

(No Model.)

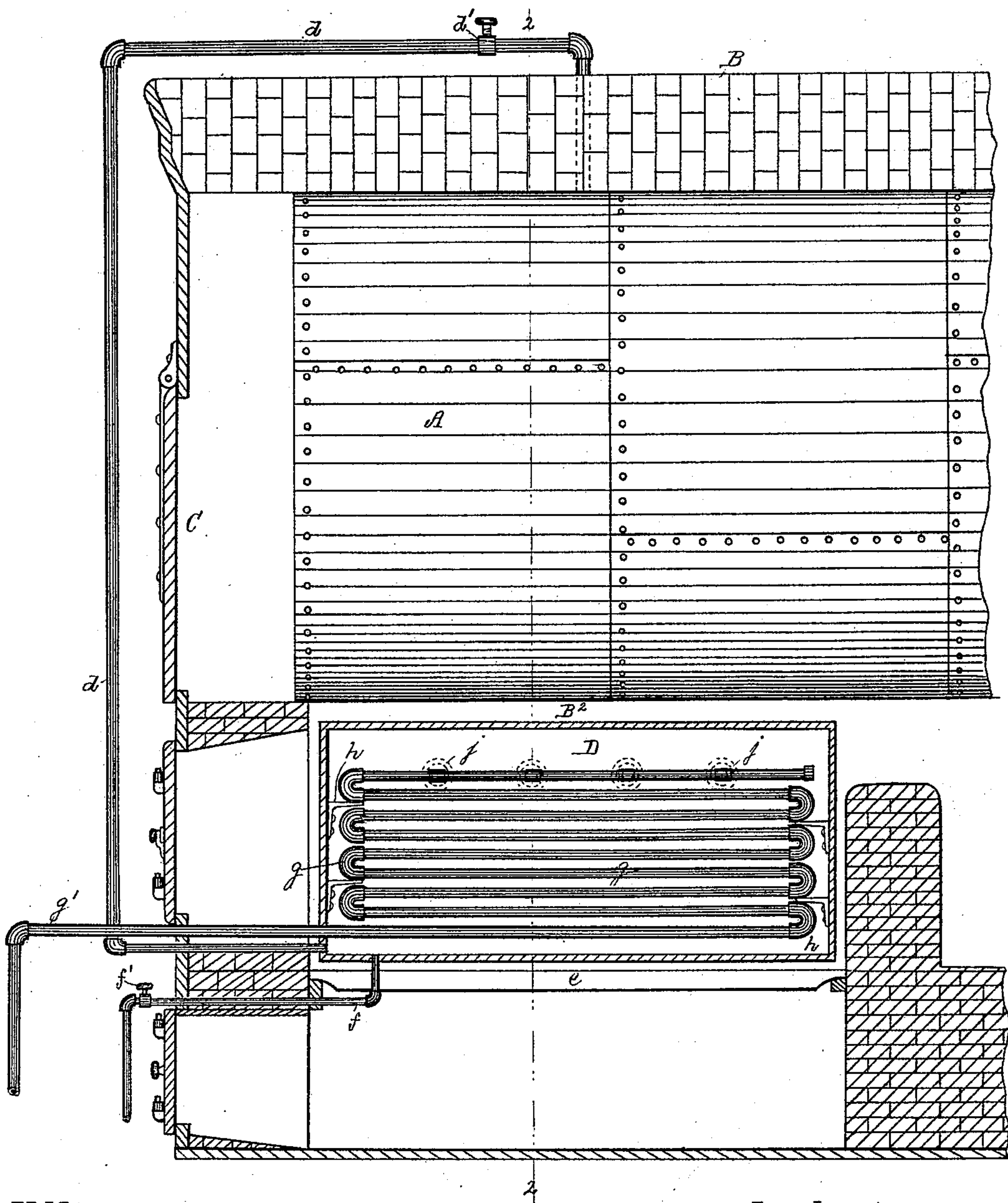
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C. A. TINKHAM.
SMOKE CONSUMING FURNACE.

No. 497,392.

Patented May 16, 1893.

