

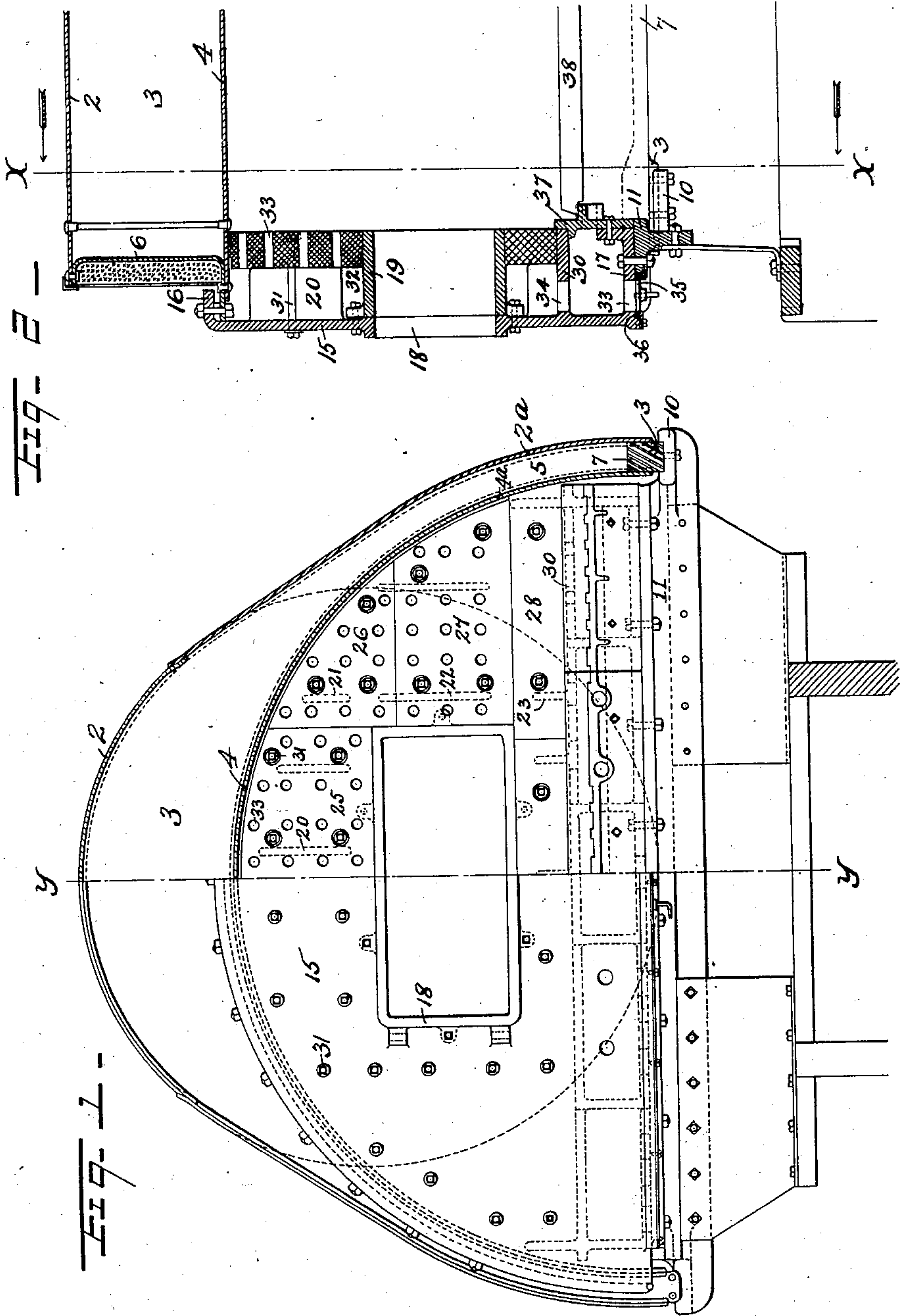
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PATENTED MAR. 15, 1904.

S. F. PRINCE, JR.  
LOCOMOTIVE BOILER.

APPLICATION FILED OCT. 16, 1903.

NO MODEL.



Witnesses  
David Levan  
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# UNITED STATES PATENT OFFICE.

SAMUEL F. PRINCE, JR., OF READING, PENNSYLVANIA.

## LOCOMOTIVE-BOILER.

SPECIFICATION forming part of Letters Patent No. 754,497, dated March 15, 1904.

Application filed October 16, 1903. Serial No. 177,242. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL F. PRINCE, Jr., a citizen of the United States, residing in the city of Reading, county of Berks, State of Pennsylvania, have invented certain new and useful Improvements in Locomotive-Boilers, of which the following is a specification.

My invention relates particularly to locomotive-boilers; and it consists in the improved construction of the fire-box end thereof, as fully described in connection with the accompanying drawings, and specifically pointed out in the claims.

As ordinarily constructed the whole fire-box or furnace is built up of metal plates and is inclosed by the rearwardly-extended shell of the boiler, so as to provide a rear water-wall, the vertical end sheet of the boiler-shell being spaced apart from the end sheet of the inclosed fire-box by stay-bolts and a door-frame, through which access is afforded to the fire-box. Among the disadvantages incident to this construction is the large area of flat surface presented to the boiler-pressure and requiring to be carefully stayed against such pressure, as well as the inconvenience obviously arising from forming the door-wall of the fire-box by thus uniting the end sheet of the outer shell to the end sheet of the fire-box proper. The main objects of my invention are, first, to overcome these disadvantages by rearwardly extending the crown and side sheets of the fire-box and directly uniting the edges thereof with the edges of the outer boiler-shell by means of a suitably-flanged end plate of approximately crescent shape and employing an independently-secured fire-box end, and, second, by so constructing the latter as to provide, in connection with an inner perforated wall of refractory material, an intermediate air-chamber, into which air is admitted in regulated quantity and supplied at proper temperature to the furnace for insuring more perfect combustion of the fuel, all as fully described hereinafter.

