

(No Model.)

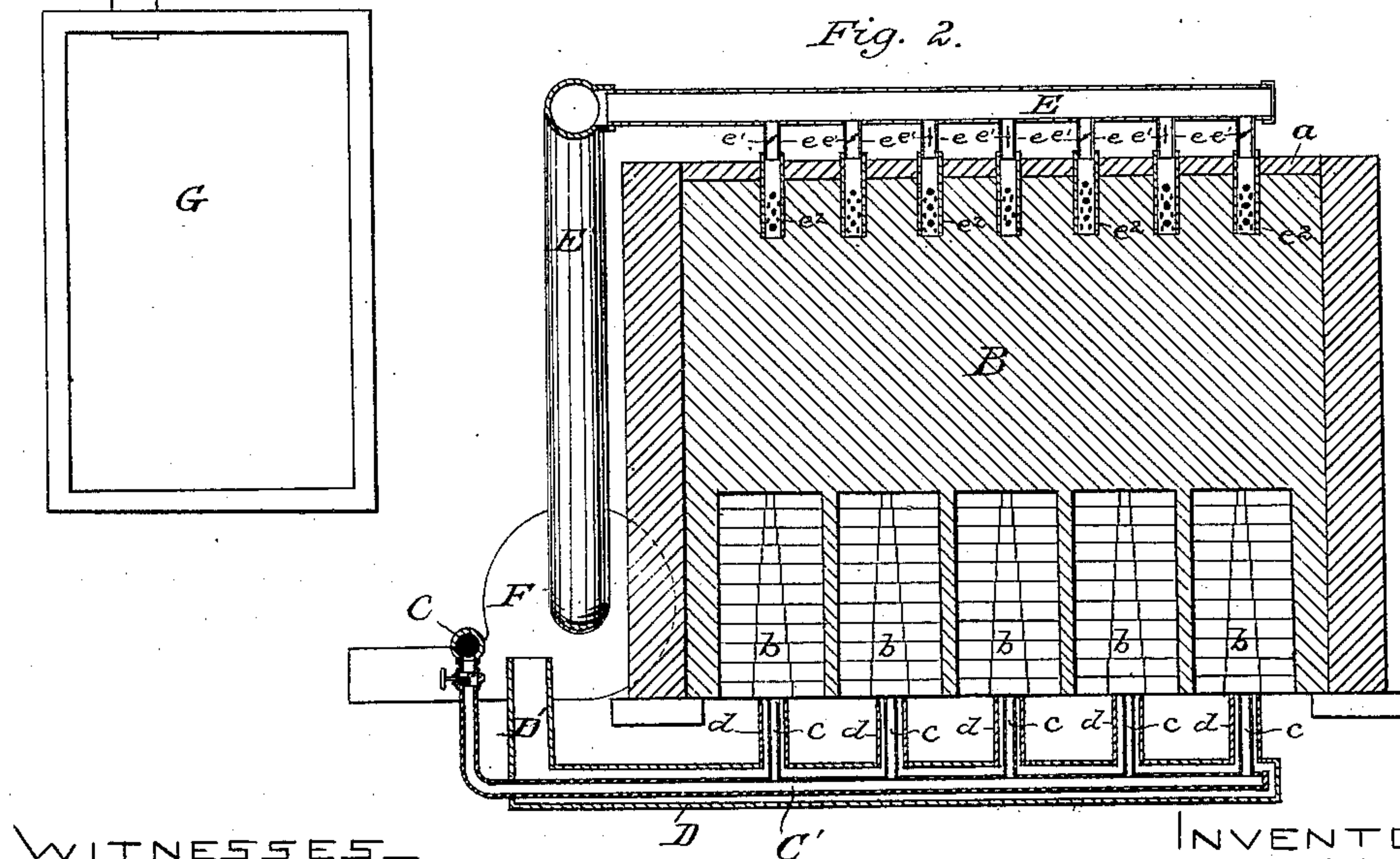
