

(No Model.)

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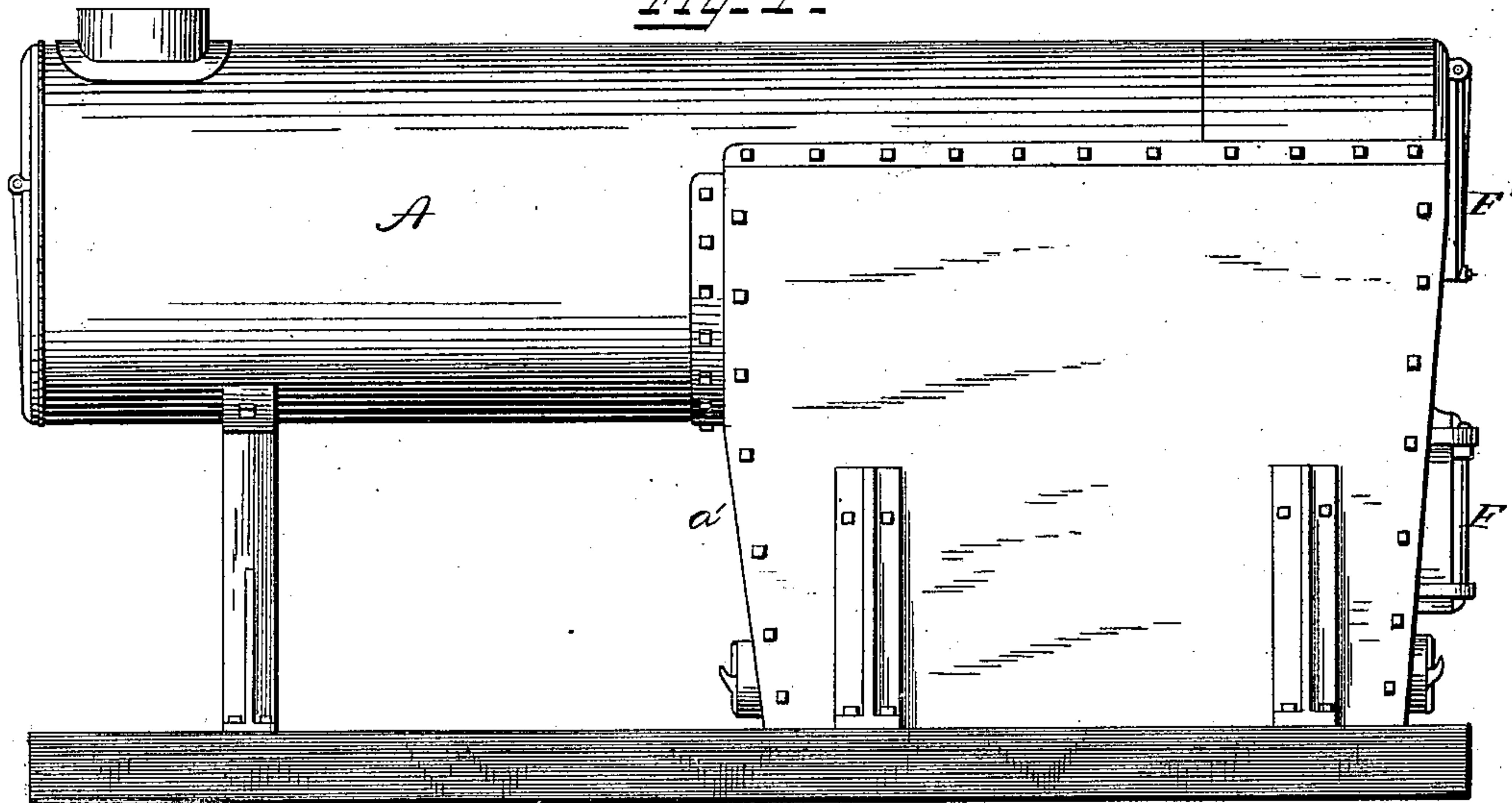
W. J. F. LIDDELL.

PORTABLE STEAM BOILER FURNACE.

