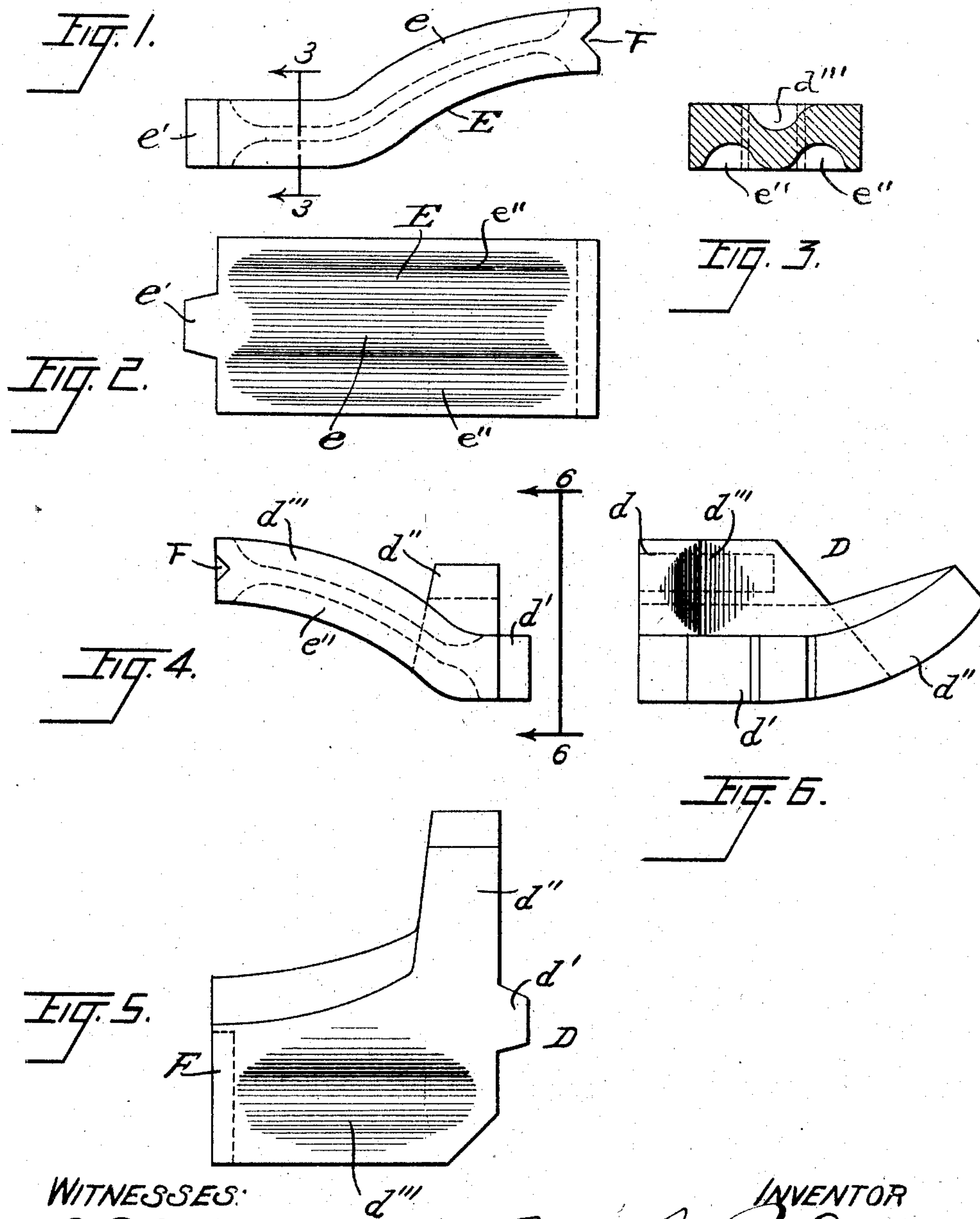


E. P. STEVENS.
FIRE BRICK ARCH.
APPLICATION FILED NOV. 27, 1908.

929,724.

Patented Aug. 3, 1909.

