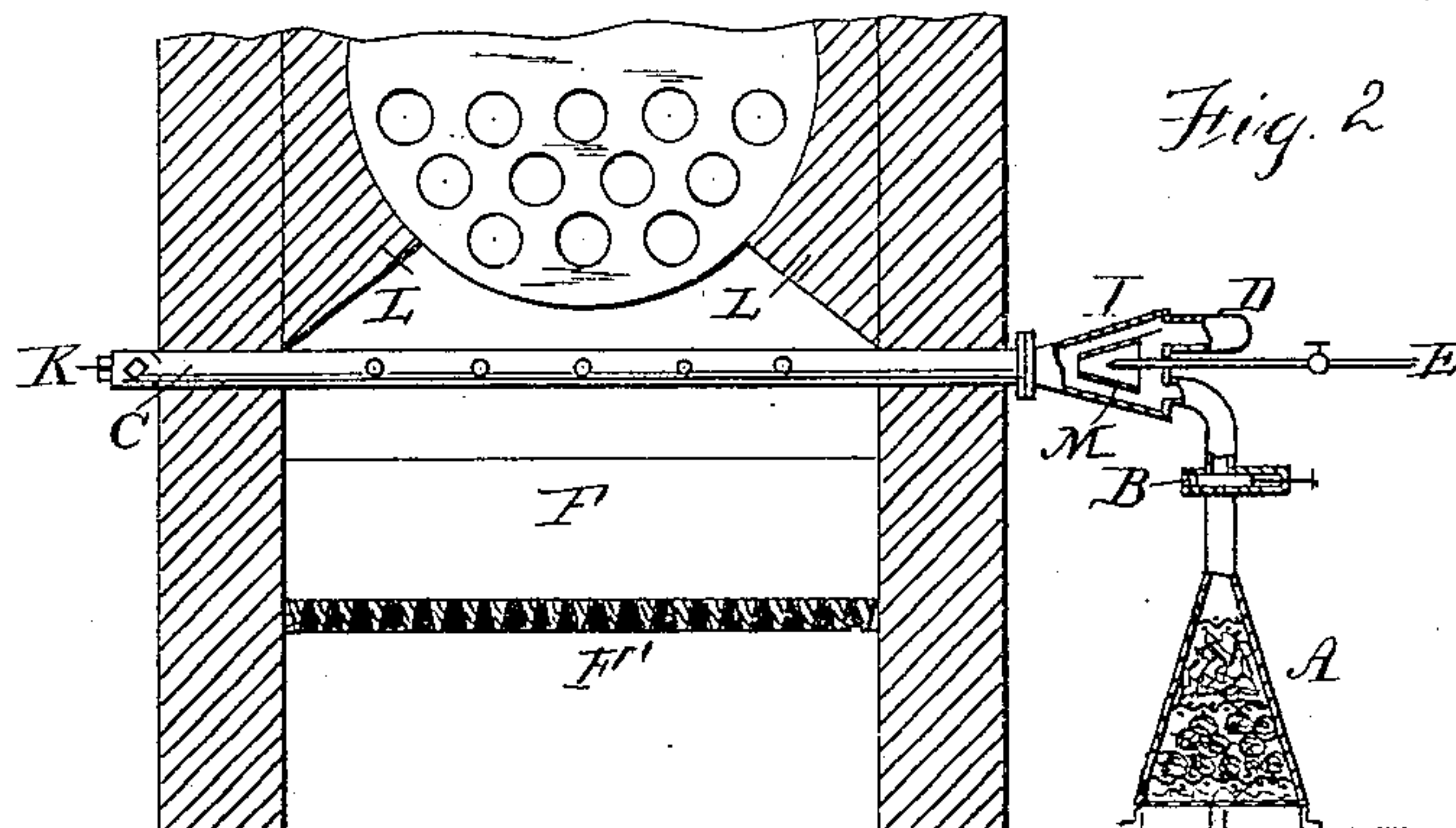
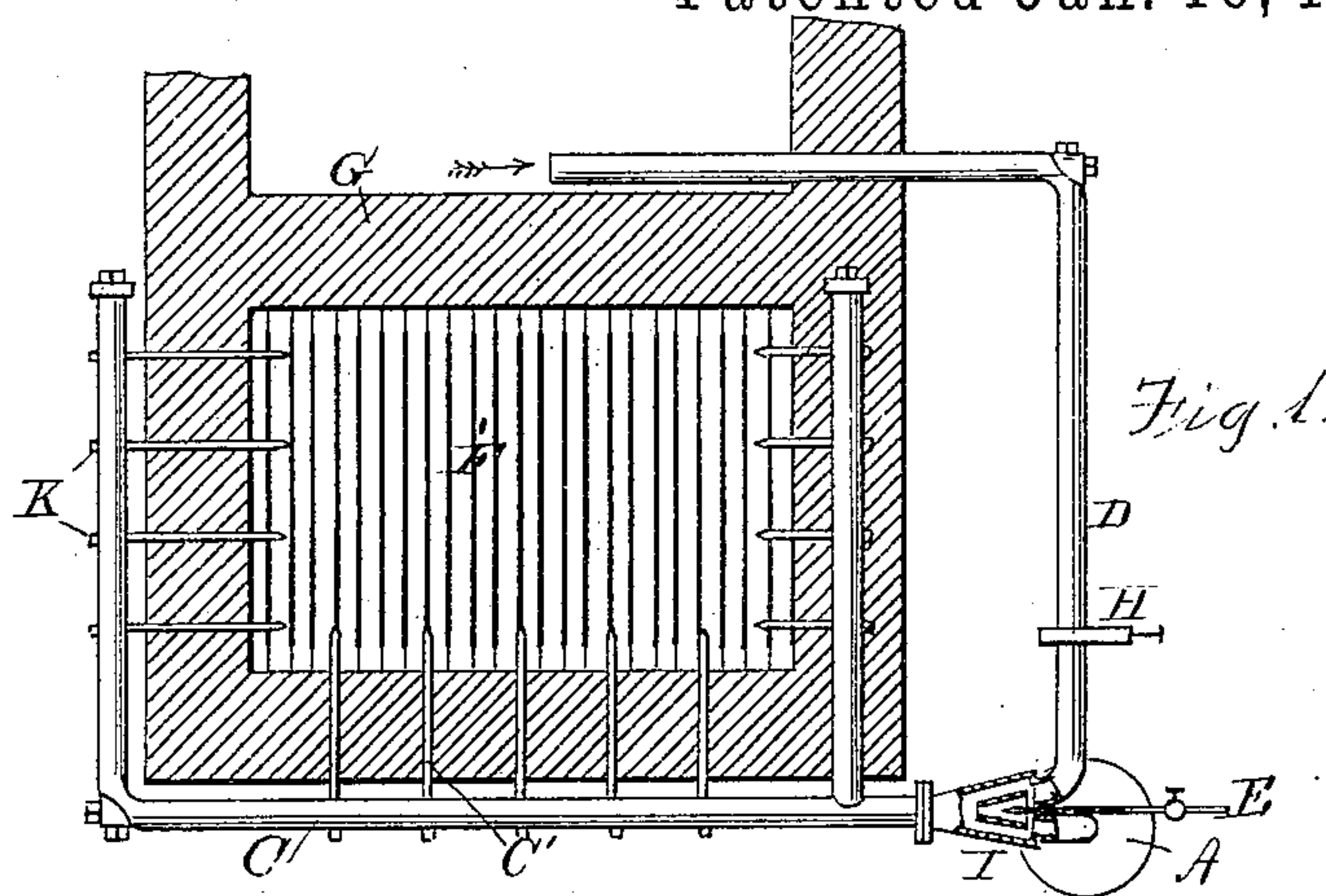
(No Model.)