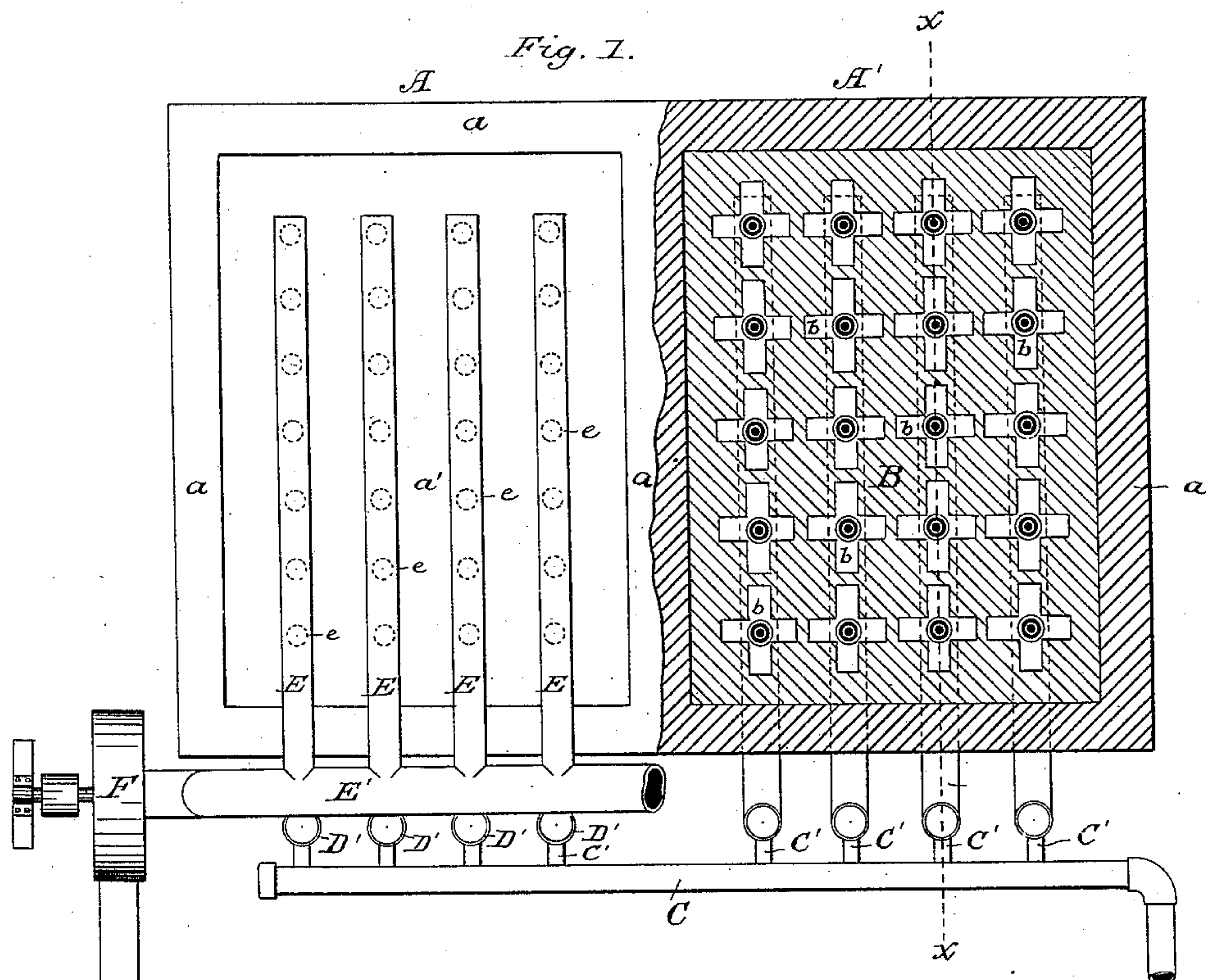
2 Sheets—Sheet 1.