2 SHEETS—SHEET 1.



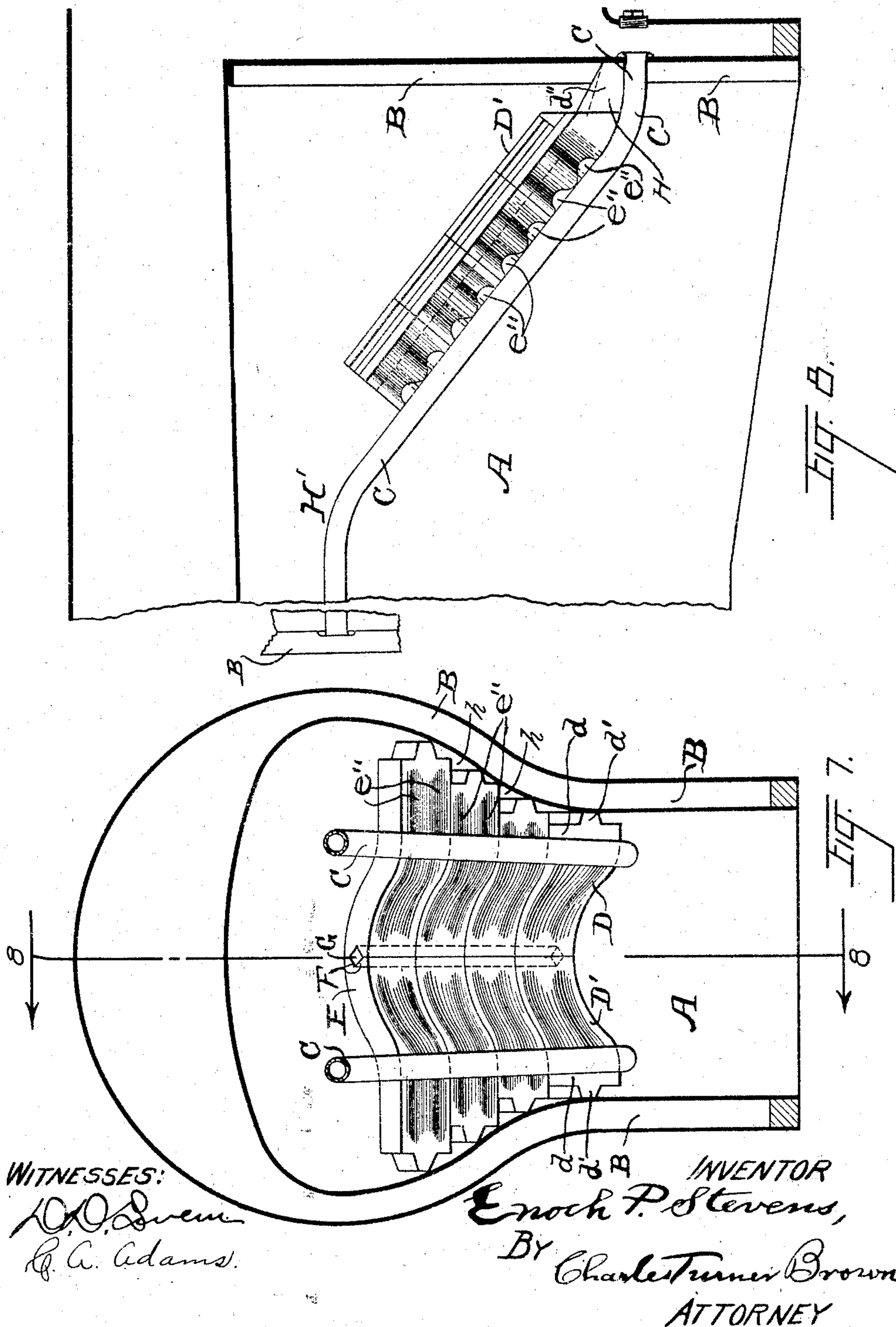
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UNITED STATES PATENT OFFICE.

ENOCH P. STEVENS, OF CHICAGO, ILLINOIS.

FIRE-BRICK ARCH.

No. 929,724.

Specification of Letters Patent.

Patented Aug. 3, 1909.

Application filed November 27, 1908. Serial No. 464,728.

To all whom it may concern:

Be it known that I, ENOCH P. STEVENS, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fire-Brick Arches, of which the following, when taken in connection with the drawings accompanying and forming a part hereof, is a full and complete description, sufficient to enable those skilled in the art to which it pertains to understand, make, and use the same.

This invention relates to fire brick arches for fire boxes, of locomotives and other like engines.

