

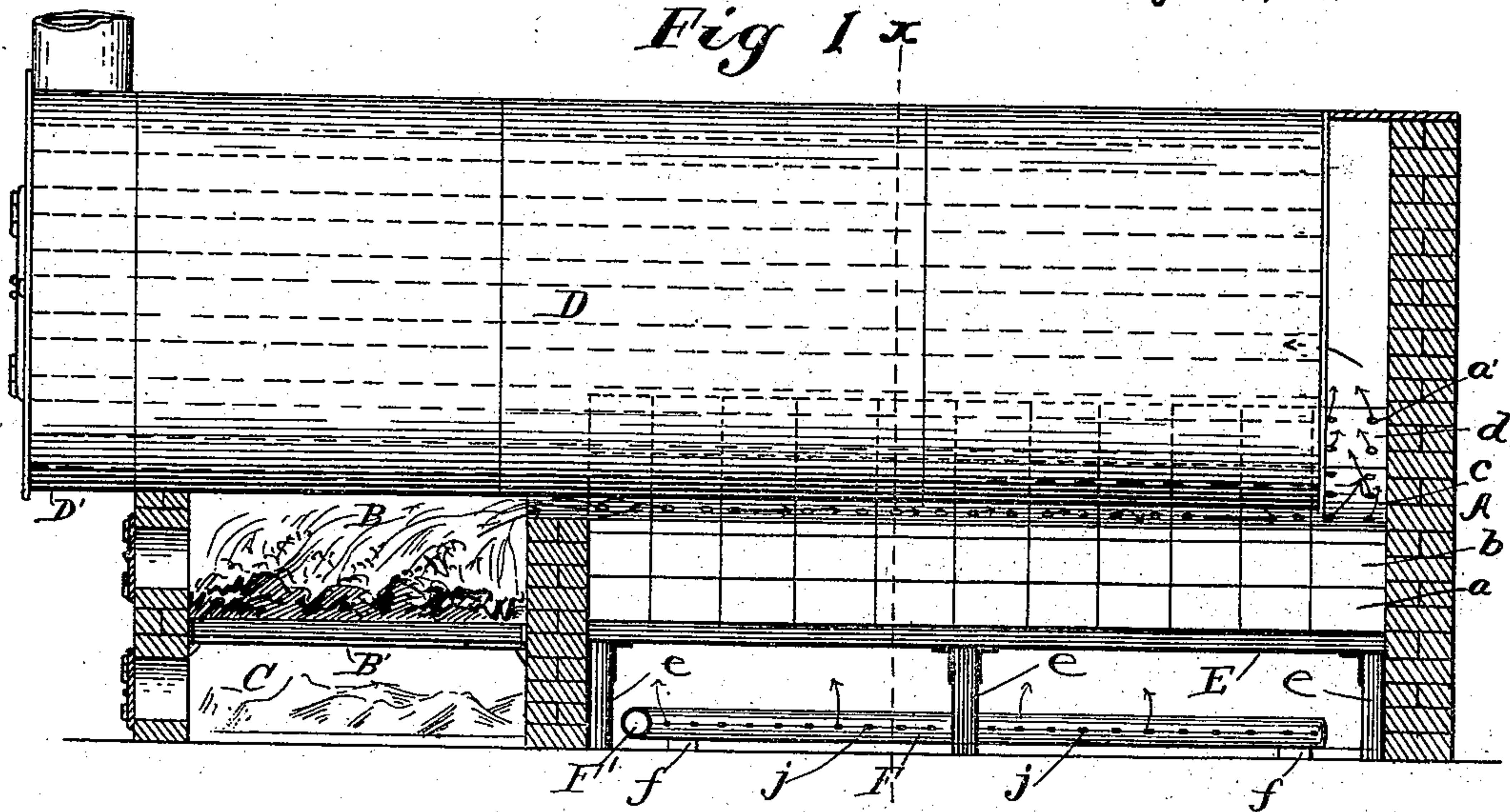
(No Model.)

