

(No Model.)

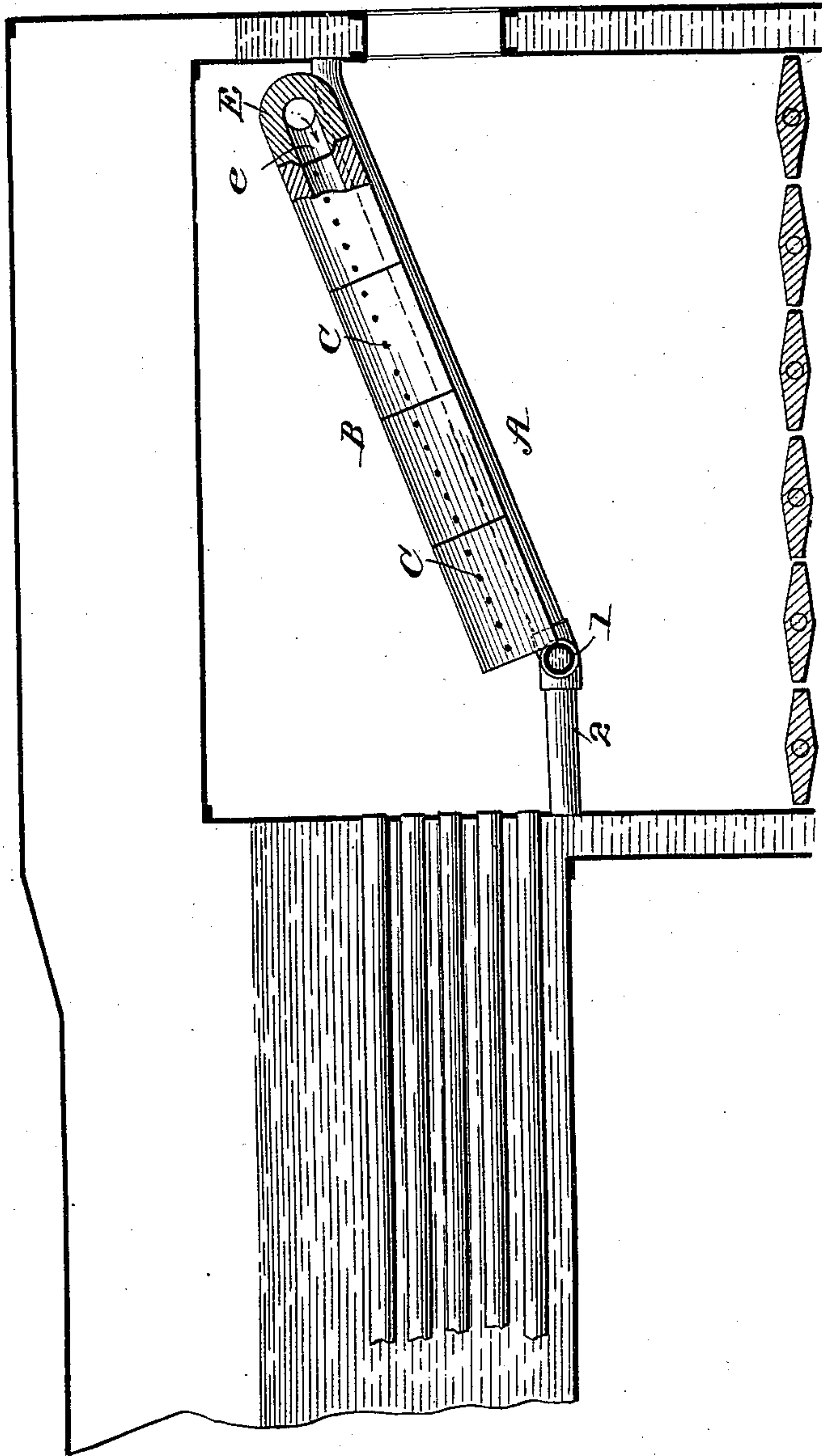
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J. MILTON
LOCOMOTIVE BOILER FURNACE.

No. 557,312.

Patented Mar. 31, 1896.

Fig. 1.