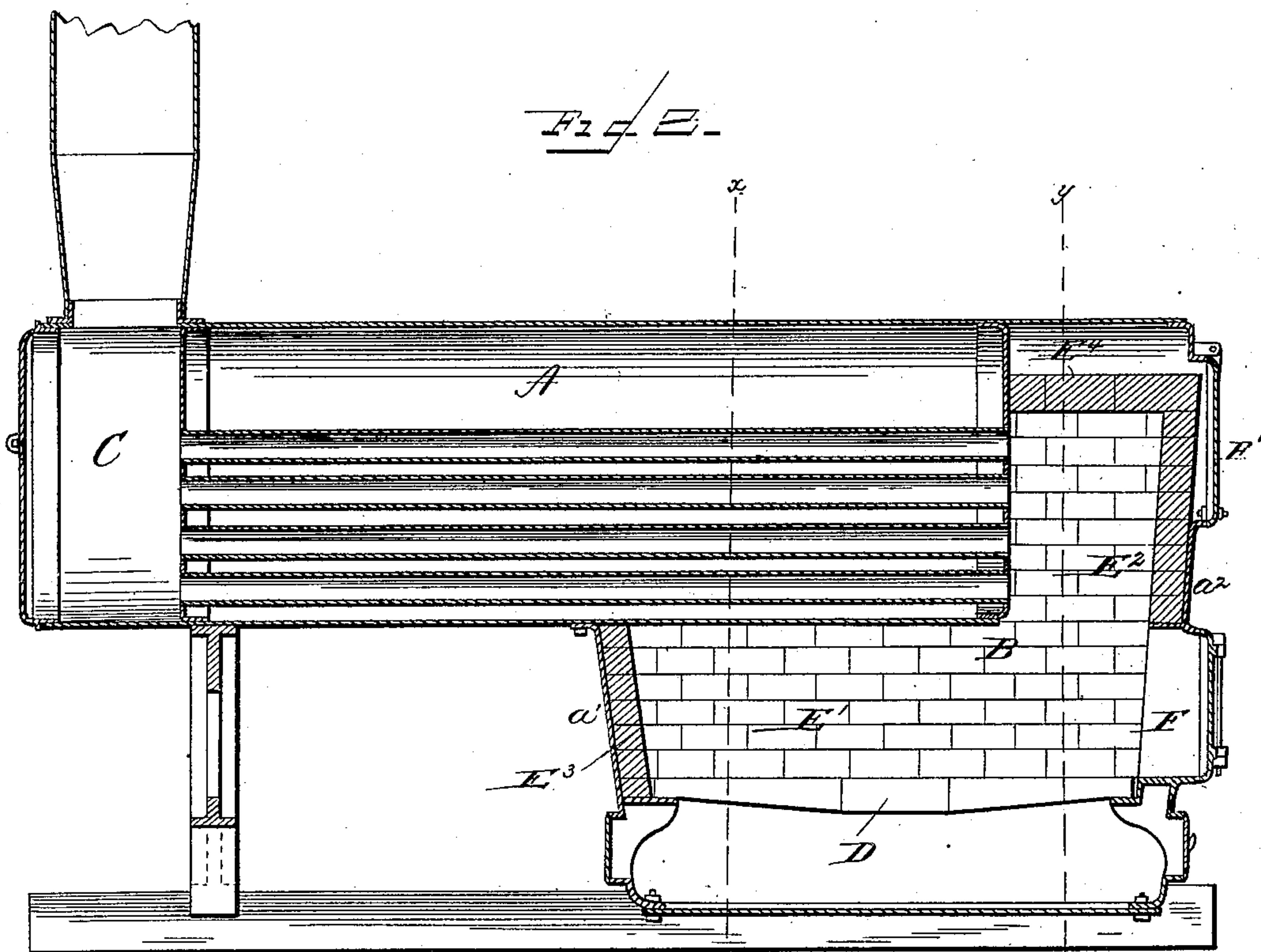
No. 344,970.

Patented July 6, 1886.

*Fig 1*



*Fig 2*



WITNESSES

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INVENTOR

*Walter J. F. Liddell*  
*by Alex. Smith*  
Attorney

(No Model.)

