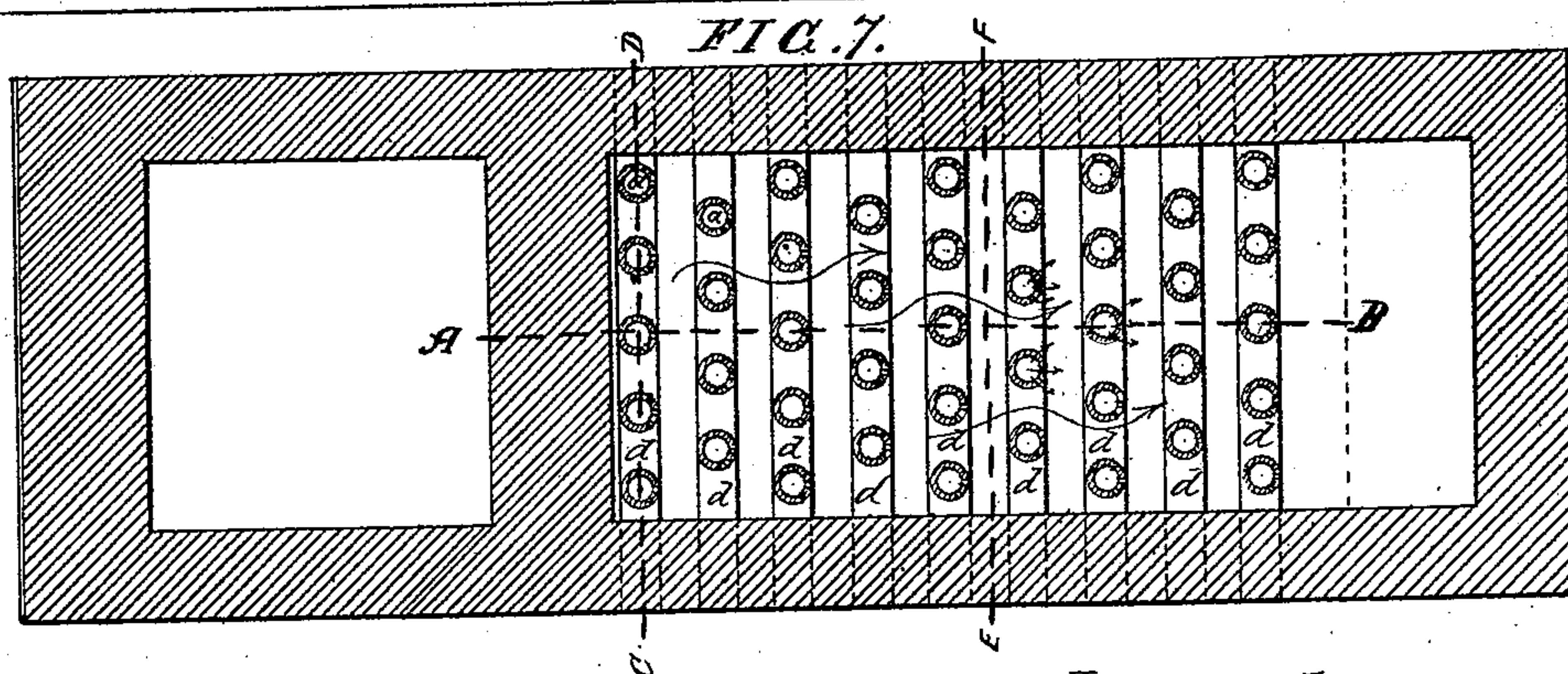
