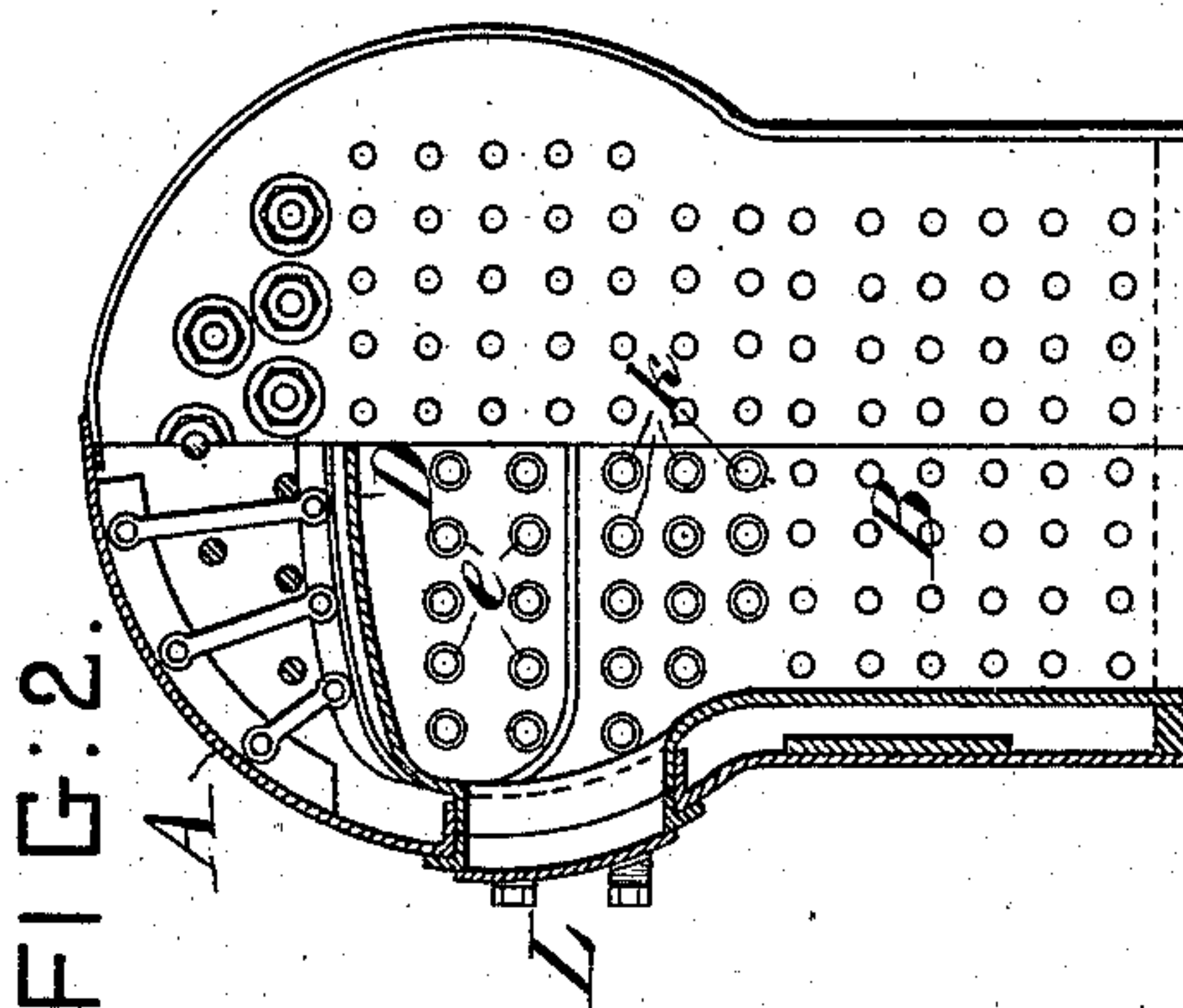
