

(No Model)

J. F. DE NAVARRO.  
BOILER FURNACE.

No. 582,760.

Patented May 18, 1897.

Fig.1.

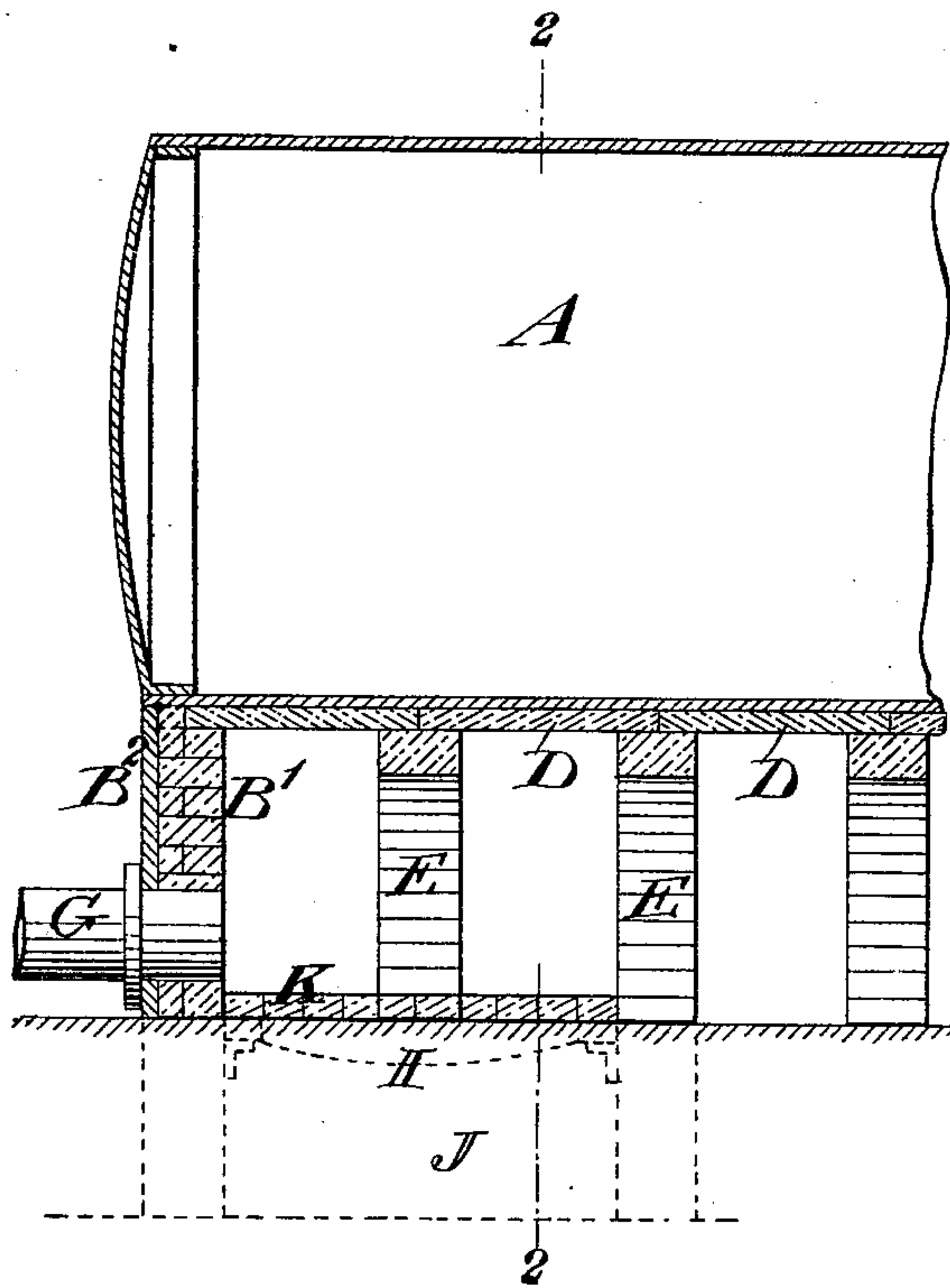


Fig.2.