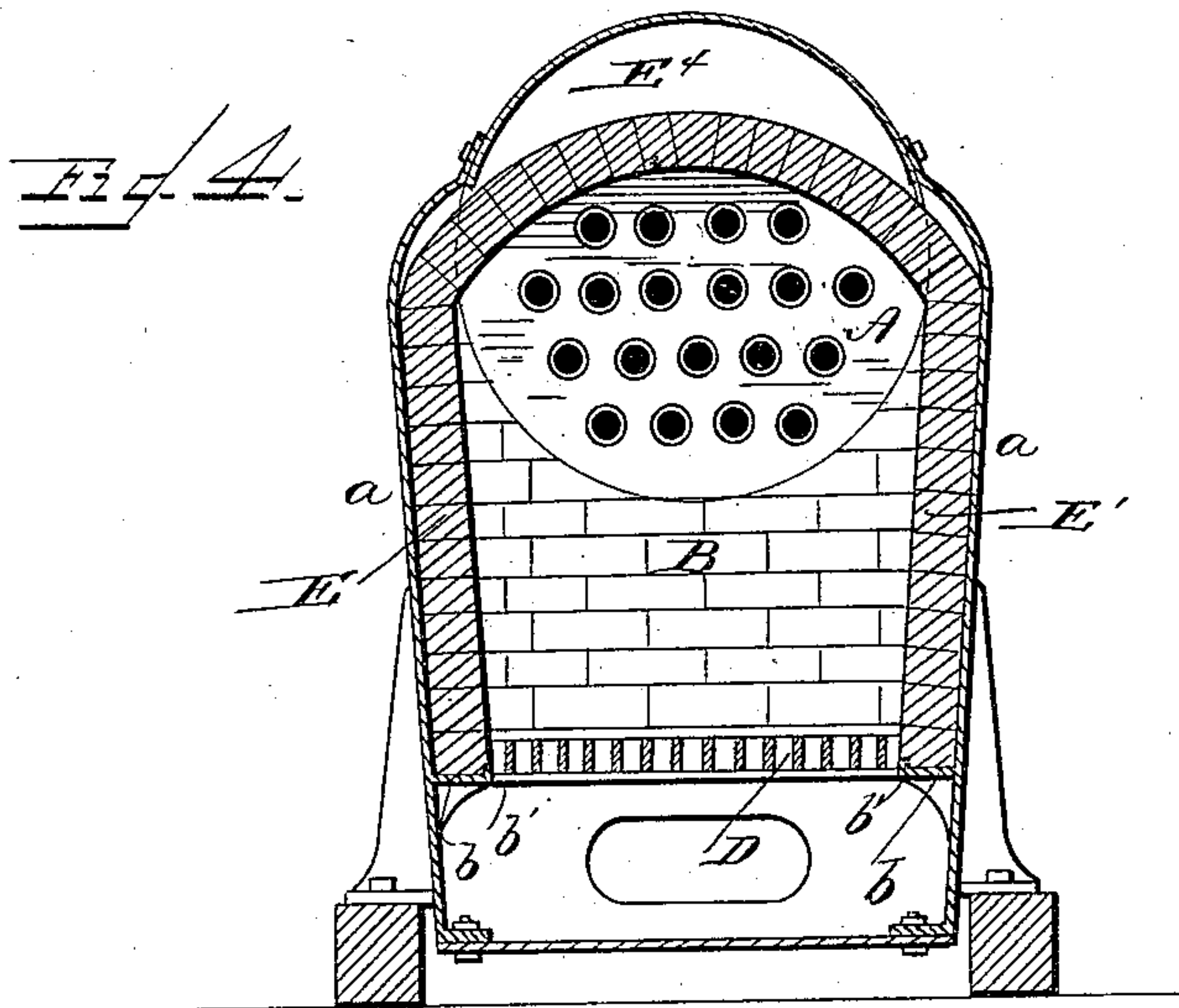
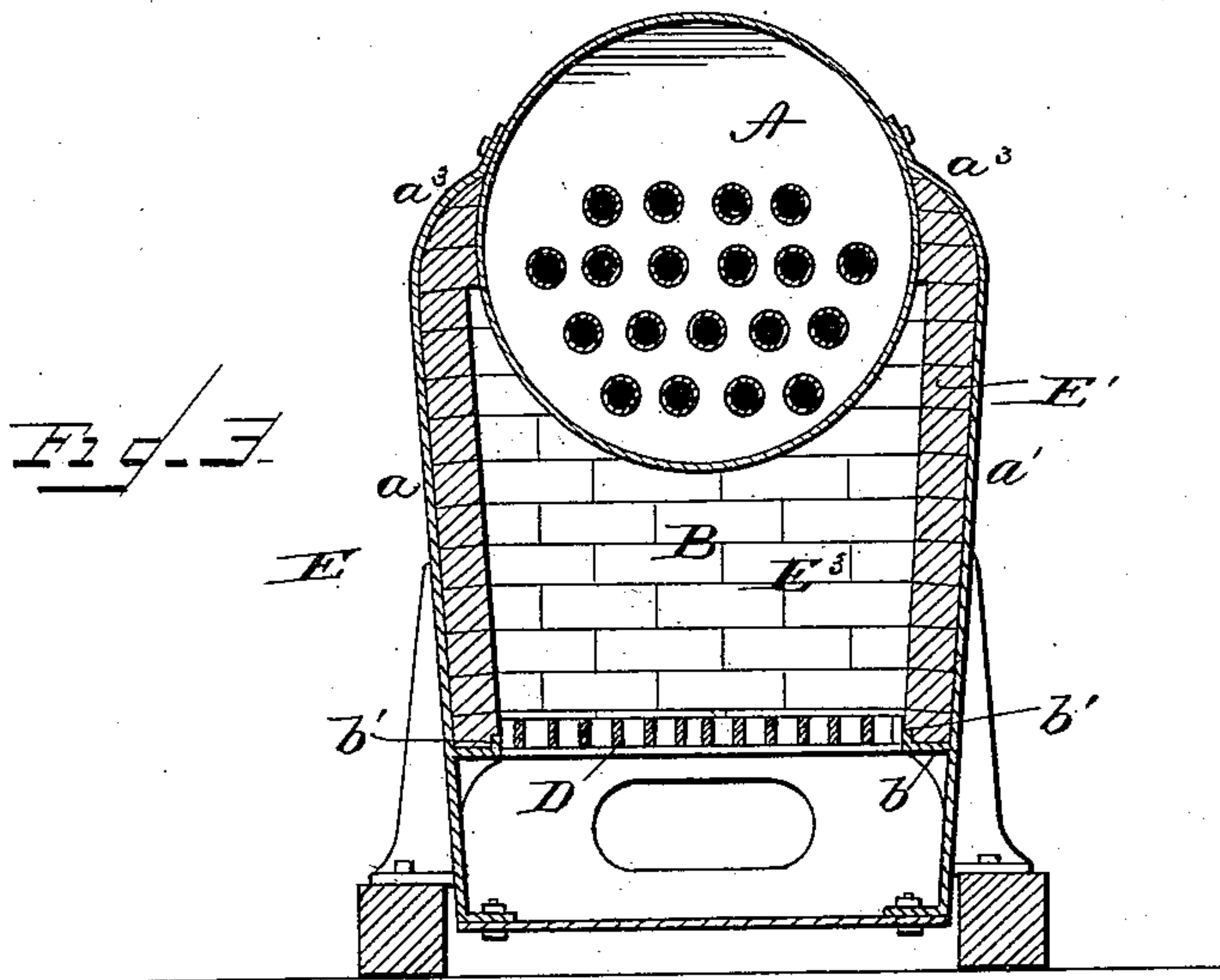
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# UNITED STATES PATENT OFFICE.