Fig. 1.



Witnesses.

Lamont N. Moller.
Mary C. Moller

Inventor.

Charles A. Tinkham
by H. A. Copeland
his atty.

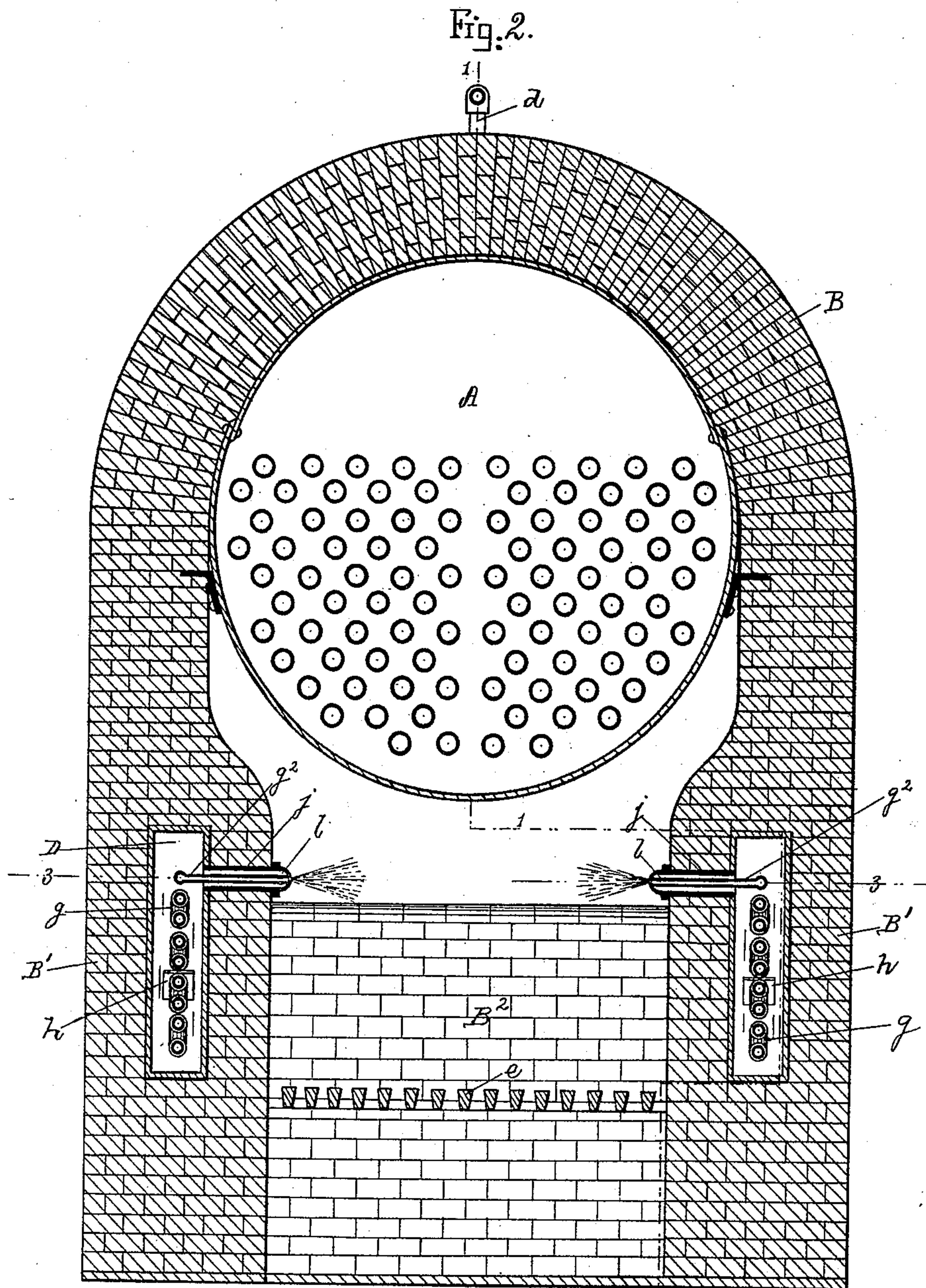
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C. A. TINKHAM.
SMOKE CONSUMING FURNACE.

