

(No Model.)

A. B. TURNER.
Furnace.

No. 240,935.

Patented May 3, 1881.

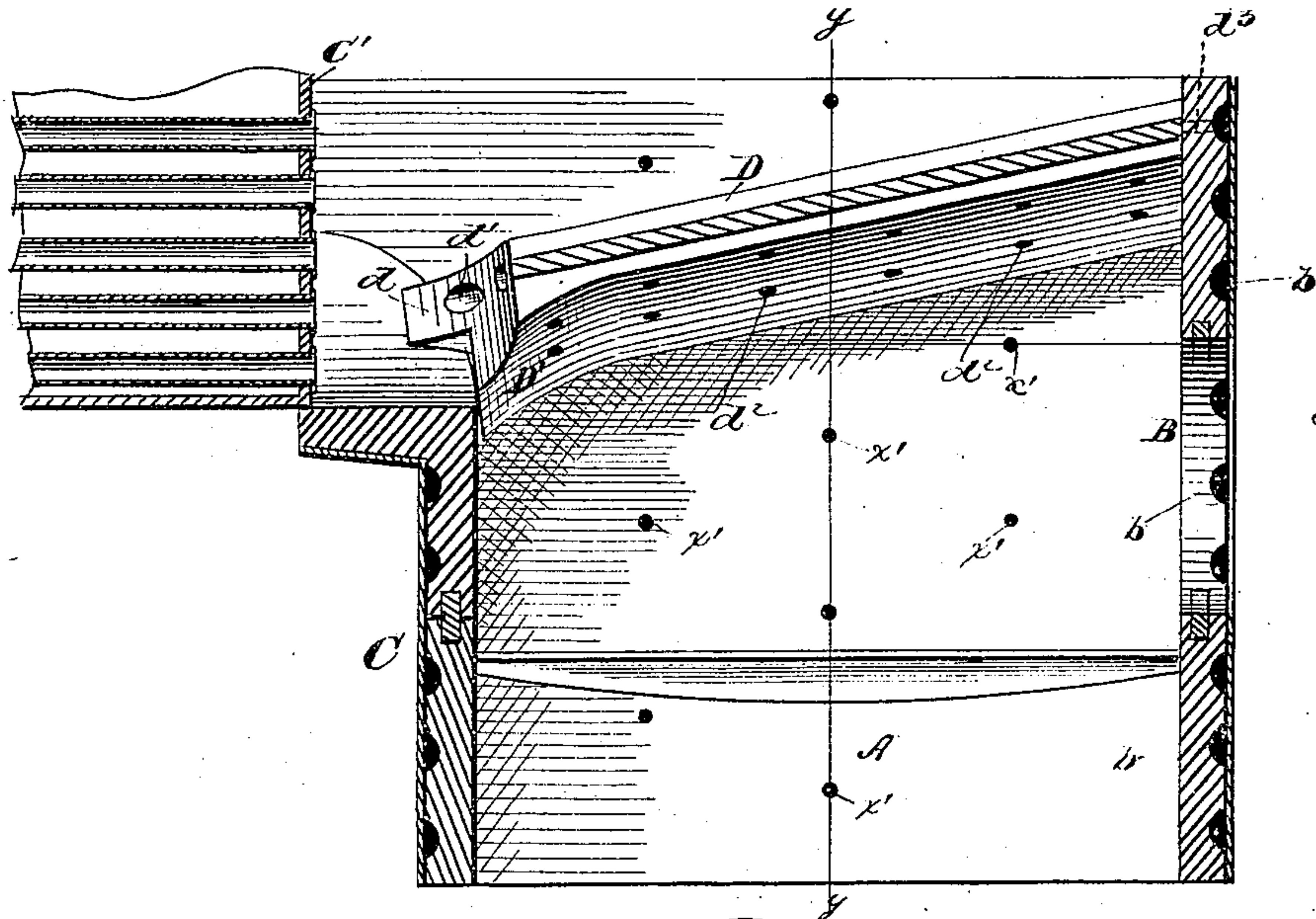


Fig. 1.