2 Sheets—Sheet 1

T. M. FELL.
FEEDING AIR TO FURNACES.

No. 270,653.

Patented Jan. 16, 1883.



Witnesses
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(No Model.)

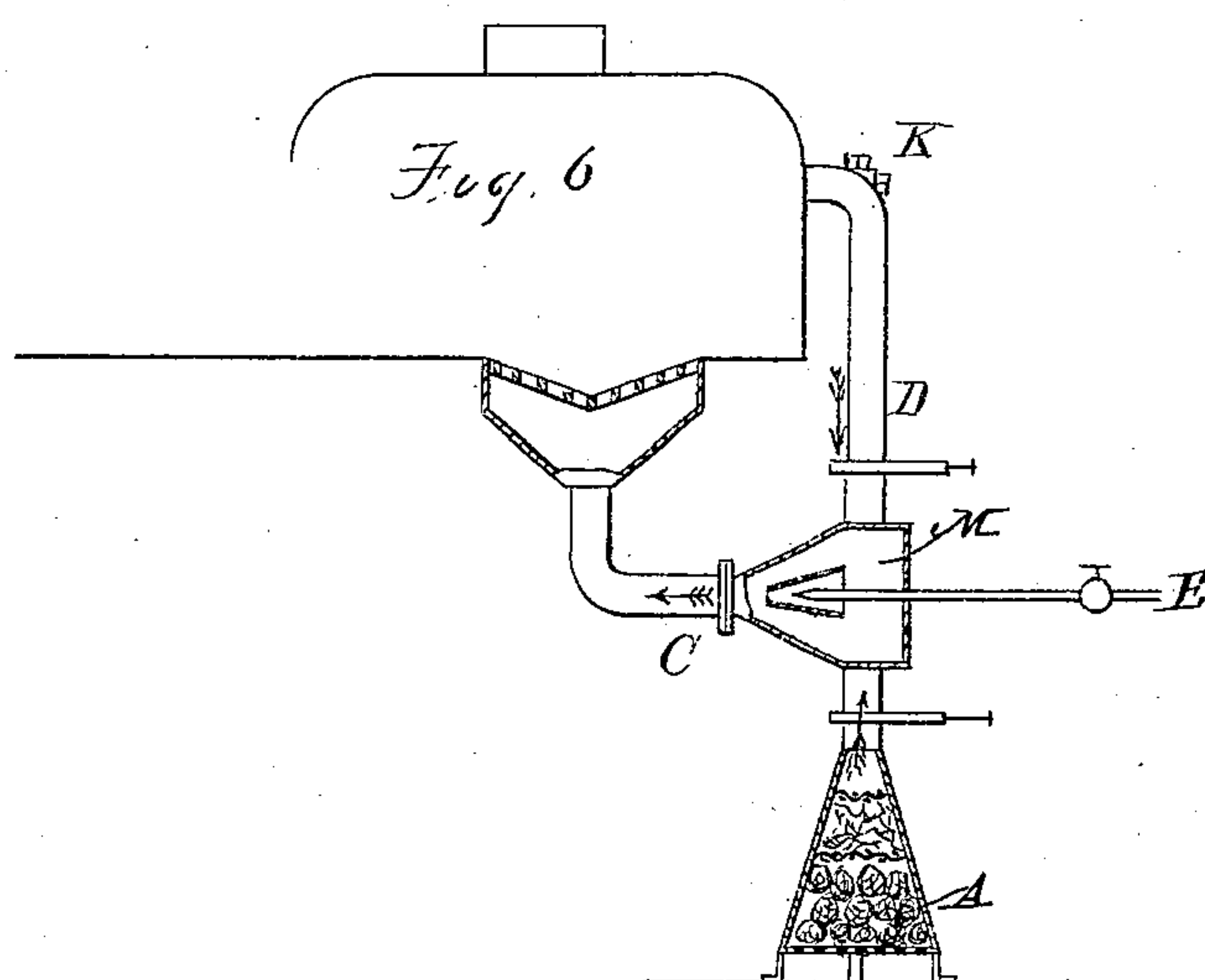
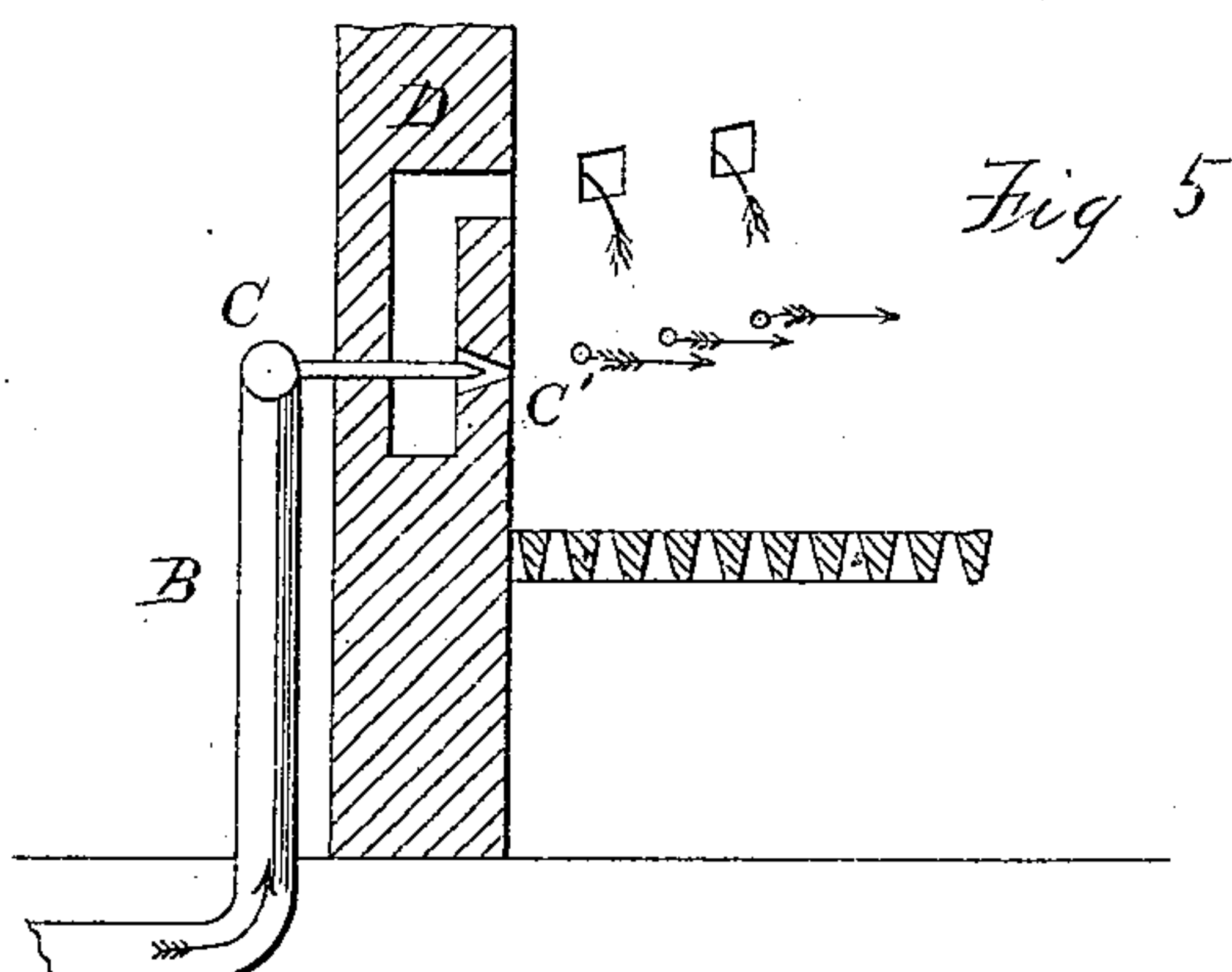
2 Sheets—Sheet 2.

