

(No Model.)

C. McWILLIAM.

FURNACE.

No. 244,911.

Patented July 26, 1881.

Fig. 1

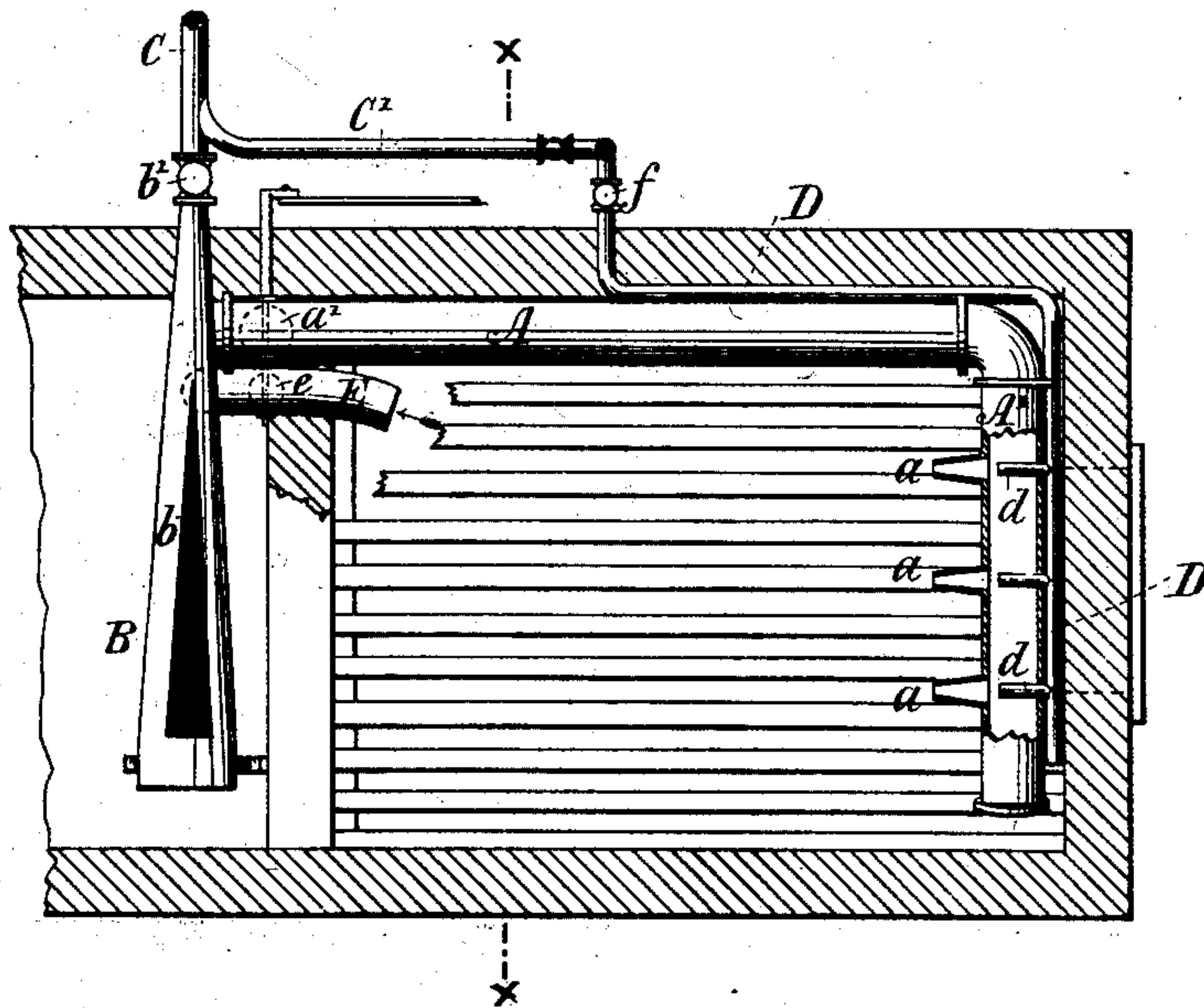
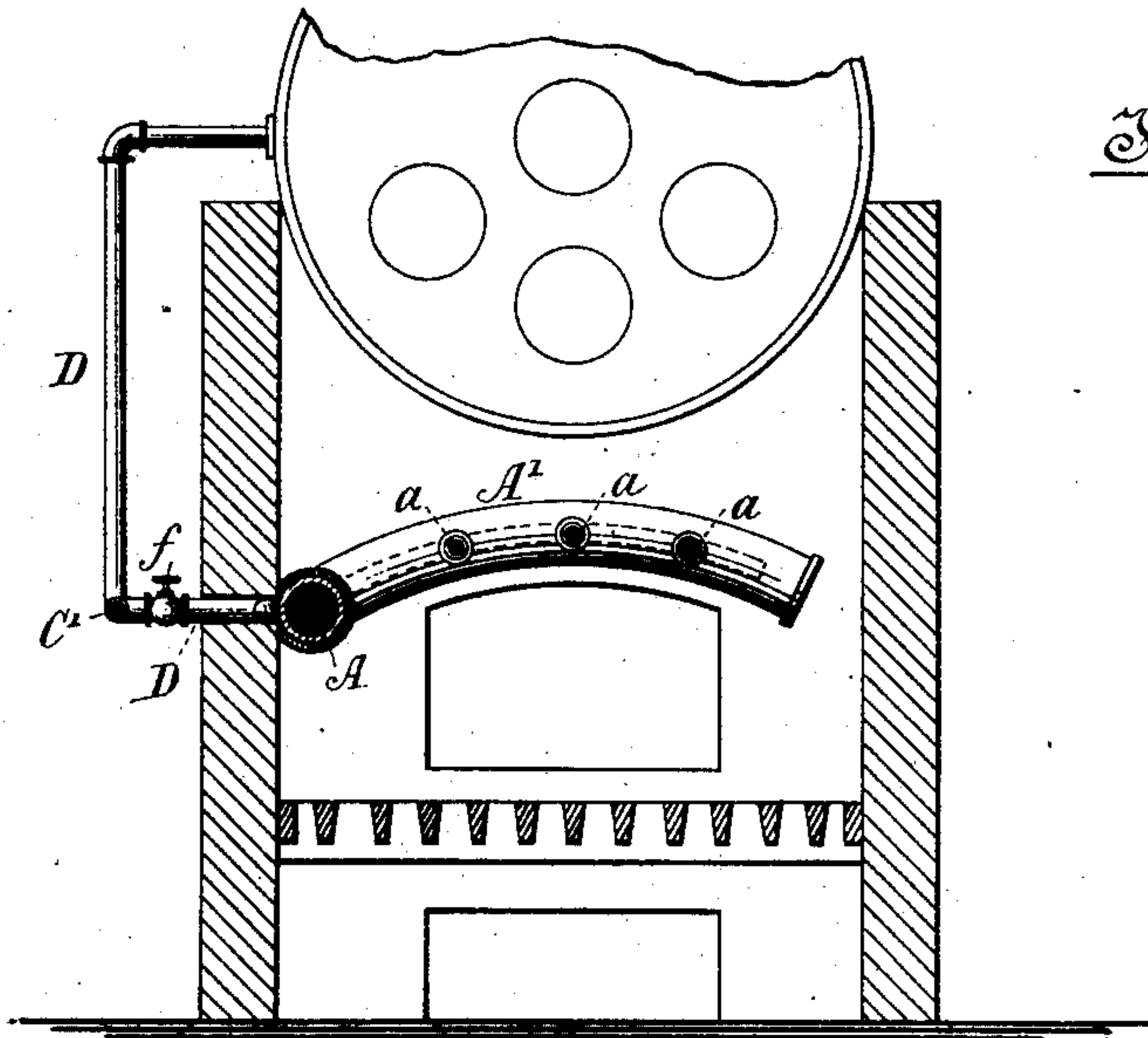