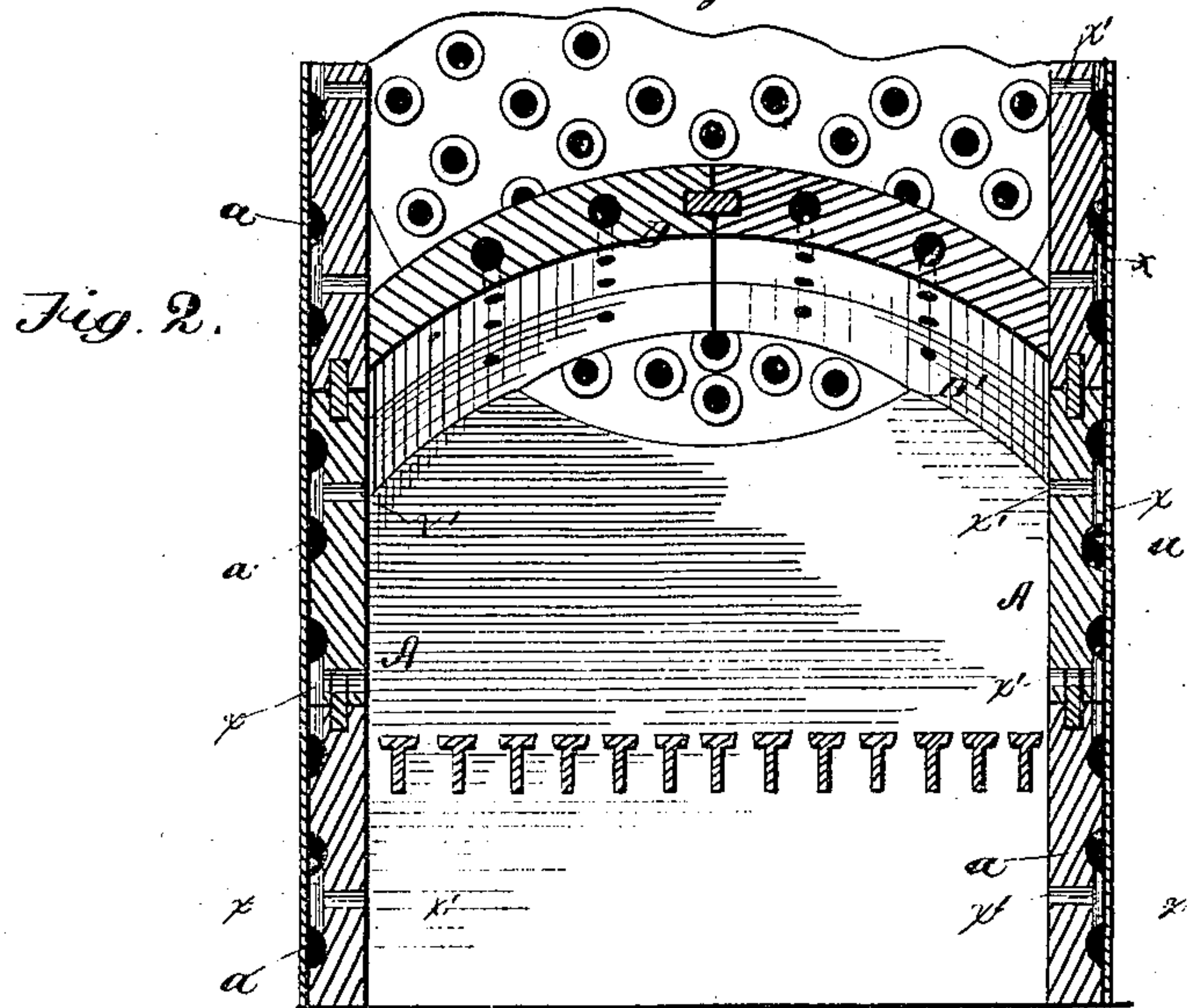


Fig. 2.

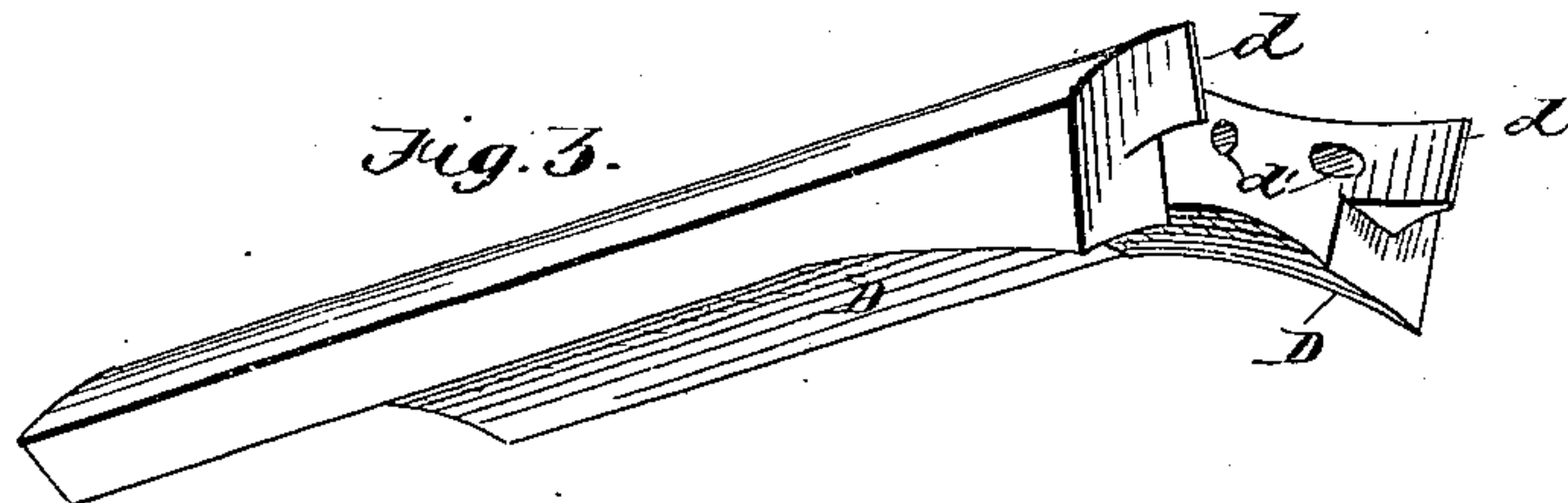


Fig. 3.