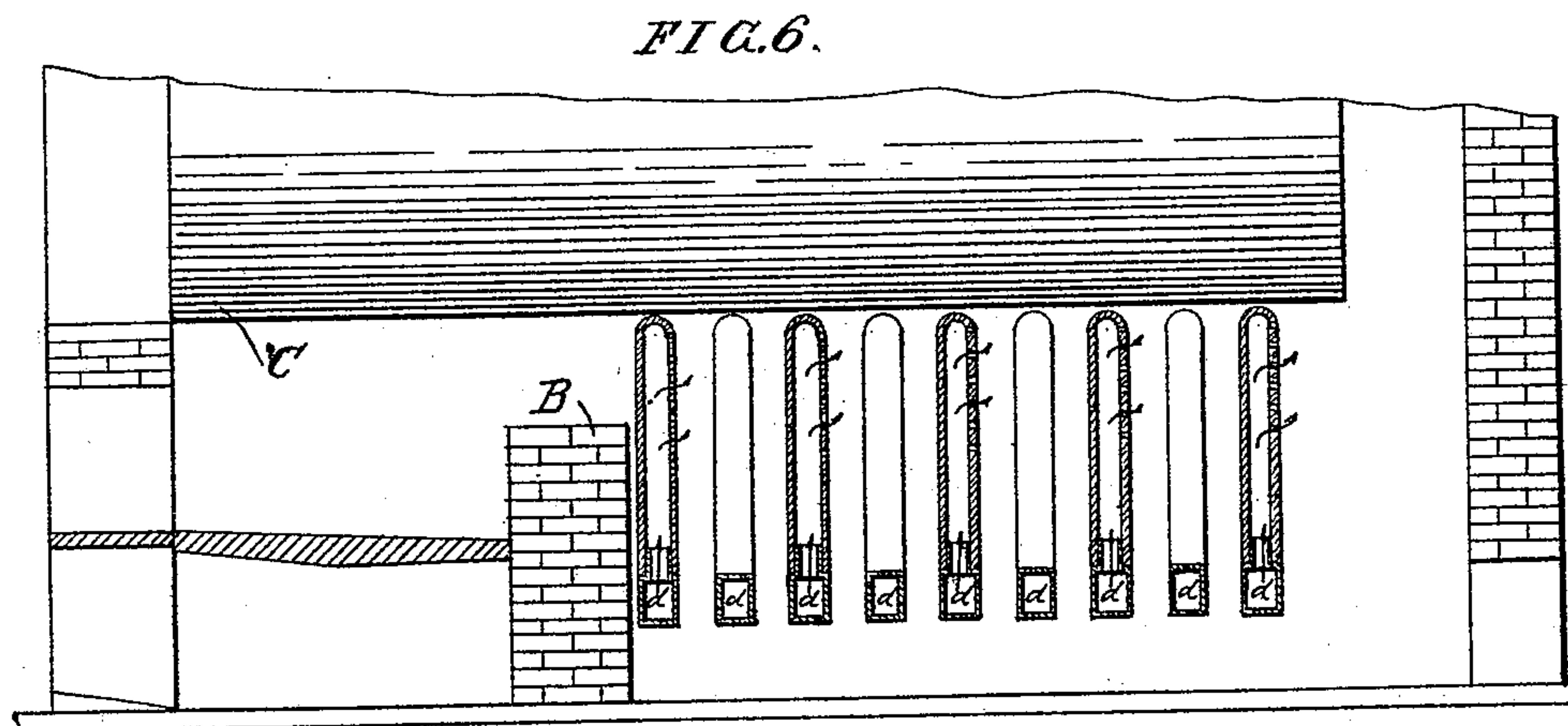
