

(No Model.)

E. C. MERRILL.
BURNER FOR GAS CONSUMING FURNACES.

No. 466,174.

Patented Dec. 29, 1891.

Fig. I.

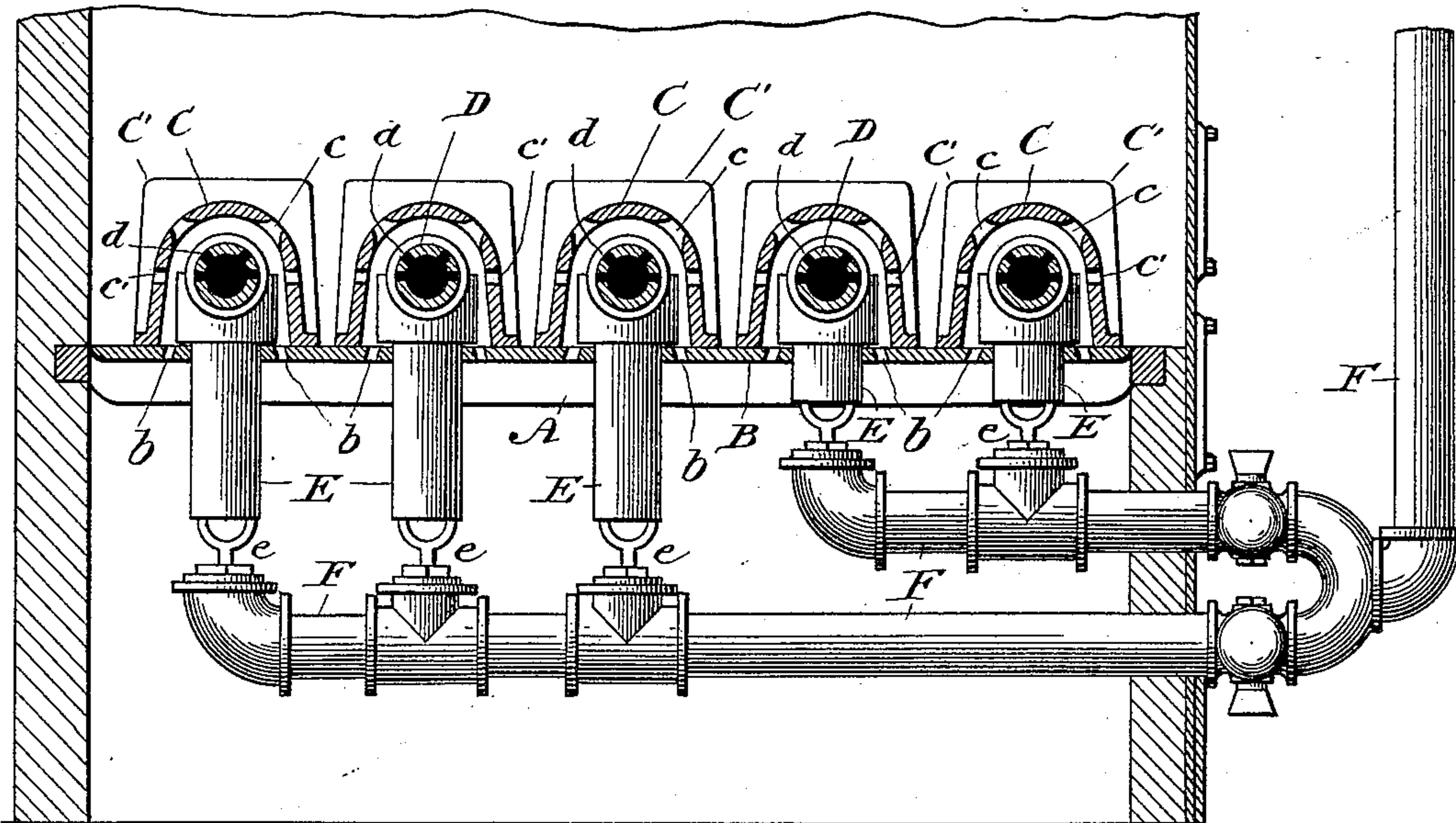


Fig. II.