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Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS MARA FELL, OF BROOKLYN, NEW YORK.

FEEDING AIR TO FURNACES.

SPECIFICATION forming part of Letters Patent No. 270,653, dated January 16, 1883.

Application filed June 16, 1882. (No model.)

To all whom it may concern:

Be it known that I, THOMAS MARA FELL, civil engineer, a citizen of the United States, residing at 320 Eighth street, in the city of Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Feeding Air to Furnaces, which is applicable to furnaces, forges, and for blowing and other purposes, of which the following is a specification.

My invention relates to an improved method of obtaining and applying either hot, cold, or tempered air blasts.

The object of my invention is to provide the means of entraining and delivering an air jet or jets for purposes of combustion, and in such manner as to avoid the noise of the present jet system.

A further object of my invention is in heating the ingoing stream of air by mixing therewith a proportion of heat, which is drawn from the furnace, for the purpose of perfecting the combustion of the fuel-gases.

A further object of my invention is delivering either a hot, cold, or tempered air blast through pipes, for heating, blowing, or boiling, and for other purposes.

The first feature of my invention is its noiseless system of entraining air by suction through a muffled or wide-mouth pipe or chamber, by means of a steam-jet, and delivering same at the point or points required.

A second feature is in drawing a proportion of the heated gases from the furnace by means of a jet of steam, for heating a supply of cold air, which is also drawn in by the jet of steam, and in such way creating a hot-blast, which is useful for many purposes.

A third feature of my invention in its application to furnaces consists in the construction of the bridge-wall, in order to concentrate the outgoing flame and gases and obtaining a supply of heat for the hot-blast.

To enable others to operate my improvement, I will now more fully describe the various parts as shown in the accompanying drawings, having reference to the letters and figures, which represent corresponding parts throughout the several views.