Figure 1 shows a half end elevation of the fire-box end of a locomotive-boiler embodying my invention and a half cross-section on the line *x x* of Fig. 2 looking rearward. Fig. 2 is

a partial sectional elevation on the line *y y* of Fig. 1.

The cylindrical forward portion of the boiler is not shown; but the rearward extension or shell 2 thereof, as indicated, incloses the fire-box, so as to form a water-space 3 between said shell and the crown-sheet 4 of the fire-box, which water-space extends downward between the side sheets 2<sup>a</sup> of the shell and 4<sup>a</sup> of the fire-box to form the usual "water-legs" 5 of this type of fire-box. In my improved construction the fire-box crown and side sheet 4 4<sup>a</sup> is extended rearward with the boiler-shell 2 2<sup>a</sup>, and the water-space between the fire-box and shell is closed by a crescent-shaped end plate 6, the outer and inner flanged edges of which are riveted, respectively, thereto, thus forming an open-end fire-box, the rear or door wall of which requires to be independently formed and attached. The water-legs 5 thus formed at each side of the fire-box are closed at the bottom by a mud bar or frame 7, to which the bottom edges of the outer and inner side plates 2<sup>a</sup> and 4<sup>a</sup>, respectively, are riveted as usual. This bottom bar, as shown, terminates at the rear on each side in an enlarged end 8, which extends below the bottom edges of the side sheets and is engaged by the flanged bolting-lugs 10 of a transverse connecting-bar 11, which serves to unite the rear ends of the water-legs and also as a means of connecting the boiler to the running-gear frame.

The independently-formed fire-box end comprises an outer wall-plate 15 and an inner fire-wall spaced therefrom. Said outer plate is formed with a flanged edge 16 for securing the same to the extended fire-box sheet and with a bottom flange 17, resting upon and secured to the transverse bar 11. The door-opening 18 in said plate is provided with a frame 19, extending inwardly therefrom through the fire-wall, and with a series of inwardly-extending spacing-ribs 20 21 22 23, which serves as a backing for the suitably formed and perforated fire-bricks 25 26 27 28. These bricks are mounted upon the inner end of said door-frame and of a supporting-flange 30 to form the fire-wall and are firmly secured to the outer wall-plate 15 by means of bolts 31, passing



through the intervening air-chamber 32, and provided with perforations 33, affording air-outlets from said chamber into the fire-box. The inwardly-extending flanges 17 and 30 are  
 5 provided with openings 33 and 34 for the admission of air into the air-chamber 32, and I employ in connection therewith for the purpose of permitting regulation of the air thus supplied to the fire-box a slide-valve 35, guided  
 10 in suitable ways 36 36, formed beneath said flange 17 and readily accessible for adjustment. The inner wall below the brick-supporting flange 30 is formed by grate-supporting plates 37, suitably fitted and bolted thereto, as shown,  
 15 and adapted to carry the grate-bars 38, as usual.

The advantages of my improved construction have already been referred to and will be readily understood. By dispensing with the  
 20 inner and outer end plates which are ordinarily employed to form the rear water-wall of the fire-box the construction of the boiler is much simplified and improved, and the separately-formed and independently-secured rear wall  
 25 is not only of great advantage structurally, but permits of readily providing a regulated amount of heated air for combustion and incidentally avoids the radiation of excessive heat, which is ordinarily a great source of dis-  
 30 comfort to the fireman.

What I claim is—

1. A locomotive-boiler having fire-box crown and side sheets extended rearwardly beyond the surrounding water-space, and a  
 35 separately-formed rear fire-box end removably secured to the projecting edges of the rearwardly-extended sheets.

2. A locomotive-boiler having a fire-box  
 40 box end comprising an outer wall-plate having a door-frame and a fire-wall-supporting flange extending inward therefrom, suitably-formed

perforated fire-brick mounted upon the inner portions of said frame and flange to form an intervening air-chamber and an air-inlet to  
 45 said chamber.

3. A locomotive-boiler having a fire-box provided with a separately-formed rear fire-box end comprising an outer wall-plate having  
 a door-frame, a fire-wall-supporting flange, 50 and spacing-ribs, extending inwardly therefrom, suitably-formed perforated fire-brick mounted upon the inner portions of said frame and flange and secured against said spacing-ribs to form an intervening air-chamber, and  
 55 an air-inlet to said chamber.

4. A locomotive-boiler having rearwardly-extended fire-box crown and side sheets directly connected to the surrounding boiler-shell by a water-space end sheet, a transverse  
 60 bottom bar connecting the rear ends of the water-legs, and a separately-formed rear-door end independently secured to said rearwardly-extended fire-box sheets and to said bottom bar.

5. In a locomotive-boiler having space between the boiler-shell and the fire-box closed by a crescent-shaped end sheet and the depending water-legs connected by a transverse  
 65 bottom bar, an independently-secured hollow door end comprising an outer wall-plate having an inwardly-extending perforated bottom flange secured to said bottom bar, a perforated fire-wall-supporting flange above said  
 70 bottom flange, removably-secured plates forming an inner wall between said flanges, and means for regulating the air-inlet through said perforated flanges.

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

SAMUEL F. PRINCE, JR.

Witnesses:

D. M. STEWART,  
 W. G. STEWART.