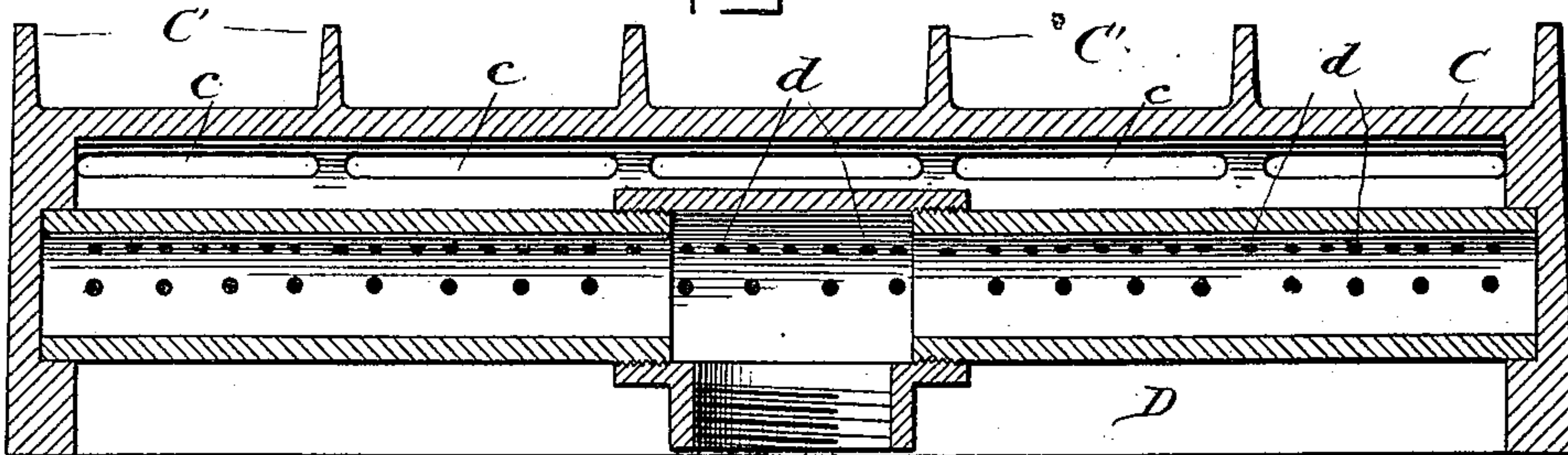
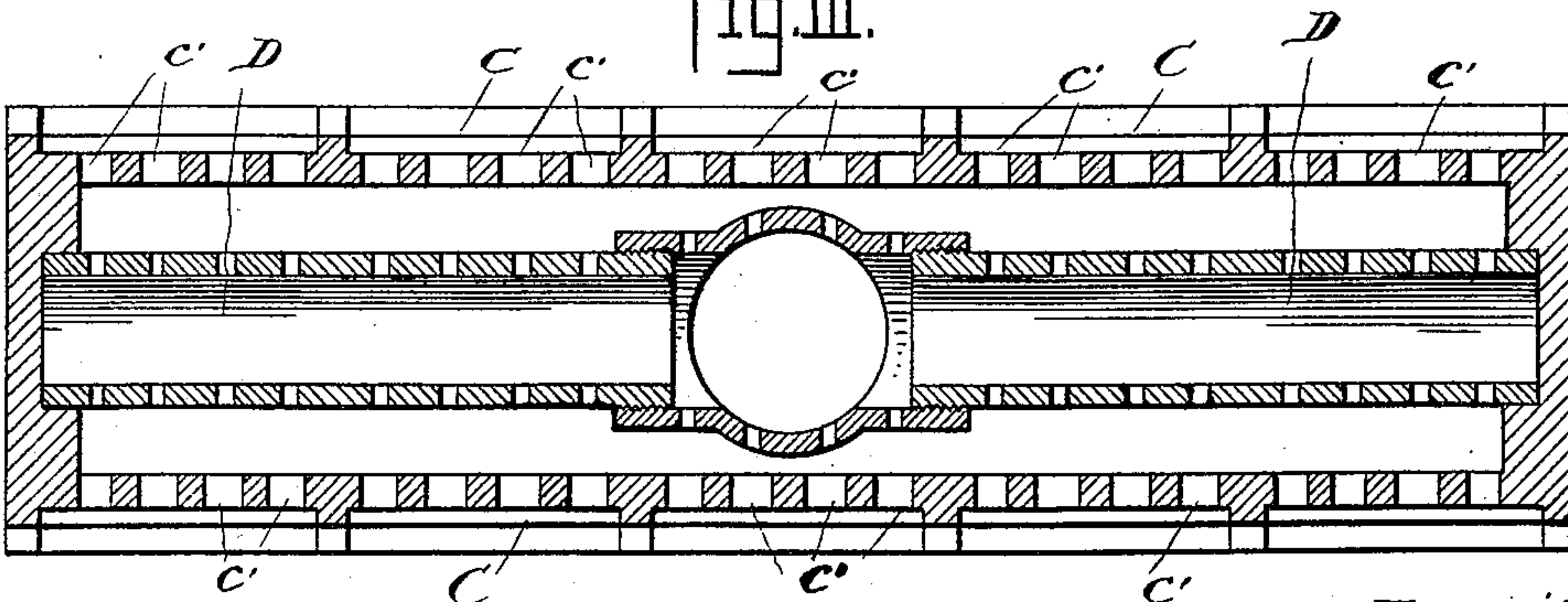