Fig. 2



Witnesses:

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FURNACE.

SPECIFICATION forming part of Letters Patent No. 244,911, dated July 26, 1881.

Application filed May 31, 1881. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MCWILLIAM, of the city of Montreal, in the district of Montreal and Province of Quebec, in the Dominion of Canada, have invented certain new and useful Improvements in Apparatus for Consuming Smoke in Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same.

10 This invention relates to improvements in furnaces and steam-generators of every class in which it is a desideratum to consume the heavy smoke and gases arising from the fire, and while efficiently effecting this object, besides assisting the draft and perfect combustion of the fuel, my invention may be converted into an apparatus for generating gas by conducting the products of combustion by simple means from the fire-chamber to a gas-retort, the operation of raising steam being meanwhile carried on without interruption.

My improvements may be thus briefly described: Along one side of the fire-chamber I place a pipe or flue, which has a branch extending across the front of said chamber above the fire-door. Its other end forms a junction with a pipe or chamber placed across the furnace, underneath the boiler, and at or near the bridge, which chamber receives through an opening in its upper side the unconsumed gases and smoke arising from the fire, these being joined by a current of heated air introduced into the chamber through a pipe leading from underneath the grate, and the whole being discharged, mixed with and aided by jets of steam brought from the boiler, through nozzles in the branch pipe above the fire-door, directly over the fire.