J. E. NEEDHAM.  
STEAM BOILER FURNACE.

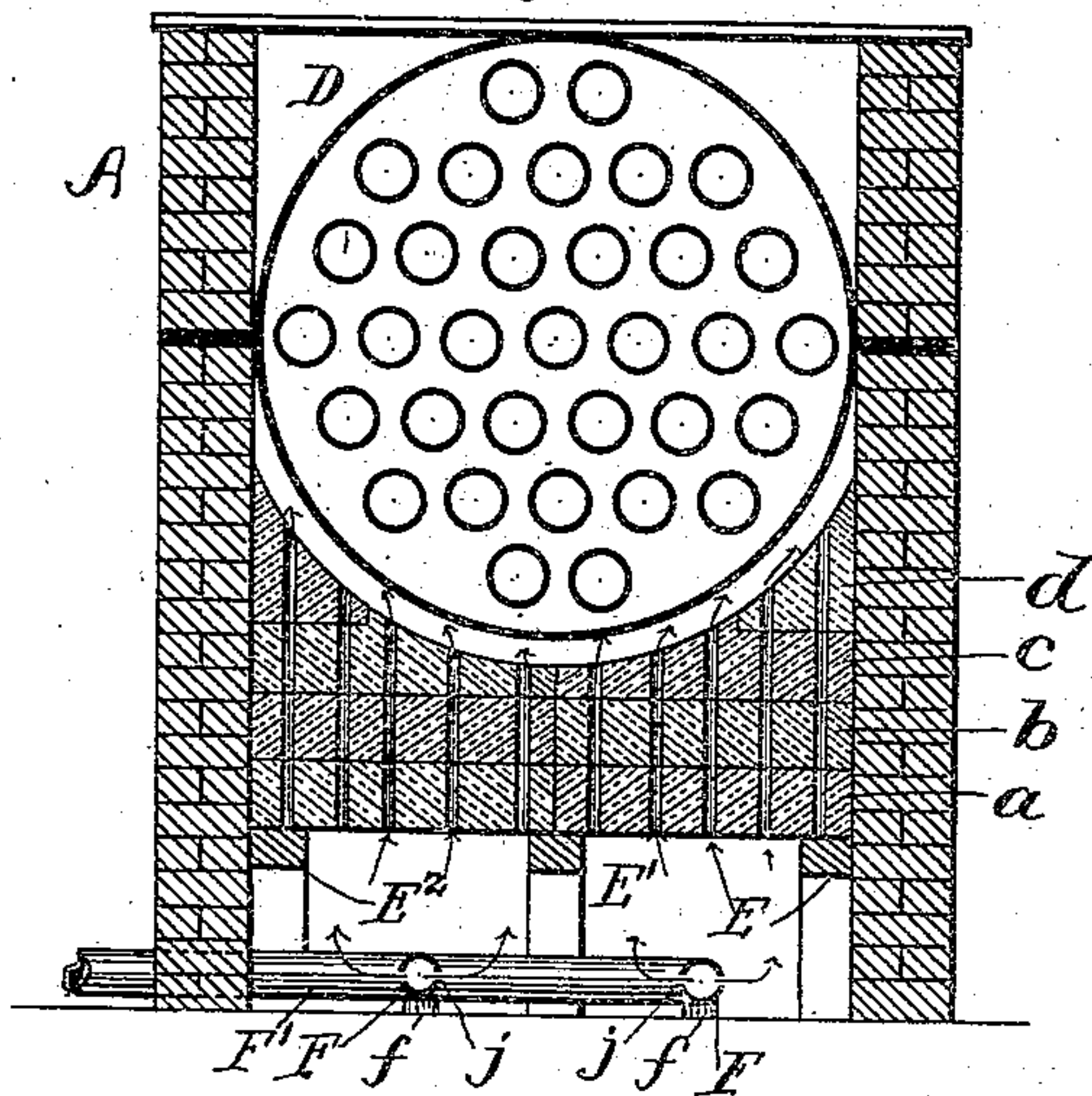
No. 501,729.

Patented July 18, 1893.