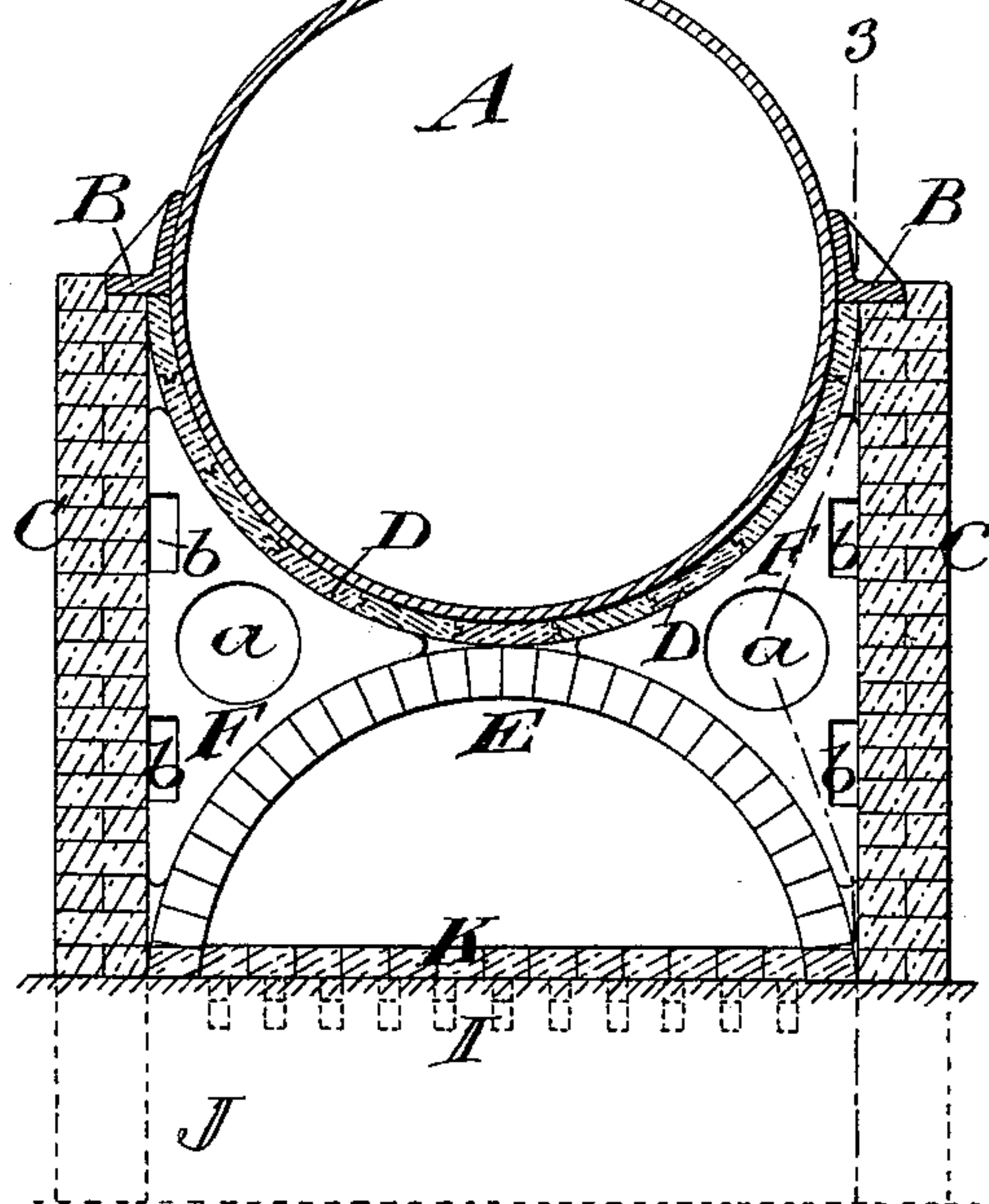