WITNESSES:
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INVENTOR
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

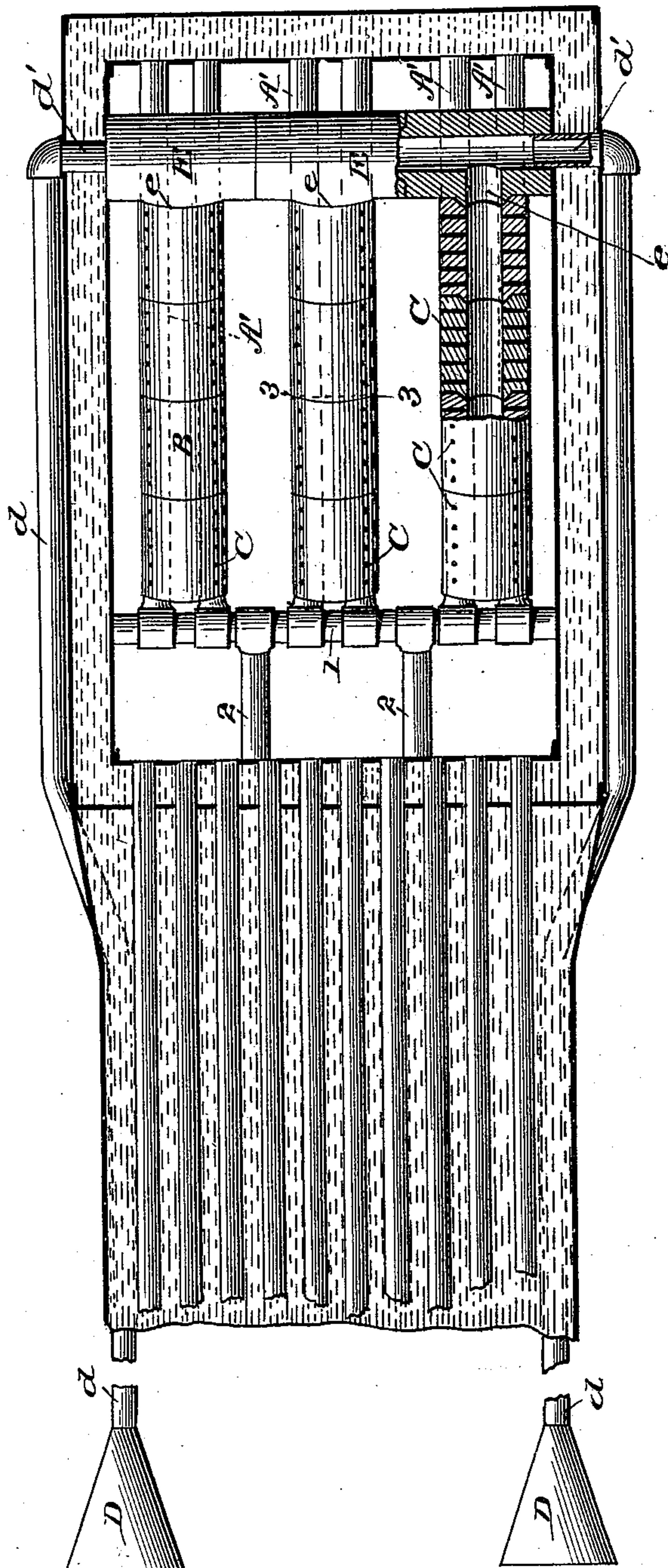
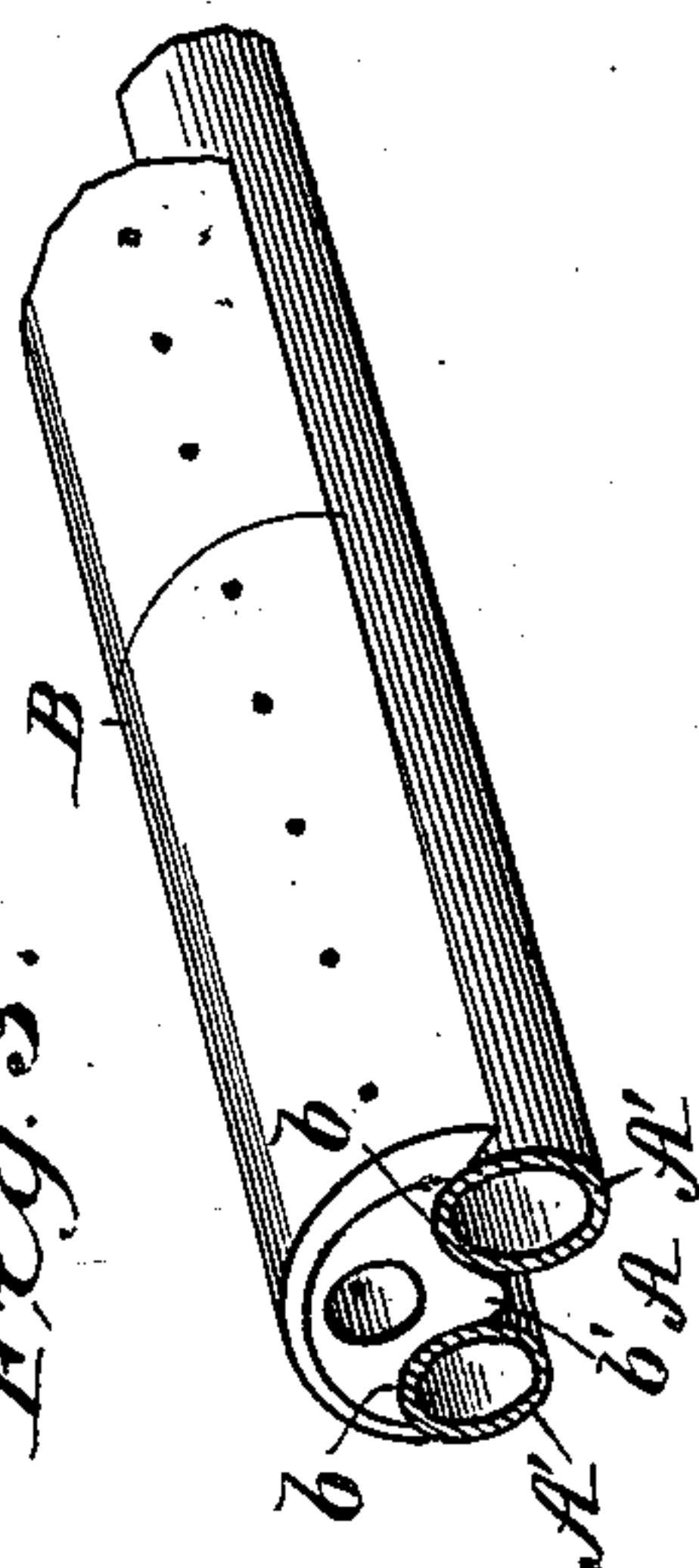