To those skilled in the art it is known that ashes and cinders are discharged from the burning fuel in the fire boxes of locomotives and other engines where coal is used to generate steam, and that, unless means are provided to prevent the same, such ashes and cinders are delivered through the flues of the boiler up the smoke stack of the locomotives and thrown therefrom. And the object of this invention is to produce a device which is simple in construction, economical, and durable; which will arrest a considerable portion of the cinders produced by the consumption of coal (or wood) in the fire box; and retain the same in said fire box; and which will not to any practical degree interfere with, or reduce the draft of the fire box.

A further object of the invention is to provide a device which can be readily installed in a locomotive after the fire box thereof has been otherwise completed.

I have illustrated the device embodying my invention in the drawings referred to in which—

Figure 1 is a side elevation of one of the fire bricks forming an element in the device. Fig. 2 is a bottom plan view of the fire brick illustrated in Fig. 1. Fig. 3 is a sectional view of the fire brick, on line 3—3 of Fig. 1, viewed in the direction indicated by the arrows. Fig. 4 is a side elevation of a brick, additional to the brick illustrated in Figs. 1, 2 and 3, forming an element in a device embodying the invention. Fig. 5 is a top plan view of the fire brick illustrated in Fig. 4. Fig. 6 is an end view as indicated by the line 6—6 of Fig. 4 looking in the direction designated by the arrows, showing the brick illustrated in Fig. 4. Fig. 7 is a front elevation of the fire box of a locomotive with the front

wall and grate thereof, removed, showing the device embodying my invention installed in said fire box; and Fig. 8 is a vertical sectional view on the median line of the device, as on line 8—8 of Fig. 7, viewed in the direction designated by the arrows.

A reference letter applied to indicate a given part is used to indicate said part throughout the several figures of the drawings, wherever the same may appear.

A (Figs. 7 and 8) is the fire box, which is provided with an ordinary grate, (not shown.)

B, B, are water legs arranged around the fire box on the back, sides and front thereof in the ordinary way.

C, C, are hollow bars or pipes, respectively communicating with the water legs in the back and front of the fire box A. The ends of pipes C, C, which communicate with the water leg at the back of the fire box are higher than the ends which communicate with the water leg at the front of the fire box so that the flow of water therethrough is from the front water leg to the back water leg.

D, D', and E, E, are fire bricks or tiles, respectively, arranged in pairs on pipes C, C, to form a baffle plate, in the form of a corrugated arch. The bricks D, D', are rights and lefts and are respectively, provided with the body part *d*, the ends *d'* and the legs *d''*. The body part of the bricks D, D' are respectively provided on the upper face thereof with single corrugations *d'''*, and on the lower face thereof with a plurality of corrugations *e''*. The bricks or tiles E are respectively provided with the body portion *e* and the end portion *e'*, and said end portion *e* is provided on the under side thereof with the longitudinal grooves, recesses or corrugations *e''*, *e''*. The bricks or tiles E are also respectively provided with a longitudinal groove *d'''* on the upper face of the body portion thereof, corresponding with groove *d'''* on the bricks or tiles D, D'. The meeting ends of the bricks or tiles D, D', and E, are respectively provided with the laterally extending recesses or grooves F.

G is a bar arranged to lie between the meeting ends of bricks or tiles D, D', and E, in recesses F, F.

In assembling the several parts to obtain a device embodying the invention the hollow bars or pipes C, C, are first installed. The

bricks or tiles D, D', are then laid on such pipes C, C; a right and left one of said bricks or tiles are used and the ends d' , d' , are chipped or broken off to bring the meeting edges of said bricks or tiles together with a suitable closeness of fit. Said bricks or tiles are also arranged so that the ears or legs d'' , d'' , are against the wall of the water leg in front of the fire box. Bricks or tiles E are then fitted on the hollow bars or pipes C, C, adjacent to the bricks or tiles D, D', by breaking or chipping the ends d' thereof, as required. Additional bricks or tiles E are fitted in place on hollow rods or pipes C, C, in like manner until the baffle plate is of the desired size. The bar G, is inserted in place in recesses F, F, to form a key to hold the bricks or tiles in place.

When the several parts are assembled as described, passage way H, adjacent to the front water leg passage ways h , h , adjacent to the side water legs, and the large passage or space H', between the rear end of the device and the back water leg, are obtained.

The products of combustion in the fire box necessarily flow through the passage ways H, h , h , and H' from the fire box A to the flues and smoke stack of the locomotive.

The grooves, recesses or corrugations e'' in the bricks or tiles D, D', and E, when the several parts are assembled, extend transversely across the fire box and particularly tend to arrest and to return the burning fuel, the cinders which come in contact with such bricks or tiles on the under side of the arch, and the grooves or recesses d''' also extending transversely of the fire box tend to arrest and hold lodged therein, cinders and ashes which are carried, by the draft, through passage way H' from the fuel in the fire box to the upper surface of the device.