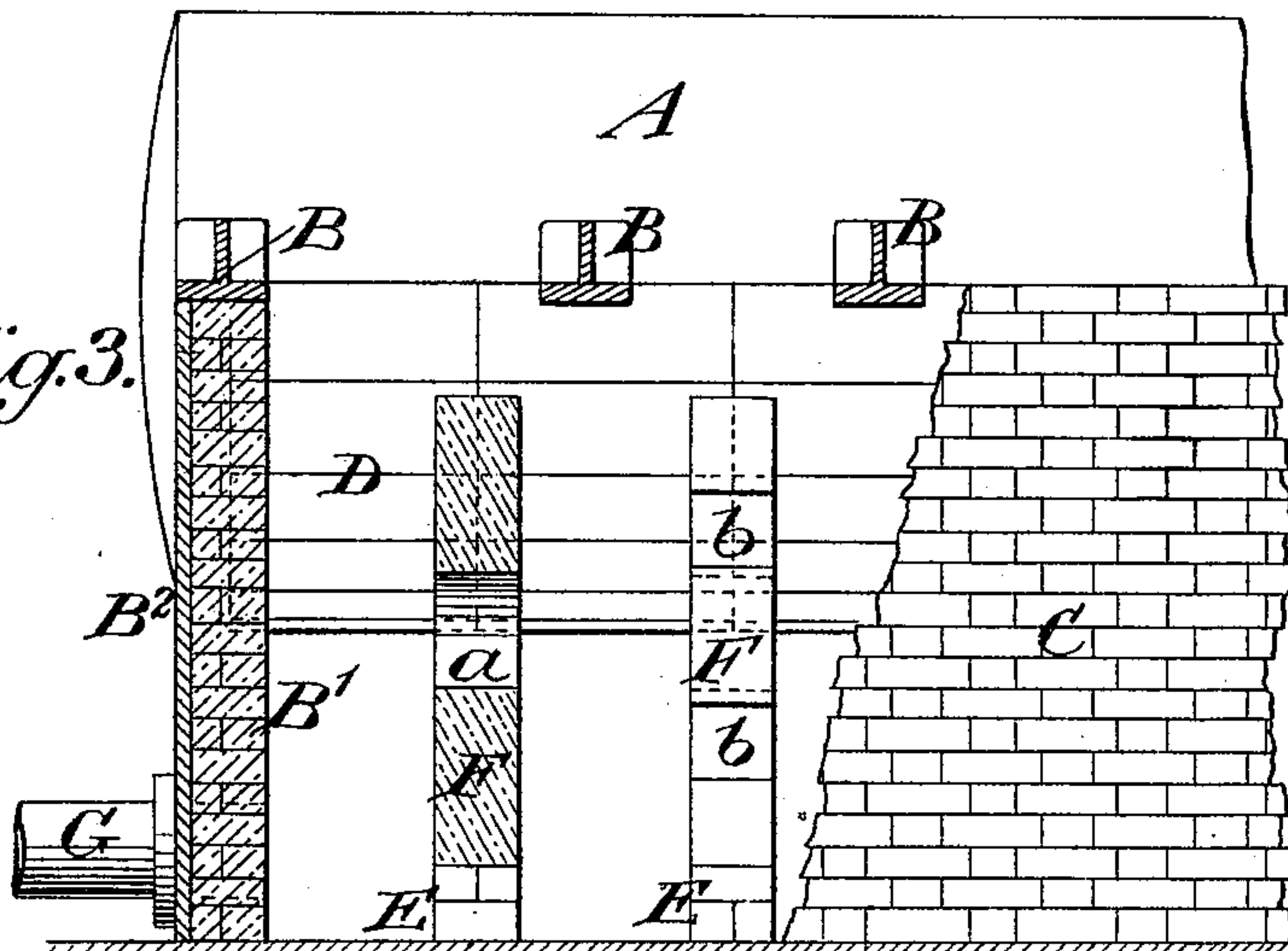