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN MILTON, OF ALEXANDRIA, VIRGINIA.

LOCOMOTIVE-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 557,312, dated March 31, 1896.

Application filed April 29, 1893. Serial No. 472,655. (No model.)

To all whom it may concern:

Be it known that I, JOHN MILTON, of Alexandria, in the county of Alexandria and State of Virginia, have invented a new and useful
5 Improvement in Locomotive-Boiler Furnaces, of which the following is a specification.

My invention is an improvement in locomotive-boiler furnaces and seeks to provide improvements in the means for feeding air
10 to the interior of the furnace, and has for an object to provide means which will be efficient in feeding air in proper quantities, will be so formed and arranged as to insure the subjection of all the gases and other products un-
15 consumed in the grates to the desired supply of air, and will be so constructed and supported as to be firm in position and durable in use.

The invention consists in the special construction and combination of parts, as will be hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a vertical longitudinal section of a furnace provided with my
25 improvements. Fig. 2 is a horizontal section, parts being broken away and others shown in section; and Fig. 3 is a transverse section, enlarged, on about line 3 3 of Fig. 2.

The water-pipes A A are arranged in pairs
30 A', the pipes of each pair being separated to support between them the air-conduits, and the adjacent pairs of pipes being also separated to permit the passage between them of the gases, &c. These pipes A are in open
35 communication with the water-space of the boiler. In securing this communication I prefer to employ a cross-pipe 1, extending across the fire-box in front of the flues, but sufficiently far therefrom to permit a man to
40 stand between them and the flues in cleaning the latter. At its ends the pipe 1 connects with the side legs of the boiler, and such pipe is connected by pipes 2 with the end of the boiler, these pipes 2 being separated suffi-
45 ciently to permit a man to stand between them. I prefer to use these pipes 2, because they brace the cross-pipe 1 and increase the water communication, and also especially because they form a support for fire-clay slabs
50 or bricks which may be placed upon them to close the space back of the cross-pipe 1; but ordinarily it is not necessary to close such

space, because ordinarily the smoke is produced in front and passes up below the said air-conduits, presently described.

The air-conduits B are in the nature of
55 pipes formed in comparatively short sections fitting together at their meeting ends, and are saddled upon the pairs of water-pipes.

Now so far as I know I am the first to saddle
60 air-supply conduits or pipes upon pairs of water-pipes, and while I greatly prefer the air-conduits formed exclusively of refractory material, such as fire-clay, for the reasons presently described, I do not desire in the
65 broad features of my invention to be restricted thereto.