Fig. III.



Witnesses:

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By his Attorneys,

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UNITED STATES PATENT OFFICE.

EDWIN C. MERRILL, OF ALLEGHENY, PENNSYLVANIA.

BURNER FOR GAS-CONSUMING FURNACES.

SPECIFICATION forming part of Letters Patent No. 466,174, dated December 29, 1891.

Application filed March 9, 1891. Serial No. 384,234. (No model.)

To all whom it may concern:

Be it known that I, EDWIN C. MERRILL, a citizen of the United States, and a resident of Allegheny, county of Allegheny, and State of Pennsylvania, have invented a new and useful Improvement in Burners for Gas-Consuming Furnaces, which improvement is fully set forth in the following specification.

The present invention has reference to the construction of burners for furnaces and other heaters consuming mixed gases.

Its general object is to provide a structure which can be readily applied to ordinary grate-furnaces and similar heaters constructed to burn coal, so as to adapt them to the use of natural or other gaseous fuel.

The invention contemplates the adaptation of such heaters to this kind of fuel without any change in their structure and by the simple addition of an attachment which can be quickly removed in case it is desired to return to the use of coal.

It further contemplates the combustion of the gaseous fuel in a highly efficient and economical manner.

In carrying out the invention a large sheet-iron plate is placed over the entire grate-surface, covering all the grate-bars and the spaces between them. On this plate are placed cast-iron shells in the form of inverted troughs, inclosing each a pipe running from end to end, the pipe having numerous small apertures on each side. A vertical pipe passing up through the plate connects with this horizontal pipe and supplies it with air and gas mixed in suitable proportions, and these gases, filling the interior of the shells, escape through slots or perforations in the latter. The sheet-iron plate cuts off all draft-air, except through a number of small apertures drilled through the same within the shells and close to the pipe delivering the mixed gases. This is a special feature of the burner and conduces greatly to the completeness of the combustion and avoidance of waste. In structures of this kind heretofore devised a large excess of draft-air has been the chief fault, the result being that much heat is carried off into the chimney. By means of this invention the draft-air is not only restricted in amount, but, being admitted in close contact with the mixed gases, becomes heated

before uniting in combustion with them. As the suction in the stack draws air from below the grate through very small apertures, the draft at these points is quite vigorous. It is sometimes advantageous, though not necessary, to place screens of wire-gauze over the openings in the shell.