Fig.3.



Witnesses:-  
George Barry Jr.  
Edward Vieser.

Inventor:-  
Jose F. de Navarro  
by attorneys  
Brown & Howard



# UNITED STATES PATENT OFFICE.

JOSÉ F. DE NAVARRO, OF NEW YORK, N. Y.

## BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 582,760, dated May 18, 1897.

Application filed January 28, 1897. Serial No. 621,046. (No model.)

*To all whom it may concern:*

Be it known that I, JOSÉ F. DE NAVARRO, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Boiler-Furnaces, of which the following is a specification.

This invention relates to the application to the under part of a boiler, which is exposed to the heat of the fire or to the ignited products of combustion, of a shield of refractory material, as fire-brick, for the purpose of protecting the surface of the plates of the boiler from injury by the too intense action of the heat; and the improvement consists in the construction of and means for supporting such a shield, as hereinafter described and claimed.

Figure 1 in the drawings represents a central longitudinal section of part of a boiler and its furnace having my improvement applied. Fig. 2 represents a transverse section on the line 2 2 of Fig. 1; Fig. 3, a side elevation with part of the side wall removed and with certain parts in section on the line 3 3 of Fig. 2.

Similar letters of reference designate corresponding parts in all the figures.

A is the boiler, which may be supported in the usual manner and is represented as so supported at its sides by saddle-plates B B on the side walls C of the furnace and by a front wall B' and front plate B<sup>2</sup>.

D designates the shield, composed of bricks of any suitable length, width, and thickness, abutting together at their sides and ends and forming together an inverted arch conforming to the under part of the boiler and fitting closely, or approximately so, to the boiler. The bricks are represented in Fig. 2 as tongued together, but this is not material.

E E are arches of masonry arranged cross-wise of the boiler between the side walls C of the furnace at suitable intervals apart for the support of the shield D, the distance between the said arches and the length of the bricks being so proportioned that the abutting ends of the bricks in the lower part of the shield are supported directly upon the crowns of said arches, as may be understood by reference to Figs. 1 and 2. On each of the said arches between it (the shield) and the side walls C of the boiler are two upright plates F of re-

fractory material, as fire-clay, of approximately triangular form, as may be understood by reference to Fig. 2, for supporting the shield toward the sides thereof, one edge of said plates conforming to the shield, another conforming to the arch E, and the third edge abutting against the adjacent side wall. These plates may be perforated with any number of holes, but are represented as each having a large hole *a* and two openings formed between it and the adjacent side wall by recesses *b* in its sides. One of the said plates is shown in Fig. 3 as in section taken on the line 3 of Fig. 2, and an edge view of the other is shown as exposed by the breaking away of the side wall C.

This invention is more especially intended for furnaces in which pulverized fuel is introduced with a blast of air, and the example represented, so far as it is illustrated in Figs. 1 and 2 in bold outline and in Fig. 3, is designed for such fuel only, the said fuel with the blast of air being introduced under the front part of the boiler through a pipe G. The incandescent particles of fuel and the inflamed gases resulting therefrom have a free passage through the arches E and through the openings *a b* of the plates F and free circulation between the arches, so that they pass under the boiler with no more obstruction than is desirable to keep them long enough in contact with the shield D for the transmission through it to the boiler of all their available heat, while the metal of the boiler is protected by the shield from the injurious effects of the intense heat generated from such fuel.

In Figs. 1 and 2 there are represented in dotted outline under the front part of the boiler as far as the second arch E a fire-grate I, having an ash-pit J below it, illustrating the adaptation of the invention to a boiler-furnace for solid fuel. For the use of solid fuel the slabs K, of fire-clay, represented in Figs. 1 and 2 as forming the bottoms of the arches, will be omitted. By providing the grate and ash-pit as so represented and making the said slabs removable convenience will be afforded for the use of either solid or pulverized fuel, as may be desirable, and in a furnace intended to be used generally for pulverized fuel the grate and ash-pit will per-



mit solid fuel to be used in case of any disorganization of the apparatus for supplying pulverized fuel.

What I claim as my invention is—

5 1. In a boiler-furnace, a shield for the under part of the boiler consisting of an inverted arch formed of bricks of refractory material conforming to the boiler, open arches arranged crosswise of the boiler and supporting  
10 the bottom of said shield at intervals, and upright supporting-plates arranged crosswise of the boiler between the said open arches and the said shield for supporting the latter between the said open arches and the side  
15 walls of the furnace, substantially as herein described.

2. In a boiler-furnace, a shield for the under part of the boiler consisting of an inverted arch of refractory material conforming to the  
20 boiler, open arches arranged crosswise of the boiler and supporting the bottom of said

shield at intervals, and upright perforated supporting-plates arranged crosswise of the boiler between the said shield and open arches and the side walls of the furnace, substantially as herein described. 25

3. In a boiler-furnace, a shield for the under part of the boiler consisting of an inverted arch formed of bricks of refractory material abutting together, open supporting-arches  
30 arranged crosswise of the boiler directly under the abutting end portions of adjacent bricks, and upright supporting-plates arranged crosswise of the boiler between said open arches and shield and the side walls of  
35 the furnace and opposite the abutting end portions of adjacent fire-bricks, substantially as herein described.

JOSÉ F. DE NAVARRO.

Witnesses:

FREDK. HAYNES,

GEORGE BARRY, Jr.