WALTER J. F. LIDDELL, OF CHARLOTTE, NORTH CAROLINA.

## PORTABLE STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 344,970, dated July 6, 1886.

Application filed March 10, 1886. Serial No. 194,689. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER J. F. LIDDELL, of Charlotte, county of Mecklenburg, and State of North Carolina, have invented a new and useful Improvement in Portable Steam-Boiler Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to that class of portable steam-boilers having a brick-lined fire-pot attached and in condition for use prior to its being sent out from the factory or shop, and adapted to be moved or transported in such condition to the place where it is to be set up and used; and its object is to give such form or construction to the fire-pot as will prevent the accidental displacement of the lining of fire-brick under the jolting incident to its removal or transportation from place to place.

The invention consists in making the side and end walls of the fire-pot flaring or inclining outward from their lower edges upward in such manner that the lining of fire-brick, resting against said walls with the upper and lower sides of the bricks in planes at right angles, or thereabout, to said walls, will be held against displacement by its own gravity, which tends to hold the bricks firmly in place against the flaring sides or walls of the fire pot or box, as will appear.

In the accompanying drawings, Figure 1 represents a side elevation of a portable boiler with my improved fire-pot applied. Fig. 2 represents a vertical longitudinal section through the same. Fig. 3 is a vertical transverse section taken on the line  $x x$ , Fig. 2; and Fig. 4 is a similar section taken on the line  $y y$ , Fig. 2.

The form of the boiler shown is the same as that shown and described in Letters Patent granted to me February 29, 1876, No. 174,139, and it will not therefore be described further than is necessary to an understanding of my present improvement.

A indicates the boiler proper, of the horizontal type, with its heads or ends perforated to receive the ends of the connecting fire-tubes, which open at one end into the fire-pot B, and at the opposite end into the smoke-box C, with which the smoke-stack D is connected, as shown, or in any usual or preferred manner.

The end of the boiler connected with the fire-pot projects within the latter and over the grate (indicated at A') a distance of, say, two-thirds, more or less, of the length of the latter from front to rear, as shown, so as to bring the main body of the fire under said end of the boiler, and thereby compel the products of combustion to pass up around and forward to the forward end of the boiler to reach the point of escape into and through the fire-tubes. The sides  $a$  and end walls,  $a'$   $a''$ , as indicated by the drawings, are made flaring or inclining outwardly from their lower edges, and preferably of boiler-plate iron; but they may be of cast-iron, if desired, and are provided at or near the plane of the grate with suitable ledges or flanges,  $b$ , forming a foot-support for the fire-brick lining to said walls. These flanges may be either horizontal, as shown, or they may be slightly inclined, so as to be at right angles to the sides with which they are connected. When they are made horizontal, they should be provided each with a vertical rib on its inner edge, as indicated at  $b'$ , to prevent lateral movement or displacement of the lower layer of brick resting thereon, and the latter should be made tapering, as indicated, so as to bring their upper faces into a plane at right angles, or thereabout, to the adjacent side wall. This arrangement serves to give a corresponding inclination outward to the succeeding layers of the brick lining, in which position they will be held, crowded outward against the supporting-wall by their own gravity. The side walls,  $a$ , extend sufficiently above the horizontal diameter of the boiler to accommodate a brick lining removed from the boiler up to or about to the plane of such diameter, as shown in Fig. 3. Above said plane the side walls are curved or bent inward, as shown at  $a^3$ , leaving space for the brick lining, and are united to the sides of the boiler by riveting, or in any suitable manner. The portion of the fire-pot in front of the forward end of the boiler is provided with a brick arch,  $E'$ , arranged above the plane of the upper tubes, as shown in Fig. 4, and which serves to deflect the products of combustion into said tubes, and to prevent their reaching the otherwise unprotected upper portion of the fire-pot casing. The front wall of the fire-pot is provided above the usual fire-door,  $F$ , with a second

door or removable plate,  $F'$ , through which access may be had to the interior for facilitating the laying of the arch  $E^4$ , or the renewal or replacing of the same, as may be required.

5 The side linings of fire-brick are indicated by the letters  $E$  and  $E'$ , and the front and rear end walls thereof, respectively, by  $E^2$  and  $E^3$ , and, aside from the particular arrangement of these and their flaring supporting-walls  $a$ ,  $a'$ ,  
10 and  $a^2$ , as described, the boiler may be of any usual or preferred construction.

Having now described my invention, I claim as new—

1. The combination, with a portable boiler,  
15 of a rectangular fire-pot having the flaring or outwardly-inclined side and end walls, a fire-brick lining applied thereto, built up of fire-brick in successive layers, inclining outward and adapted to be held in place against the

inclined casing-walls by gravity, and a sup- 20  
plemental door facilitating the lining of said fire-pot, all substantially as and for the purpose described.

2. The combination, with a portable tubular boiler, of the fire-pot having the flaring side 25  
and end walls, the fire-brick lining applied thereto, as described, and provided in its forward end above the fire-door with a second door or opening, for facilitating the laying and removal of the brick lining, substantially as 30  
described.

In testimony whereof I have hereunto set my hand this 5th day of March, A. D. 1886.

WALTER J. F. LIDDELL.

Witnesses:

J. R. HOLLAND,

EVA LIDDELL.