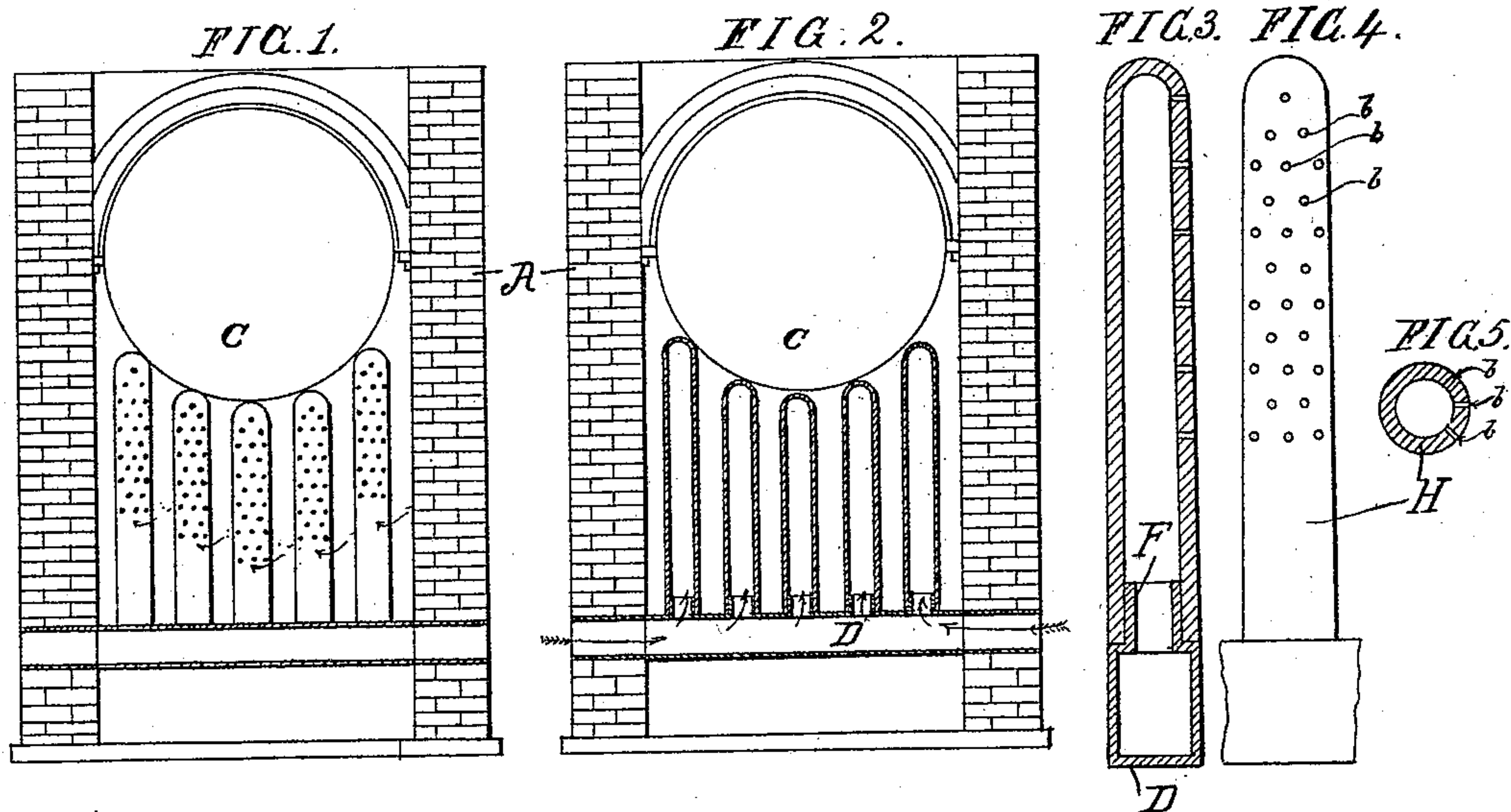