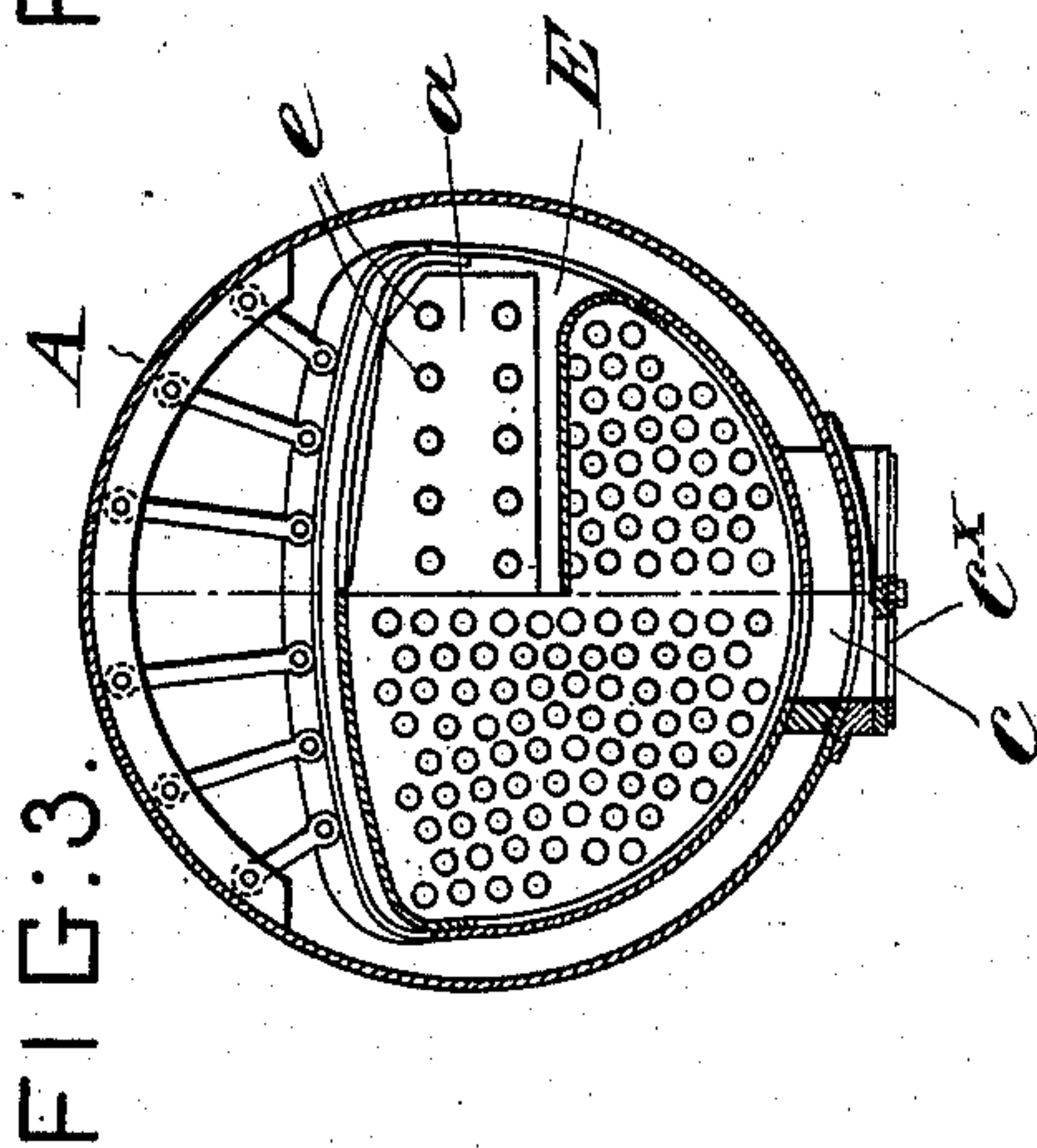