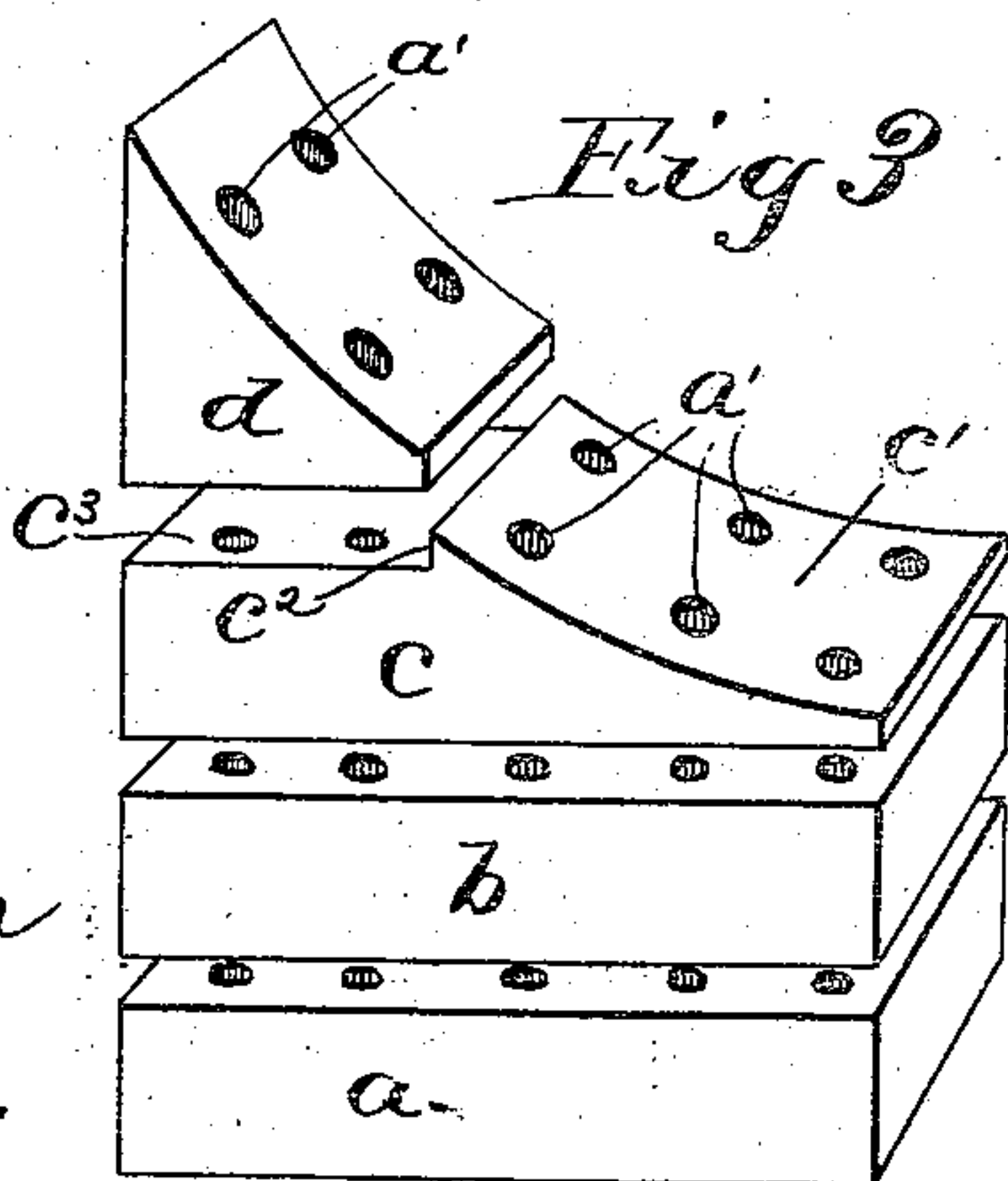
*Fig 1 x*



*Fig 2 x*



*Fig 3*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOHN EDWARD NEEDHAM, OF MOUNT TABOR, OREGON.

## STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 501,729, dated July 18, 1893.

Application filed February 27, 1893. Serial No. 463,914. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN EDWARD NEEDHAM, a citizen of the United States, residing at Mount Tabor, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Steam-Boiler Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to an improvement in steam boiler furnaces and consists in the construction and arrangement of parts hereinafter described and definitely pointed out in the claims.