In the accompanying drawings, which form part of this invention, Figure I is a central longitudinal section of a grate-furnace equipped with my gas-fuel attachment; Fig. II, a longitudinal section of one burner, and Fig. III a horizontal section through the shell.

A represents the dead-bars of an ordinary furnace built for burning coal. Across these bars is laid a sheet-iron plate B, which cuts off all draft from below, except through the small openings *b*.

C is a cast-iron shell having at intervals ribs *C'* to impart strength and prevent warping. A series of these shells are placed parallel to each other on plate B. Each shell incloses a wrought-iron pipe D, extending lengthwise thereof and secured in the ends of the shell. The latter has openings on opposite sides for the exit of mixed gases. These openings are shown as a series of slots *c* and a series of small perforations *c'*. I may use either or both, as desired. The pipe D has also on each side a series of perforations *d* opposite the slots *c*, and may have more than one row on each side, if desired, the object being simply to utilize the principle of a multiplicity of apertures, each furnishing as great a supply of gas as is consistent with good combustion instead of burning large fires through a small mixer.

Vertical pipes E pass through the plate B and connect one with each of the pipes D. These pipes are open at their lower ends, and into each extends the nozzle *e* of a gas-pipe connected, as shown, with gas-supply pipes F. Through the annular spaces around the nozzles *e* a proper quantity of air is drawn in by the action of the gas-jet and mixes with the gas while ascending through pipes E and D. This preliminary mixture introduces sufficient air into contact with the gas to ignite at the jet-orifices *d* and burn the carbon of the gas. The draft-air, entering the space within the highly-heated shell C, mingles with the burning vapors and effects complete combustion.

tion. Excess of draft-air, particularly cold air, whose presence would lower the temperature of the inflammable gases and diminish combustion, is thus completely avoided.

5 Since the air entering by the numerous small orifices *b* absorbs part of the heat of pipe *D*, the latter does not become so hot as would otherwise be the case. The small apertures *d* therefore are not so likely to become closed
10 by oxidation. This particular arrangement of the shell, burner-pipe, and draft-openings is further advantageous in that it tends to prevent ignition of the gas at the nozzle *e*, which sometimes happens when the supply of
15 gas is turned partly off.

The burner is frequently employed to consume waste and garbage. In such case the arched shell serves to protect the burner-pipe *D* from refuse.

20 It will be seen that the plate *B* and all the parts above it, as well as the supply-pipes beneath, can be removed quickly and easily whenever desired, it being only necessary to uncouple a few joints, and when these parts
25 are removed the furnace is restored to its original condition and can be used for burning coal.

I have found that by the arrangement described a very crude coal-burning contrivance
30 may be converted into a heater of great capacity and efficiency without any change other than the addition of the devices described.

I claim as my invention—

35 1. The described attachment for coal-burning furnaces and heaters, comprising in combination a plate adapted to cover the grate-

bars, a shell resting thereon and provided with slots or openings, and a perforated pipe inclosed by said shell and connected with a
40 gas-supply pipe, said plate having a series of small apertures within the shell and close to said pipe, substantially as and for the purpose described.

2. The combination of the horizontal plate, 45 a series of hollow shells resting thereon and inclosing each a horizontal pipe having a row or rows of perforations, said shell having slots or apertures opposite said perforations, and vertical supply-pipes passing through said
50 plate and connected with said perforated pipes, said plate having a series of small draft-openings adjacent to gas-exits and cutting off draft from below, except at these openings, substantially as described. 55

3. The combination of the horizontal plate adapted to rest on ordinary grate-bars and cutting off all draft from below, except through a series of small draft-openings, vertical pipes extending through said plate, gas-jet orifices
60 or nozzles extending into without closing the lower ends of said pipes, horizontal perforated pipes connecting with said vertical pipes, and perforated shells inclosing the horizontal pipes and also covering the draft-openings, 65 substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

EDWIN C. MERRILL.

Witnesses:

JONA B. ALLY,
PHILIP MAURO.