No. 497,392.

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Witnesses.

Lauritz N. Moller.
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Inventor.

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(No Model.)

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Fig. 4.

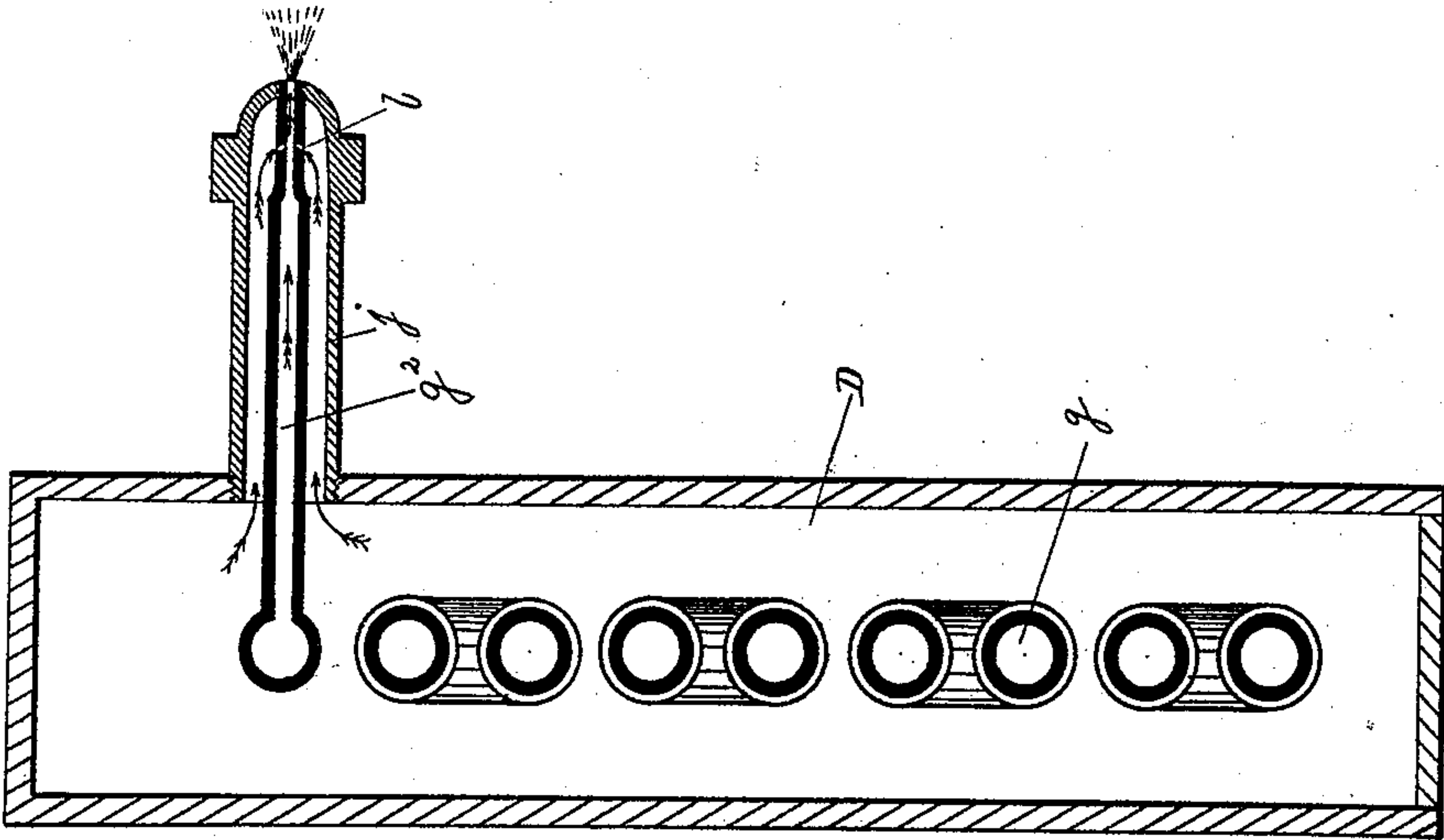
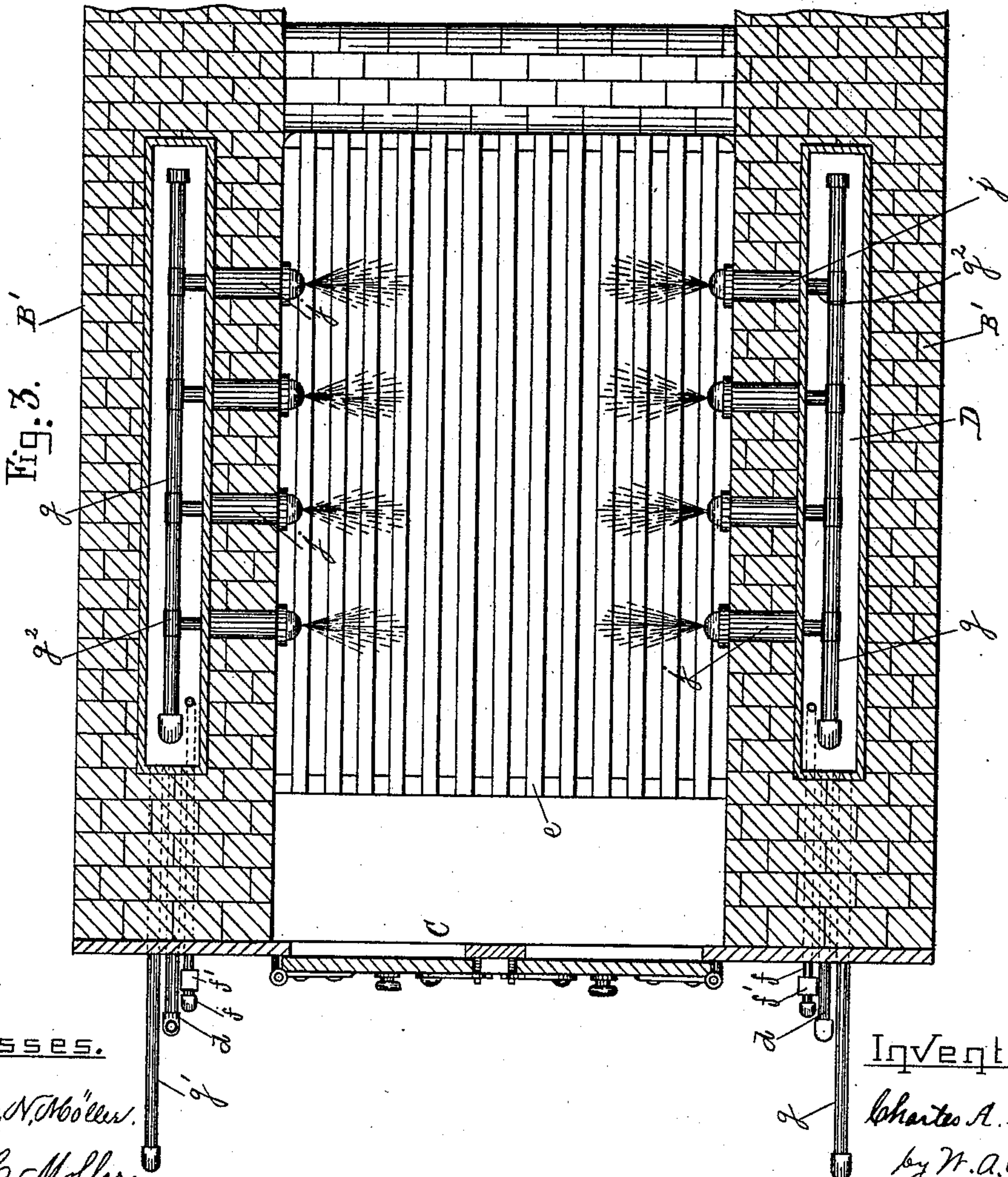


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

CHARLES A. TINKHAM, OF BROCKTON, MASSACHUSETTS.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 497,392, dated May 16, 1893.