B. LOOMIS.

DEVICE FOR BURNING GASEOUS FUEL IN KILNS.

No. 280,838.

Patented July 10, 1883.



WITNESSES—
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C. C. Poole

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Attorney

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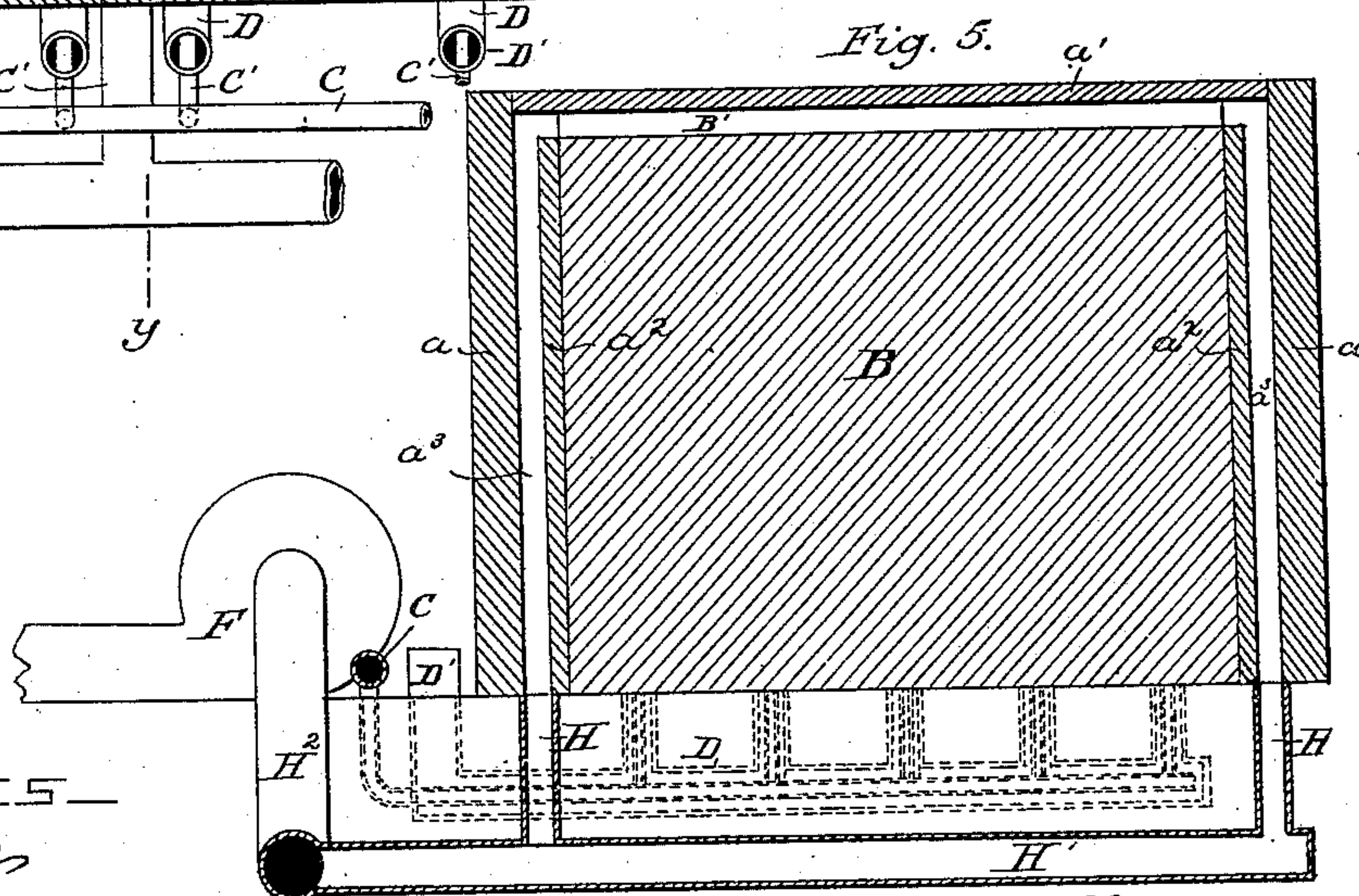
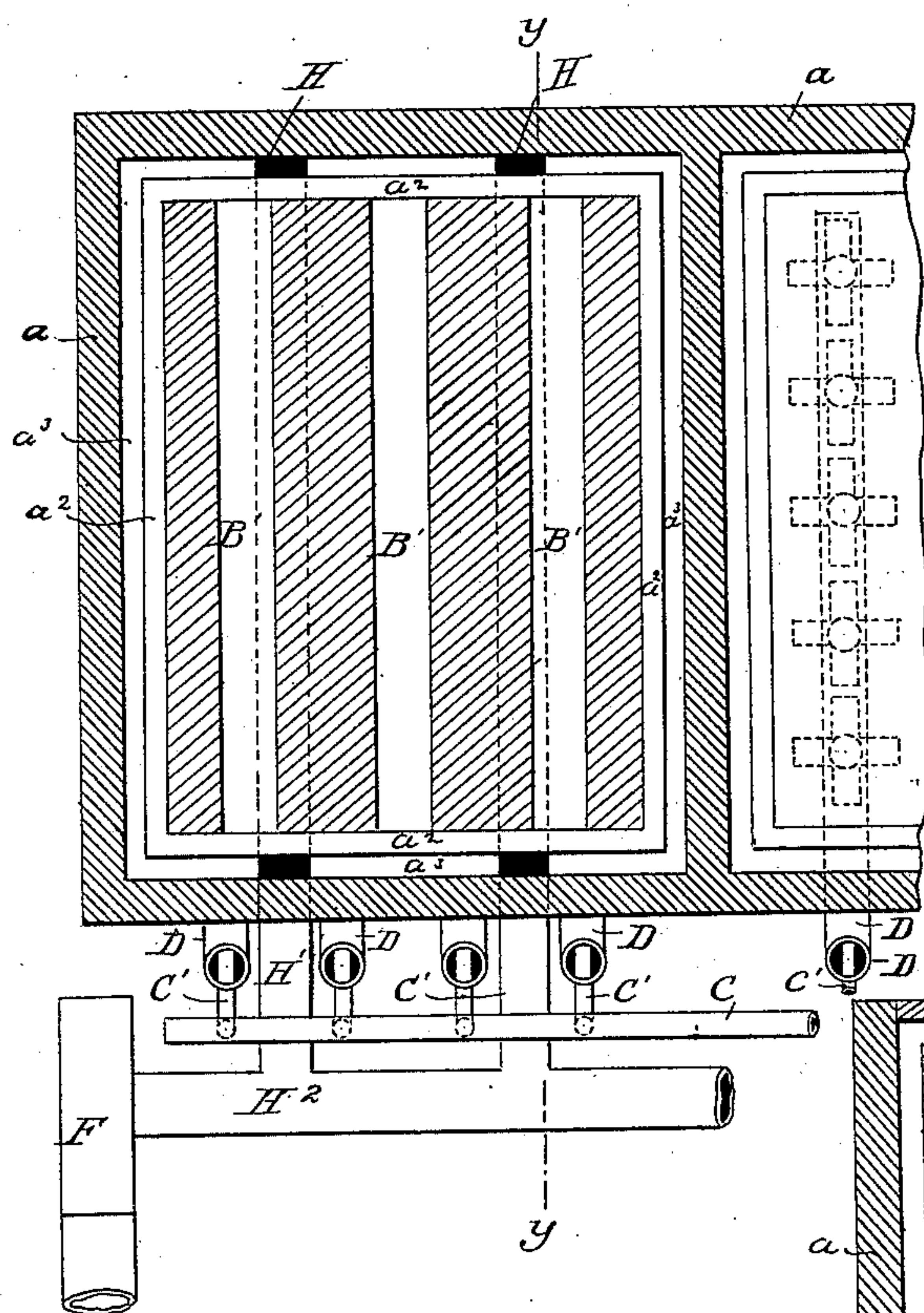
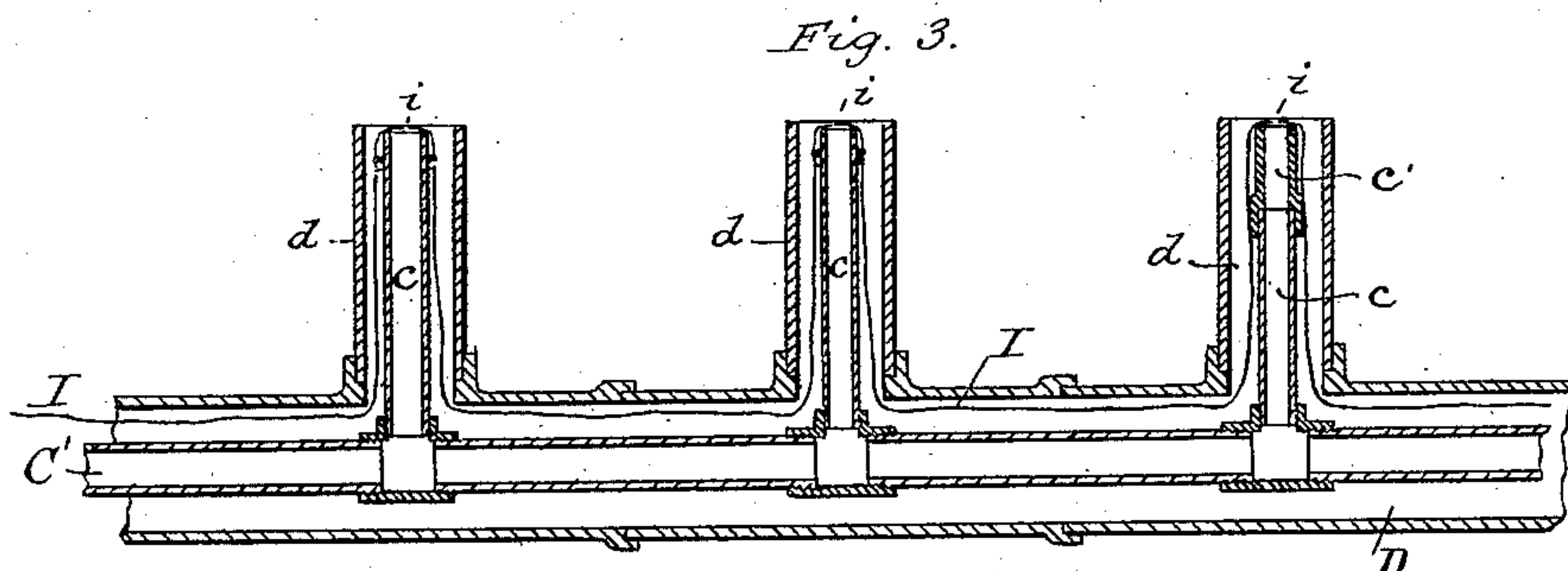
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UNITED STATES PATENT OFFICE.

