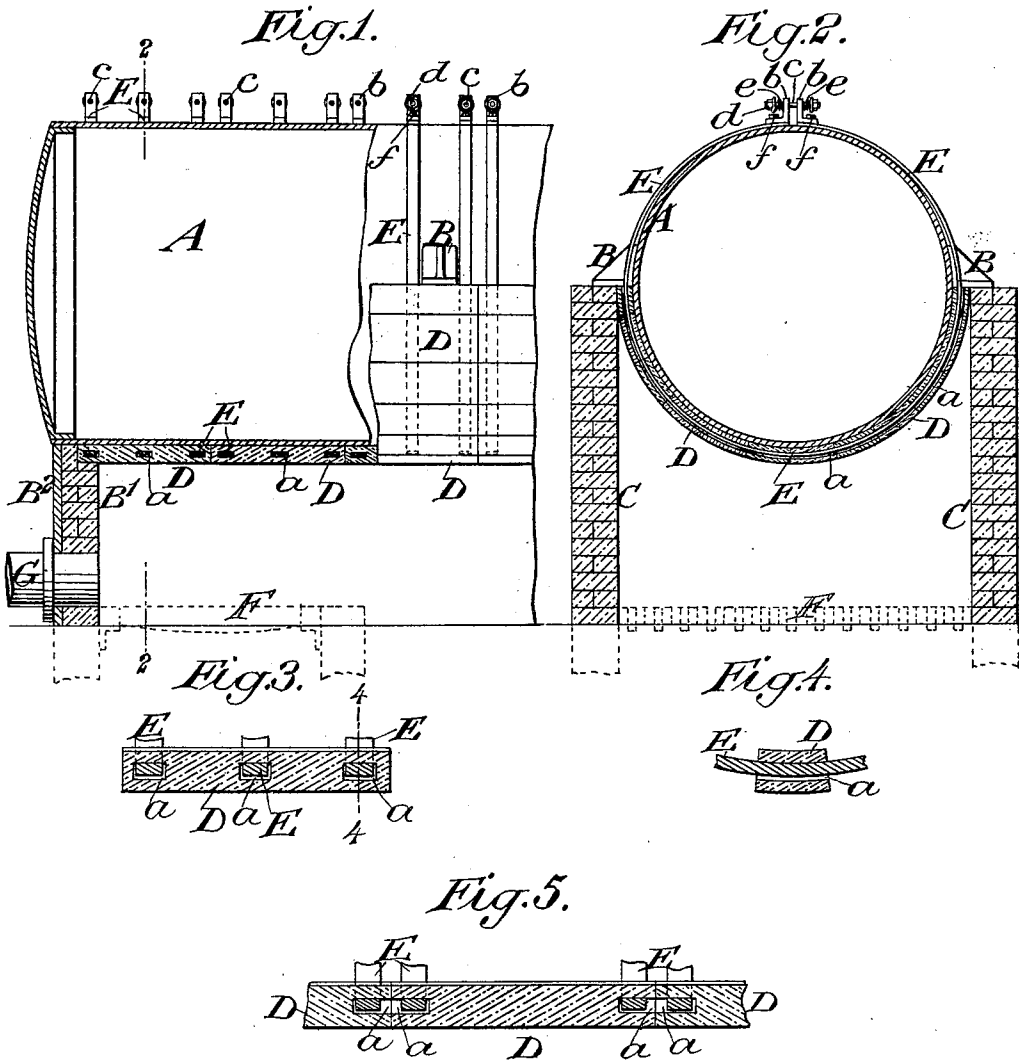


(No Model.)

J. F. DE NAVARRO.
BOILER FURNACE.

No. 582,761.

Patented May 18, 1897.



Witnesses:-
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UNITED STATES PATENT OFFICE.

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

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 582,761, dated May 18, 1897.

Application filed January 30, 1897. Serial No. 621,258. (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 represents a longitudinal elevation of parts of a boiler and its furnace having my improvement applied, the boiler being represented as partly in section and partly as only having the side wall removed to expose to view the shield and the bands by which it is suspended. Fig. 2 is a transverse section in the line 2 2 of Fig. 1. Fig. 3 represents, on a larger scale than Figs. 1 and 2, a longitudinal section of one of the bricks of which the shield is composed and transverse sections of metal bands by which the shield is suspended from the boiler. Fig. 4 represents a section corresponding with Fig. 3, taken transversely to the brick on the line 4 4 of Fig. 3. Fig. 5 represents longitudinal sections of three bricks with transverse sections of their suspension-bands, illustrating a modification of the construction of the shield.

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

A is the boiler, which may be set and 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 B², as shown in Figs. 1 and 2. The shield is composed of fire-bricks D 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 shield D D is suspended from the boiler by bands E, of steel or iron, which encircle

the said boiler and the shield, the said bands being represented as passing through mortises *a*, formed transversely in the bricks. In the example shown in Figs. 1, 2, 3, and 4 the mortises are at a distance from the ends of the bricks and only open at the sides thereof. In the example shown in Fig. 5 the mortises are in the ends of the bricks and are open at the ends, permitting the bands to be inserted laterally from the ends of the bricks, while in the example shown in Figs. 1, 2, 3, and 4 the bands must be run endwise through the mortises. The bands are each open in that part which comes upon the crown of the boiler and provided with lugs *b*, through which are passed a screw-bolt *c*, threaded and furnished with nuts *d* at each end for the purpose of drawing up the band as tight as may be desired through the bricks of the shield and around the boiler. Between the nuts *d* and the lugs *b* coil-springs *e* are applied, which compensate for the contraction and expansion of the bands by variations of temperature and keep them tight without danger of their bursting or of the bricks being injured by them.

In order to provide for the passage of the bands through the mortises constructed as illustrated by Figs. 1, 2, 3, and 4, one or both of the lugs *b* must be removably attached to the band. In Figs. 1 and 2 both are shown so removably attached by a screw *f*.

A shield constructed and suspended as above described is applicable to boilers to be heated by the combustion of solid fuel on a grate or by pulverized fuel introduced along with an air-blast, but is applicable with very special advantage to boilers heated in the latter way, which, owing to the intensity of the heat developed, are particularly liable to destruction unless the plates are specially protected or shielded by refractory material. In the example represented the boiler is to be heated in this way, the fuel being introduced with a blast of air through a pipe G under the front end of the boiler, but I have represented in dotted outline in Figs. 1 and 2 how a grate F may be applied for the use of solid fuel.

What I claim as my invention is—

1. The combination with a boiler, of a shield for its under part consisting of an inverted

arch of refractory material, and metal bands encircling both the said shield and the boiler for the suspension of said shield from the upper part of the boiler, substantially as herein described.

5 2. The combination with a boiler, of a shield for its under part consisting of an inverted arch formed of mortised bricks of refractory material conforming to said part, and metal
10 bands passing through the mortises of said bricks and encircling the boiler, substantially as herein described.

3. The combination with a boiler, of a shield

for its under part consisting of an inverted arch of refractory material, open metal bands 15 encircling both the said shield and the boiler for the suspension of said shield from the upper part of the boiler, means for drawing together the open ends of said bands, and springs applied at said ends to compensate 20 for expansion and contraction, substantially as herein described.

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