15 The aim and purpose of this invention is an improvement in steam boiler furnaces which will embody simplicity of structure and improved means for introducing and heating the air used for accelerating combustion. These objects are attained by the construction illustrated in the accompanying drawings wherein like letters of reference indicate corresponding parts in the several views and in which—

25 Figure 1 is a longitudinal vertical section. Fig. 2 is a transverse section through the line  $x x$  Fig. 1 and Fig. 3 are perspective views of the fire brick used in at the rear of the bridge wall.

30 In the drawings A represents the outer casing or brick work, B the combustion chamber having a grate B' and C the ash pit, all of usual construction.

D is the boiler of the tubular flue pattern supported slightly above the bridge wall, and the combustion chamber, and extending back to a point adjacent to the rear wall of the casing. The forward edge of the boiler has the flange D' which extends out to the front wall of the casing beyond the end of the boiler, and from this point the smoke and gases escape to the chimney, the space between the rear end of the boiler and casing forming the flue for the smoke and gases, which pass through the tubes.

45 Below the boiler and between the bridge wall and rear of the casing is a body of fire brick occupying a position midway between the base and the boiler base. This brick work is formed of a series of bricks  $a b c d$  the two former being rectangular in shape and hav-

ing a series of perforations  $a'$  therein. The brick  $c$  is formed with a rectangular base, a sloping upper inner face  $c'$  terminating in a flange  $c^2$  and a flat section  $c^3$  at the rear. On this section rests the triangular brick  $d$  its upper face being curved and its inner edge abutting against the flange  $c$ . These bricks also have perforations which register with those in bricks  $a b$ . These courses rest on frame work E, E' E<sup>2</sup> consisting of longitudinal beams arranged at opposite sides and the center and supported on the uprights  $e$  resting on the base. The lower bricks rest with their outer edges on the beams E and E' and their inner edges rest on the edges of the central beam. The arrangement of the courses, is such that a concaved upper face is formed extending the entire distance between the bridge wall and rear wall, and a short distance below the lower curved side of the boiler, thereby forming a duct or flue.

Heretofore in supplying air for perfecting the combustion at the rear of the bridge wall it has usually been customary to introduce the air in a body at one or two points directly in the rear of the plane of the bridge wall and conducting the air to the rear in flues or channel out from which the perforations in the brick work lead. The channels thereby become clogged and materially interfere with the perfect operation of the furnace. To overcome this defect, I form the vacant space at the base of the brick work constituting the air space, and arrange on suitable supports the longitudinal pipes F, which have horizontal perforations  $f'$  in their sides only. These pipes are arranged parallel and extend from the front to the rear of the air space and on opposite sides, their forward ends terminating in a cross supply pipe F' leading to the outside of the casing. The rear of the casing may have suitable hand holes through which a cleaning instrument may be inserted for cleaning out the air space.

In operation the air is drawn up through the perforations in the brick work, and greatly aids the combustion. The brick work acts as a heat retainer.

The rear wall of the casing has a suitable door for cleaning the upper surface of the fire brick work.



I am aware that many changes in the construction and arrangement of the parts of the apparatus can be made and substituted for those herein shown and described without in the least departing from the nature and principle of the invention.

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

10 1. In a steam boiler furnace, the combination with the casing having a fire box in its forward end, a bridge wall and a tubular flue boiler, of frame work between the bridge wall and rear of the casing resting on the base of  
15 the casing of a fire-brick work arranged between the bridge wall and rear of the casing a short distance below the boiler and above the base resting on said frame work said brick work having a series of vertically disposed  
20 apertures therein, an air space below the entire brick work, an air pipe leading into the air space and longitudinal pipes within the air space communicating with the air supply and having a series of perforations at points

below the tops thereof, substantially as described. 25

2. In a steam boiler furnace, the combination with the casing boiler and fire box, of a fire brick work between the bridge wall of the fire box and rear of the casing consisting 30 of a series of rectangular perforated brick, a second series of brick resting thereon having sloping inner faces, flat rear sections and flanges between the sloping faces and rear sections, a third series of bricks resting on 35 the flat rear sections and abutting against the flanges of the second series having curved inner faces the respective bricks having registering apertures therein, an air space below the brick work and air supply pipes leading 40 into the air space, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN EDWARD NEEDHAM.

Witnesses:

W. J. CARTER,  
D. T. ALLISON.