BURDETT LOOMIS, OF HARTFORD, CONNECTICUT.

DEVICE FOR BURNING GASEOUS FUEL IN KILNS.

SPECIFICATION forming part of Letters Patent No. 280,838, dated July 10, 1883.

Application filed November 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, BURDETT LOOMIS, of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Devices for Burning Gaseous Fuel in Kilns; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in devices for burning gaseous fuel in kilns for burning brick, pottery, or other ceramic ware. Its general object is to provide a means whereby the gas to be burned may be conveyed into the interior of the kiln, together with a supply of atmospheric air necessary to its combustion, and to provide for such a distribution of the gas that a uniform heating effect is obtained throughout the kiln. Its object is also to provide means for igniting the gas at its points of exit into the kiln at the beginning of the operation of burning, and details of construction in the kiln, supply-pipes, and exhausting devices necessary in carrying out the general object above mentioned. To these ends my invention consists in the matters hereinafter described and claimed.

In the drawings, Figure 1 is a plan view of a kiln constructed as proposed by my invention, having two compartments, one of which is shown in section. Fig. 2 is a transverse vertical section on line *xx* of Fig. 1. Fig. 3 is an enlarged detail view of the inner openings of the gas-pipes and air-supply flues. Fig. 4 is a plan view of one compartment of a kiln, showing a modified form of the devices shown in Fig. 1. Fig. 5 is a vertical section on line *yy* of Fig. 4.