It should be understood that the water-pipes are in open communication with the water-space of the boiler and are therefore
70 constantly filled with water and protected thereby from burning. In supporting the air-conduits I provide their under sides with seats at *b* to fit upon the pipes A of the pairs A', and also with a rib or tongue *b'* fitting
75 down between the pipes of the pairs and conforming to the adjacent upper surface thereof. This construction, it will be seen, avoids any rigid connection between the air-conduits and water-pipes, so the differential expansion
80 between said parts cannot affect them, and at the same time the air-conduits are securely supported against displacement by the oscillation of the engine.

The fire-clay or other refractory conduits
85 are provided in their opposite sides with numerous openings or perforations C arranged close together and from which the air issues in jets and forms practically a thin sheet
90 (constantly renewing) of air through which the products of combustion passing up from the fire must pass, or to the action of which such products must be subjected, so that such products by the admixture of air will be to all
95 practical ends entirely consumed.

The air-conduits being arranged as described and shown form what may be termed
100 an "air-grating" interposed between the grate and flues and so discharging air that the products of combustion passing in subdivided condition through the constricted intervals between them must pass through the discharged air.

Air may be supplied to the air-conduits in

various ways; but I prefer in practice to employ the funnels D open and flaring toward their front ends and provided at the front ends of pipes *d*, which lead back and communicate with the air-conduits. In effecting this communication it is preferred to extend the pipes *d* to a point in rear of the air-conduits and provide them at their rear ends with lateral branches *d'* opening into a cross distributing-pipe E formed in sections of fire-clay and having nipples *e* leading into the air-conduits, said sections being saddled upon the water-pipes in rear of the air-conduits, as shown.

It will be seen that the described construction, including the refractory fire-clay air-conduits, furnishes an air-grating which will effectually resist the action of heat, secure an even and thorough distribution of air to the furnace and cause each particle of the products of combustion to come in contact with and commingle with the air to effect the perfect combustion desired.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a furnace substantially as described a grating composed of water-pipes arranged in pairs and air-conduits saddled upon said pairs of pipes and having openings for the issue of air, the said grating having openings or passages between which the products of combustion must pass substantially as set forth.

2. In a boiler-furnace the combination with the fire-box and flues of a grating in proximity to and extending over the grate-surface and between it and the flues such grating being composed of perforated fire-clay conduits through the spaces between which the products of combustion must pass to the flues and water-pipes in communication with the boiler-space and supporting and holding in place said fire-clay conduits against displacement but not connected rigidly therewith substantially as set forth.

3. In a steam-boiler furnace a grating or partition comprising a plurality of water-pipes arranged in pairs and perforated air-pipes, composed of refractory material supported and held upon the pairs of water-pipes substantially as shown and described.

4. In a steam-boiler furnace a grating com-

prising parallel water-pipes communicating with the water-space of the boiler and arranged in and extending across the fire-box above the grate-surface combined with air-conduits composed exclusively of jointed sections of fire-clay pipes having lateral jet-openings and provided on their lower sides with seats to rest upon the water-pipes such air-conduits being supported and held by said water-pipes substantially as set forth.

5. A grating for steam-boiler furnaces comprising pairs of parallel water-pipes communicating with the water-space of the boiler, and arranged in and extending across the fire-box combined with air-conduits formed of jointed sections of fire-clay pipes provided with lateral jet-holes such pipes being provided on their under sides with seats for the water-pipes and having downwardly-extended portions projecting between the water-pipes of each pair, and air-feed pipes having funnels at their front ends and communicating at their rear ends with the air-conduits all substantially as and for the purposes set forth.

6. In a boiler-furnace the combination with the fire-box and flues of water-pipes in communication with the boiler-space, perforated air-conduits composed of refractory material and supported on said water-pipes and a cross distributing-pipe also supported on said water-pipes and composed of refractory material and having outlets communicating with the air-conduits all substantially as and for the purposes set forth.

7. In a boiler-furnace, the air-grating comprising the cross-pipe 1, and the pipes A in communication with the water-space of the boiler and the air-conduits supported on the pipes A substantially as set forth.

8. The combination with the furnace and boiler of the cross-pipe 1 pipes 2 and pipes A in the fire-box and in communication with the water-space of the boiler and the perforated air-conduits of refractory material, saddled upon the water-pipes A substantially as set forth.

JNO. MILTON.

Witnesses:

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