Application filed February 18, 1893. Serial No. 462,835. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. TINKHAM, a citizen of the United States, residing at Brockton, in the county of Plymouth and State of Massachusetts, have invented a new and useful Improvement in Smoke-Consuming Furnaces, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates especially to steam generating furnaces which use soft coal, and its object is to burn the gas and smoke which arise in the combustion chamber.

My invention consists in injecting a jet of hot air and super-heated steam into the combustion chamber above the body of the fire, the air being heated while passing through a pipe in a steam chamber embedded in the furnace wall, and in the features which will be more particularly described and claimed.

In the drawings, Figure 1 is a longitudinal section on line 1 1 of Fig. 2 showing the steam boiler and the air pipe coil within the steam chamber. Fig. 2 is a vertical cross section on line 2 2 of Fig. 1. Fig. 3 is a horizontal section on line 3 3 of Fig. 2. Fig. 4 is a vertical section showing the steam chamber and air coils and nozzle.

A is the boiler of a steam generating furnace set in the brick work B in the usual way, and C represents the front of the furnace. A steam chamber D consisting of a rectangular iron box is set into the brick wall B' on each side of the combustion chamber.

B² represents the bridge wall of the furnace and e represents the grate bars.

A steam pipe d leads from the boiler to the steam chamber D, the supply of steam being controlled by valve d'. A drip pipe f leads from the bottom of the steam chamber, having a valve f'. An air pipe coil g is supported on brackets h in the steam chamber and is supplied with air under pressure through pipe g' by means of a common air pump, not shown in the drawings. From the side of the steam chamber extend a series of nozzles j projecting through the side walls B into the combustion chamber. A corresponding series of branch pipes g² lead from the upper section of air pipe coil through the steam nozzles, the air pipe nozzles being

smaller in diameter than the steam nozzles and allowing circulation of steam around the air nozzles, but closing up the mouth of the steam nozzles except through the mouths of the air nozzles. Minute perforations l lead from the steam nozzle into the pipe nozzle. The steam in the chamber D will be superheated to a high degree, and this in turn will heat the air in the air pipe coil. I have shown the steam chamber embedded quite deeply in the wall. The depth to which it is embedded may be greater or less as desired, but in most steam generating furnaces the heat is so intense as to penetrate through the brick and be sufficient for the purpose when embedded as deeply as I have shown it, and at the same time the steam chamber will be better protected than when exposed directly to the flames.

The perforations l leading from the steam nozzle into the air nozzle should be very minute in order that the supply of steam may not be too abundant. The steam and hot air thus mingle and pass together into the combustion chamber.

When the air in the air pipe is heated by direct contact of the pipe with the hot air of the furnace, or when the air pipe nozzle unprotected projects into the combustion chamber, it soon burns off. By inclosing the air pipe inside the steam chamber and inclosing the air pipe nozzle within the steam nozzle the same degree of heat may be applied without injuriously affecting the pipe.

What I claim as my invention is—

1. In a steam generating furnace, a steam chamber embedded in the walls of the furnace, a steam pipe leading from the boiler to the steam chamber, the steam being superheated after introduction into the chamber, an air pipe coil within the steam chamber and supplied with air from outside the furnace, nozzles leading from the steam chamber and air pipes into the combustion chamber, the hot air and steam mingling as they enter the combustion chamber, substantially as described.

2. In a steam generating furnace, a steam boiler, a steam chamber fed from the boiler, and exposed to additional heat whereby the steam is superheated in the chamber, an air

pipe coil within the steam chamber and supplied with air from outside the furnace, a nozzle leading from the steam chamber into the combustion chamber, a branch from the air
5 pipe extending through to the mouth of the steam nozzle and port holes in the air pipe near its mouth through which the steam is allowed to enter and mingle with the hot air

and pass through a common mouth into the combustion chamber, substantially as described.

CHARLES A. TINKHAM.

Witnesses:

WM. H. WHITE,

WM. A. COPELAND.