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UNITED STATES PATENT OFFICE.

ALONZO B. TURNER, OF MOUNT SAVAGE, MARYLAND.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 240,935, dated May 3, 1881.

Application filed March 7, 1881. (No model.)

To all whom it may concern:

Be it known that I, ALONZO B. TURNER, a citizen of the United States, residing at Mount Savage, in the State of Maryland, have invented certain new and useful Improvements in Furnaces, &c.; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to a boiler-furnace of peculiar construction, having a spark-arrester and devices adapted to consume the smoke, gases, and other products of combustion, and the novelty consists in the construction and arrangement of parts, as will be more fully hereinafter set forth.

The objects of the invention may be stated as follows: First, to admit air, both above and below the grate, in the combustion-chamber, to supply oxygen, not only to the heat-supplying and burning material, but also the necessary amount thereof to consume the sparks and smoke in the combustion-chamber, or before its exit; second, to deflect or torture the sparks back into the combustion-chamber above the grate, while the smoke and gases are allowed to be deflected back to the direct furnace-draft; third, to hold within the combustion-chamber each and every element not consumed, and of heat-giving or combustible substance, until it is consumed, and its entire usefulness is appropriated, as will be set forth.

In carrying out the invention I employ a rectangular or other shaped frame, formed in sections and provided with horizontal grooves which form air-chambers between the frame, which is of fire-brick, and the masonry or metal of the furnace proper, which surrounds the same. Between the horizontal grooves and recesses are short vertical connecting recessed portions, perforated in such a manner as to admit the air from the intervening chambers to the flames or fire, above the grate. A tube-head is provided at the rear of the fire-box, upon proper projections of which rests an oval deflector of fire-brick, and made in sections, provided with longitudinal channels and

lateral vertical connections thereto. This deflector forms the top of the combustion-chamber, and presents a regular incline or deflecting surface from the front of the furnace to a point near the exit of the combustion-chamber, where a further deflecting-ledge serves to drive the sparks, &c., back to the coal-bed, while the gases, smoke, &c., pass into the longitudinal channels to be deflected to the exit, and there consumed by the intense heat at that point.

It will be understood that the device is equally applicable to locomotive or stationary boilers, and that the device presented is a fire-brick lining made in sections, adapted to serve in the furnace, and to provide a current of air in an intervening chamber, not only to protect the furnace, but to supply oxygen at different heights within the combustion-chamber, to assist in the further utilization of the products of combustion, but to consume the gases and smoke which are contained therein. The sparks are also arrested and deflected back to the fire, where they are consumed.

The invention is fully illustrated in the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a longitudinal section; Fig. 2, a transverse section, and Fig. 3 detail views of the deflector.

Referring to the drawings, in which similar letters of reference represent like parts in all the figures, A represents the sides of the lining, made in sections, and provided with horizontal grooves, *a*; B, the front end, having corresponding sections and grooves, *b*, and C, the rear section, having the tube-sheet C'. The horizontal grooves or recesses are connected by short vertical recesses, *x x*, which form the entire series of grooves into an air-chamber, between the fire-brick lining and the furnace proper, and these recesses *x x* connect, by apertures *x' x' x'*, with the interior of the combustion-chamber, supplying oxygen from the outer air to the flame at different points of contact, to assist the combustion to destroy and utilize the gases and smoke.

Upon the ledge formed by the tube-sheet C' rests the lower end of an arched sectional deflector, D, having resting-lips *d*, longitudinal passage-chambers, *d'*, and connecting vertical passages *d*². Horizontal apertures *d*³ in the

end B connect with the chambers d' , and serve as a draft to force the gas and smoke through the chambers d' to the flame at the exit. This portion D is so inclined as to deflect the rising sparks back into the fire, and to further this result I employ the more abrupt deflecting ledge D', as shown.

What I claim as new is—

1. A fire-brick lining made in sections and having on its outer surface horizontal grooves connected by vertical recesses, forming an air-chamber between the fire-brick and the outer casing, said air-chamber having connections leading to the combustion-chamber at different heights, as and for the purposes specified.

2. The combination of the sides A and ends B and C, made in sections and recessed, as shown, with the tube-sheet C' and the removable deflecting roof, as specified.

3. The spark arrester and deflector D, hav-

ing lips d , chamber-passages d' , and connecting-passages d^2 , with the case-lining having passages d^3 , as and for the purposes specified.

4. The spark-arrester D, having lips d , channels d' , and passages d^2 , and having the more abrupt deflecting-ledge D', adapted to serve as specified.

5. The combination of the casing A B C, having horizontal grooves $a b$, connecting vertical grooves $x x$, and passages $x' x'$ to the combustion-chamber, the apertures d^3 , and the spark-deflector D $d d' d^2$, as and for the purposes set forth.

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

ALONZO B. TURNER.

Witnesses:

A. J. CARNEY,
JOHN SAVILLE.