(No Model.)

J. MUELLER.  
SMOKE CONSUMER.

No. 438,704.

Patented Oct. 21, 1890.



Witnesses  
J. S. Pearson  
J. V. Swanson

Inventor  
Jacob Mueller



# UNITED STATES PATENT OFFICE.

JACOB MUELLER, OF DES MOINES, IOWA.

## SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 438,704, dated October 21, 1890.

Application filed August 16, 1889. Serial No. 321,050. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB MUELLER, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented a new and useful Device for Complete Combustion in Relation to Furnaces, &c., of which the following is a specification.

Heretofore air-chambers have been constructed under a boiler in a furnace in various ways, and air heating and distributing tubes connected with such chambers to promote combustion and prevent the annoyances and waste incident to the escape of soot and black smoke.

My object is to facilitate the application of and permanently fixing of air-chambers adapted to support and retain air superheaters and distributors in vertical positions under a boiler without any extraneous fastenings; and my invention consists in the construction and combination of metal tubes for conveying cold air and earthenware tubes for superheating and distributing the air, with a furnace in rear of the bridge-wall, as hereinafter set forth, pointed out in my claim, and illustrated in the accompanying drawings, in which—

Figures 1 and 2 are transverse sectional views of a boiler-furnace of common form, showing my invention applied. Figs. 3 and 4, jointly considered, clearly illustrate the construction and combination of the metal tube adapted to occupy a horizontal plane and to support an earthenware tube in a vertical position. Fig. 5 is a transverse sectional view of the earthen pipe having perforations in its top portion. Fig. 6 is a vertical and longitudinal sectional view, and Fig. 7 a view looking down from a horizontal plane, of a boiler-furnace of common form to which my invention is attached as required for practical use.

A represents the outside wall, B the bridge-wall, and C the boiler.

D is a four-sided open-ended cast-metal tube adapted to be permanently fixed in the parallel walls of a boiler-furnace. It has a number of integral, vertical, tubular, and open-ended projections F, adapted to engage and retain air heating and distributing tubes in a vertical position under the boiler.

H is an earthenware tube, preferably made of fire-clay, open at its lower end, and adapted in size and shape to fit over a projection F, as required to be connected with the tube D, and supported thereon in a vertical position without any fastening device. The upper end of the tube H is closed, and one of its sides is perforated at its upper portion to allow the escape of jets of superheated air.

In the application of the air conducting and superheating and distributing device thus composed of two detachable parts I place the open-ended tube D in the parallel side walls of a furnace in such a manner that it will be retained in a horizontal position and one or both ends in communication with the atmosphere on the outside of the furnace-wall. I then place the open ends of the tubes H over the projections F, as clearly shown in Figs. 1, 2, 3, and 6, to project upward perpendicularly and to terminate close to the surface of the boiler, and preferably in such a manner that the perforations will be on their rear sides. Any number of tubes D and H may be thus readily attached to a furnace, so that the products of combustion will envelop all the superheating and air-distributing tubes in passing rearward from the fire-box and bridge-wall to be subject to the action of my invention, which is as follows: The caloric is retained under the boiler by means of the tubes H longer than if allowed an unmolested rearward passage, and the tubes are thereby heated, as required, to superheat the air admitted into them through the open-ended tubes D. The air thus superheated is discharged from the perforated top portions of the tubes H and mingled with the valuable products of combustion liberated in the fire-chamber and carried backward over the bridge-wall, and, in combination with such carbonaceous matter that usually escapes in black smoke and soot, produces an inflammable gas, that is consumed immediately under the boiler to aid in generating steam and to prevent the flues in the boiler from becoming fouled; and it is obvious that when all the valuable products of combustion are thus utilized there will be no black smoke and soot carried through the escape-flue to soil persons and objects on the outside of the furnace and building within which the furnace is located.



By forming the perforations in the tubes H in one side only and placing the tubes so that the perforations will discharge the superheated air rearward the draft of the furnace is increased thereby whenever such increase of draft is desirable; but I do not wish to confine myself to the number of perforations in a tube, or the positions thereof, or the number and size of tubes thus formed and applied in rear of the bridge-wall of a furnace.

I am aware a longitudinal air-chamber between the parallel walls of a furnace and in rear of the bridge-wall has had an arched brick roof, vertical openings in the roof, and perforated tubes placed over said tubes to project vertically under the boiler; but my manner of constructing open-ended tubes with open-ended vertical projections and combining them with the parallel side walls to receive and retain perforated tubes is novel

and greatly advantageous, in that the complete invention can be connected with a new or old furnace with greater facility and less cost than by forming an air-chamber and vertical openings in its roof of masonry.

I claim as my invention—

An improved smoke-consuming device for furnaces, consisting of a four-sided open-ended metal tube having integral tubular open-ended vertical projections or branches, and perforated earthenware tubes having closed tops and open bottoms fitted over the vertical projections of the said metal tube, in combination with the parallel side walls of a boiler-furnace, as shown and described, for the purposes stated.

JACOB MUELLER.

Witnesses:

J. S. PEARSON,  
J. V. SWANSON.