40 The apparatus is utilized for the manufacture of gas by closing the flue at side of fire-chamber, and also the air-pipe from underneath the grate, and discharging the smoke and gases through a pipe connected outside the furnace-walls with any ordinary retort, gasometer, &c.

45 For more complete comprehension of my invention reference must be had to the annexed drawings, in which Figure 1 represents a sectional plan of part of a furnace with my im-

provements applied; and Fig. 2 a cross-section of same on line *xx*, looking toward the fire-door.

Similar letters of reference indicate like parts.

A is a pipe or flue extending along one side of the fire-chamber and terminating in a branch, A', which passes across the front above the fire-door, said branch being provided with any desired number of nozzles, *a*, the parts being placed in this position in order to overcome the objections heretofore found to exist where the mixture of smoke, air, and steam has been blown underneath the grate, among which may be mentioned the necessity of making the ash-pit and fire-doors air-tight or practically so, and also the fact that the fuel lies so thickly on the grate as to prevent the free upward passage of the products so directed. The other end of the pipe A forms a junction with a chamber or pipe, B, placed transversely in the furnace, at or near the bridge, and supported about level with the top of same by any suitable means. This chamber B is preferably of the shape shown—viz., an elongated cone—in order to serve more thoroughly the purpose of an ejector, and is provided with an opening, *b*, in its upper side, the point of the conical chamber being taken out through the side wall of the furnace and connected at the cock *b'* with a pipe, C, leading to any system of retorts and gas apparatus.

D is a steam-pipe conducted from the boiler to any desired point where it enters the fire-chamber, (if found necessary to superheat the steam this pipe is taken wholly or partially round the grate,) and is connected by T-pipes *d* with the nozzles *a*. A branch pipe, C', conducts steam from the pipe D or from the boiler into the pipe C, and serves to form an ejector for the products of combustion into the retorts.

The pipe A is provided with a damper, *a'*, placed, as shown in Fig. 1, near its junction with the chamber B, and operated by a handle extending through the furnace-wall. The spindle upon which this damper is mounted extends through A, and also through an air-pipe, E, which is brought from underneath the grate and joins the chamber B close to its junction

with A, a damper, *e*, being inside this air-pipe, and operated by the same spindle and simultaneously with *a'*.

A cock, *f*, on the steam-pipe D is placed where shown, for regulating the admission of steam into the fire-chamber or branch pipe C'.

The operation of my invention, when used for consuming smoke in the fire-chamber, is as follows: The cock *b'* is first closed and the dampers *a'* and *e* and the cock *f* opened. The steam is thus admitted to the pipe D and discharges from the T-pipes through the nozzles *d*, forming an exhaust in the branch A', which has the effect of drawing the smoke and unconsumed gases, as they arise from the fire, into the chamber B through the opening *b*. These products of combustion are there joined by a current of heated air from the pipe E, and the mixture passes round through the pipe A to the branch A', where it is discharged, with the jets of steam, in a highly-heated condition, directly over the fire, and there becomes totally consumed.

When it is desired to use the waste products of combustion for the purpose of generating gas the dampers *a'* and *e* and the cock *f* are closed and the cock *b'* opened, this operation having the effect, as will be understood, of shutting off the smoke and gas from the pipe A, and preventing the introduction of air from the pipe E. The mixture of gas and smoke is then, by the action of the exhaust formed by the jet of steam, forced from C' into C, drawn through the pipe C and forced into the retort, (which may be of any pattern found suitable,) where the operation of generating illuminating-gas is carried on in the usual way.

I do not claim in this application the here-

inbefore-described features which relate more especially to the collecting of the heavier particles of the products of combustion for subsequent utilization in manufacturing gas, but I reserve the right to file a separate application for Letters Patent, in which said features will be embodied and form the subject of claims.

Having thus described the construction and operation of my invention, what I claim, and desire to secure by Letters Patent, is as follows:

1. In a furnace, a pipe or flue arranged to discharge smoke and unconsumed gases arising from the fire of said furnace, mingled with heated air and steam, from a branch pipe extending along the inside front of the fire-chamber and above the fire-door, for the purpose set forth.

2. In combination with the pipe A and branch pipe A', and steam-injectors *d*, located above the grate-surface, the chamber B, having an opening in its upper side, substantially as and for the purpose described.

3. In combination, in a furnace, with the smoke and gas receiving chamber B, pipe A, and branch A', the pipe E, receiving air from underneath the grate, for the purpose described.

4. In a smoke-consuming furnace, the combination, substantially as before set forth, of the chamber B, pipe A, and air-pipe E, said pipes A and E being provided with dampers *a'* *e*, adapted to be opened or closed simultaneously.

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Witnesses:

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