The heated condition of the device, when steam is being generated, and its location, increase the efficiency of the combustion chamber obtained in the upper portion of the fire box, and the quantity of cinders and ashes carried through the flues is materially reduced by the use of this device. The bricks D and E are arranged in place to form the baffle plate, as described, and the several projections e' , d' , and d'' are arranged to produce passage ways for the products of combustion to flow from below the baffle plate to the upper surface thereof and also to deflect such products against the inner walls of the water legs of the fire box. Said projections also present parts which may be chipped easily to obtain a good fit of the arch in the fire box.

By making the several brick or tile D, D', and E with the recesses or corrugations thereon, as described, I not only obtain the advantages I have named, but in addition thereto I am able to make the ends of such

brick or tile deeper, with the same weight thereto, than when the upper and under faces thereof are smooth, (not corrugated.) This is especially advantageous relative to the meeting edges in which the groove or recess F is placed.

The hollow pipes C are not necessarily used as the arch will maintain itself in position in the fire box after the bar G has been inserted in recesses F, F, and the thickness of the fire bricks at the meeting edges thereof may be made so great, because of the lightness resulting from the making of the corrugations hereinbefore described, that a permanent arch is obtained even without the support which is furnished by the hollow bars (C, C.)

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

1. A fire box, in combination with an arch consisting of a plurality of rows of fire bricks, each row containing a plurality of bricks respectively provided with longitudinal recesses on the under and upper faces thereof, such recesses terminating short of the meeting edges of the rows of bricks, and with transverse recesses at their meeting edges, and a bar between the meeting edges of the brick in the transverse recesses thereof, arranged to bind the meeting bricks of all the rows together.

2. A fire box provided with water legs in front and back thereof, in combination with an arch consisting of a plurality of rows of fire bricks, each row containing a plurality of bricks respectively provided with longitudinal recesses on the under and upper faces thereof, such recesses terminating short of the meeting edges of the rows of bricks, and with transverse recesses at their meeting edges, hollow pipes communicating with said water legs, said bricks mounted on the hollow pipes and a bar between the meeting edges of the brick, in the transverse recesses thereof arranged to bind the meeting bricks of all the rows together.

3. A fire box provided with water legs in the front and back thereof, in combination with an arch consisting of a plurality of rows of fire brick, each row containing a plurality of bricks, a leg on one end of each brick arranged to abut the side of the fire box and said bricks provided with longitudinal recesses on the under and upper faces thereof, said recesses terminating short of the meeting edges of the rows of bricks and with transverse recesses arranged at the ends forming the meeting edges thereof, hollow pipes communicating with said water legs, said bricks mounted on the hollow pipes, and a bar between the meeting edges of the brick in the transverse recesses thereof, arranged to bind the meeting bricks of all the rows together.

4. A fire box provided with water legs in the front and back thereof, in combination with an arch consisting of a plurality of rows of fire bricks, each row containing a plurality of bricks, a leg on one end of each brick, an additional leg on one side of two of said bricks, said additional legs arranged to make right and left bricks of such ones, and said bricks provided with longitudinal recesses on the under and upper faces thereof, said recesses terminating short of the meeting edges of the rows of bricks, and with transverse recesses arranged at the ends forming the meeting edges thereof, hollow pipes communicating with said water legs, said bricks mounted on the hollow pipes, and a bar between the meeting edges of the brick in the transverse recesses thereof, arranged to bind the meeting bricks of all the rows together.

5. The combination of a fire box, provided with water legs, hollow pipes com-

municating with the water legs in the front and back of said fire box, rows of bricks on said pipes forming an arch, said bricks being provided with recesses on the upper and under faces thereof, said recesses terminating short of the meeting edges of the rows of bricks, and also with recesses in the meeting edges of the rows of bricks, legs on the bricks adjacent to the side water legs of the fire box of less cross sectional area than the body part of said brick, additional legs on the bricks which are adjacent to the front water leg, said fire bricks arranged to obtain passage ways between the front and back and rear water legs and themselves and a bar between the ends of the rows of bricks in the transverse recesses thereof, arranged to bind the meeting bricks of all the rows together.

ENOCH P. STEVENS.

In the presence of—

CHARLES TURNER BROWN,

CORA A. ADAMS.