In Figs. 1 and 2 is shown a brick-kiln having two compartments, A and A'. This kiln is made with plain side walls, *a a*, which may be temporary or permanent. The interior of the kiln is shown as filled with brick, (indicated by the light shading B,) which are stacked so as to leave spaces between them for the passage of heated air and products of combustion in a well-known manner. A substantially air-tight covering, *a'*, is placed over the kiln, which is made by placing a layer of

closely-laid bricks over the top surface of the loosely-stacked bricks to be burned.

The gaseous fuel used in firing the kiln is brought from the generator through a main supply-pipe, C, which extends along the front of the kiln, and has a number of lateral branches, C' C', which extend downwardly from the supply-pipe C, and then longitudinally under the bottom of the kiln.

From the pipes C' C' a number of short vertical branch pipes, *c c*, extend upward, and terminate in the interior of a kiln at or about the level of its bottom surface. The branch pipes *c c* are arranged at approximately equal distances apart over the entire bottom surface of the kiln, as shown in the sectional plan of the compartment A', Fig. 1, so that a uniform distribution of the gas-supply over the entire lower area of the kiln is effected. The gas-supply pipes mentioned are preferably of metal, and such as are ordinarily used for this purpose.

DD are the air-supply flues for supplying the atmospheric air necessary for the combustion of the gas, which are laid under the kiln, and in the interior of which the gas-supply pipes C' C' are placed. A series of vertical branch flues, *d d*, corresponding to the gas-pipes *c c* and surrounding the latter, terminate at the bottom surface of the kiln, and supply air at and around the open ends of the pipes *c c*, at which the gas escapes and is burned. The outer ends of the horizontal air-flues D D are turned upward and terminate in the open air at D'. The air-flues D and *d* are preferably made of cylindrical tiles, which are laid in the ground and connected in the manner common in laying drain-tiles.

A series of exhaust-flues, E E, are arranged over the top of the kiln, which communicate with the interior thereof by numerous short vertical pipes *e e*, and which are connected to a main cross-flue, E', extending downward at one end of the kiln, and connected to the inlet-opening of an exhaust-fan, F. The branch pipes *e e* are provided with valves or dampers *e' e'*, and connect with a corresponding number of short vertical cylindrical tiles, *e*, which extend through the top covering, *a'*, of the kiln, and are provided with perforations

in their lower portions. The lower and perforated ends of the tiles *e* extend downwardly into the mass of loosely-stacked bricks, so that the waste products of combustion may pass from the interstices therein through the perforations in the tiles and out through the flues *e* and *E*. The said tiles are put in place during the operation of stacking the kiln, and are held in position by the unburned bricks and the covering *a'*, both of which are laid around them.

The action of the exhaust-fan *F* is to draw the heated air and products of combustion from the gas-flames at the bottom of the kiln upward through the mass of bricks and out of the top of the kiln through the tiles *e* and valved pipes *e*, which are distributed at equal intervals over the entire top of the kiln. The effect of this arrangement of the exit-flues *e*, combined with the uniform distribution of the gas-inlet pipes *c* in the bottom of the kiln, is to produce an equal and uniform distribution of heat throughout the mass of bricks. In case, however, the burning of one part of the kiln is found not to be progressing as rapidly as the remainder, the dampers *e'* in a portion of the pipes *e* can be closed and the heat deflected through such part of the kiln to the flues which remain open. A uniform burning of the kiln can thus be accomplished under any circumstances.

In order to facilitate the distribution of the heat from the gas-flames throughout the mass of bricks, and to prevent the melting or defacing of those in immediate proximity to the gas-flame, openings *b b* are left in the bricks when stacked over the open ends or burners of the gas-pipes *c*, which extend upwardly into the mass of bricks, as shown in Fig. 2, and are preferably extended radially from each burner as a center into the surrounding mass, as shown in Fig. 1.

The waste products of combustion and heated gases, after being drawn from the top of the kiln, may be driven from the exhaust-fan *F* into a drying-chamber, *G*, Fig. 1, there to be utilized in drying a fresh batch of wet or green brick preparatory to burning them. The application of waste heat from the kiln for this purpose forms no part of the invention set forth in the present application, but is described and claimed in an application for a patent previously made by me.