Figure 1 is a plan, and Fig. 2 a vertical sec-

tion, showing the application to a boiler or other furnace, in which—

A is a wide-mouth vessel or pipe, having a perforated plate or bottom, and containing wire screens or wool, cotton, balls or pieces of other material capable of deadening sound; B, a flat valve and inlet-pipe; C, delivery-pipe placed across the front or sides, having a number of small pipes or contracted nozzles, C', which enter the furnace preferably above the line of fuel, and pointing slightly downward thereon; D, a hot-gas-blast pipe, having a terminus within the furnace, either behind the bridge-wall or in the side walls; E, a suction and force jet of steam, so placed as to be capable of drawing either the hot gases from the furnace or a supply of cold air by the vessel A, or both; F, the furnace, the dotted lines showing a set of grate-bars, F'; G, the bridge-wall; H, a flat valve on the pipe D, and I the suction-blower; K, screw-plugs for cleaning purposes, inserted at the various angles and opposite each nozzle; and L projecting side walls of the furnace immediately over the bridge-walls, and M a combined air, steam, and gas mixing chamber.

The operation is as follows: The steam-pipe, with its contracted nozzle and blower, being placed behind the inlets of the pipes C and D, and centrally in said blower I, cold air is drawn in by suction through the pipe or vessel A, and hot air or gases from the furnace by using the valves B and H, which regulates both the quantity and temperature from either source. The united streams on entering the pipe C become mixed, and are then forced through the smaller jets or pipes, C', producing a superior combustion of the fuel-gases and the prevention of smoke.

Figs. 3 and 4 are modifications of the hot-blast pipe D, and which also show my construction of bridge-wall and arrangement of fire-bars. In order to prevent the fuel-gases from arising and passing off at the side walls, and to confine or concentrate them near the fuel and in the line of the jets, I continue the ordinary bridge-wall upward to or above high-water line, leaving only a wide opening, as shown; and, further, I raise the back end of the fire-bars. G' shows a hot-gas duct, which

passes out through the side walls, and into which the pipe D is inserted, the projecting top tile, G², protecting said duct from being filled with cinder, &c.

5 Fig. 5 is a further modification of the hot-air duct or pipe D, which is adapted to the side walls of a furnace. In this view the inlet cold-air pipe B is shown passing to an under-
10 ground passage or to the outer walls of the building, and the pipe C and its nozzles operating in the manner clearly shown and indicated by the arrows.

In Figs. 1 and 2 the pipes C and D are shown outside the furnace-walls; but such pipes may
15 be placed within the furnace or constructed in the thickness of said walls.

Fig. 6 shows the application of my system to a forge or blowing furnace, or a melting-furnace, the view being upright or vertical;
20 and Fig. 7, a vertical view of my improvements for forcing a noiseless and heated blast of air through pipes, which is useful as a means of warming, boiling, or evaporating.

What I particularly claim as my invention
25 is—

1. The method herein described of injecting air and hot gases into the combustion-chambers of furnaces, consisting in deadening the noise thereof by first causing the air to enter
30 a chamber connected to the air-inlet pipe, then exhausting it therefrom by means of steam-jet, said steam-jet also exhausting hot gases from the furnace or flues thereof, and then forcing the mixed air and gas into the furnace,
35 substantially as described.

2. The combination, with a furnace, of the noiseless muffling device connected to the air-inlet pipe, the hot-gas-exhausting pipe, and the

steam-nozzle, said nozzle being adapted to exhaust the hot gases and air from the furnace or
40 flues and then force them into the furnace above the grate, substantially as described.

3. The combination, with a furnace, of a muffling device, a hot-gas pipe, a steam-injecting pipe, a diffusing-pipe, and suitable noz-
45 zles, all arranged for joint operation in the manner shown and described.

4. The combination, with a furnace, of the hot-gas pipe, the air-muffling device, the steam-jet-injecting pipe, the said three pipes uniting in
50 a chamber common to all, and the delivery-pipe having reduced pointed nozzles, with the hot-gas and cold-air controlling valves, all arranged for joint operation in the manner shown and de-
55 scribed.

5. The combination, with a furnace, of the air-muffling device, having a perforated bot-
60 tom and an air-receiving chamber, said chamber being filled with fibrous or other material in such manner as to deaden the noise of the incoming air, a hot-gas pipe, D, a steam-injector pipe, E, and an intervening mixing-chamber, M, and delivery-pipe C, as described.

6. In a furnace, the combination of the hot-gas pipe D, the steam-injecting pipe E, the
65 discharge-pipe C, provided with nozzles, and the bridge-wall having a contracted throat, as shown, by which arrangement the combined mixture of air and gases is kept longer in
70 contact with the incandescent fuel, for the better combustion of the same, substantially as set forth.

THOMAS MARA FELL.

Witnesses:

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