In Figs. 4 and 5 are shown a kiln having between its outer wall, *a*, and its inner wall, *a'*, a vertical passage, *a''*, which communicates with cross-passages *B'*, formed in the top of the stacked bricks, and is connected by means of flues *H*, *H'*, and *H''* with the exhaust-fan *F*. This is intended to illustrate the application of the mode of applying gaseous fuel before described to permanent kilns having double walls, or to a kiln constructed as described in my application for patent before mentioned, in which the waste heat is applied to a drying-chamber for drying a fresh batch of brick. I

prefer, however, the mode of construction first described, and shown in Figs. 1 and 2.

In order to provide means for igniting the gas at the points of its exit into the kiln at the beginning of the operation of burning, I have provided an insulated wire, *I*, which extends through the air-flues *D* under the kiln, and is connected to a device, *i*, for igniting the gas, such as is ordinarily used for that purpose, at the orifices at the top of the pipes *e*, and to a suitable electric battery situated at a convenient place outside of the kiln. The gas may thus be ignited over the entire area of the kiln simultaneously by the passage of an electric current through such wire, and the use of openings in the kiln, through which fire may be applied, or other devices for lighting, is rendered unnecessary.

The air-flues *D* and *d* are, as before described, preferably composed of tiles; or they may be made of any other refractory material. The purpose of using refractory substance in these flues is to protect the metal gas-pipes placed therein from injury by excessive heat. Such protection is especially desirable in the case of the vertical gas-pipes *c*, which enter the bottom of the kiln and are subjected to great heat on account of their proximity to the burning fuel.

As a further guaranty from injury, the vertical gas-pipes *c*, where they enter the interior of the kiln, may themselves be also composed of tile or other refractory material, so that such ends will be unaffected by the heat either from the burning gas issuing therefrom or communicated from the adjacent mass of heated brick. A tile tip, *c'*, applied to a metal pipe, *c*, is shown at the right in Fig. 3.

I claim as my invention—

1. In a kiln for burning brick and other articles, the combination, with the kiln, of flues for the supply of air to effect combustion of the fuel, and pipes arranged within said flues for the conduct of the gas, substantially as described.

2. In a closed-top kiln, the combination, with inlets for gaseous fuel, arranged to deliver the fuel at points uniformly distributed throughout the bottom of the kiln, of a series of similarly-arranged outlets at the top of the kiln and an exhaust-fan connected with said outlets, substantially as described.

3. In a closed-top kiln, the combination, with means for firing the same at horizontally-distributed points, of a series of valved and correspondingly-distributed outlets, and an exhaust-fan connected with said outlets, whereby the burning may be regulated at different parts of the kiln, substantially as described.

4. In a closed-top kiln, the combination, with a series of vertical flues or pipes, *e*, and an exhaust-fan connected therewith, of a corresponding series of tiles, *e''*, connecting the said pipe *e* with the interior of the kiln, substantially as and for the purpose set forth.

5. The combination, with a closed-top kiln,

of the vertical pipes *e*, flues *E*, cross-flue *E'*, and fan *F*, substantially as described.

6. In combination with a brick or other kiln, a gas-supply pipe, *C'*, air-pipes *C*, provided
5 with valves *c'*, and branch pipes *c*, connecting the said pipes *C* with the interior of the kiln, substantially as described.

7. In a kiln, the combination, with a gas-supply pipe and an air-duct in which said gas-
10 pipe is placed, of a suitable electric conductor placed in said air-duct and arranged to effect the ignition of the gas at the point of its exit from the said pipes by the passage of an electric current through said wire, substantially as
15 described.

8. In a kiln for burning brick or other articles, the combination, with metal pipes for

supplying gaseous fuel to the interior of such kiln, of air-flues surrounding the said pipes, composed of refractory material, substantially 20 as described.

9. In a kiln for burning brick or other articles, the combination, with air-flues *d*, of metal pipes placed in the interior of said flues, having terminal sections *c'*, of refractory material, 25 substantially as described.

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

BURDETT LOOMIS.

Witnesses:

M. E. DAYTON,
JESSE COX, Jr.