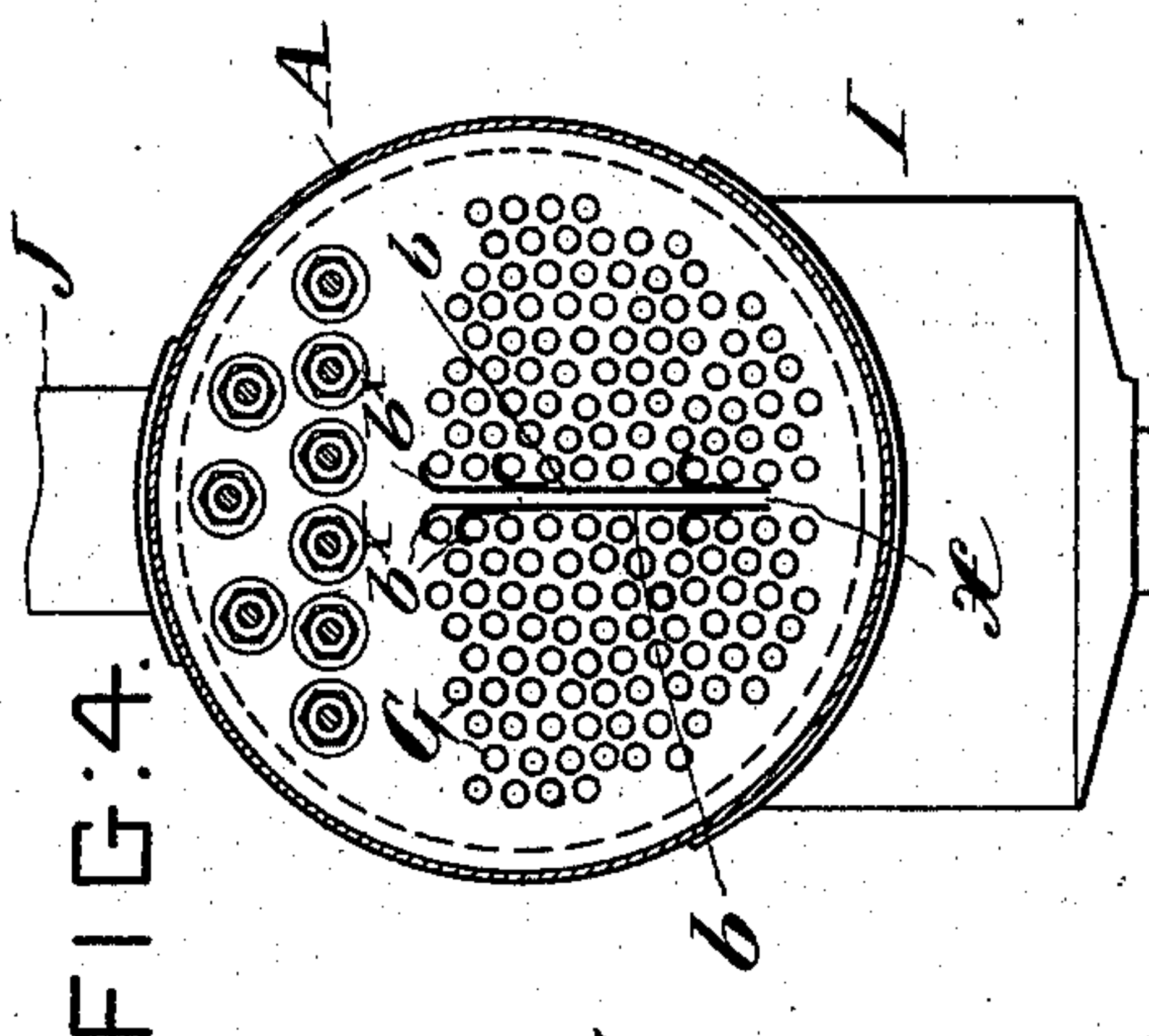
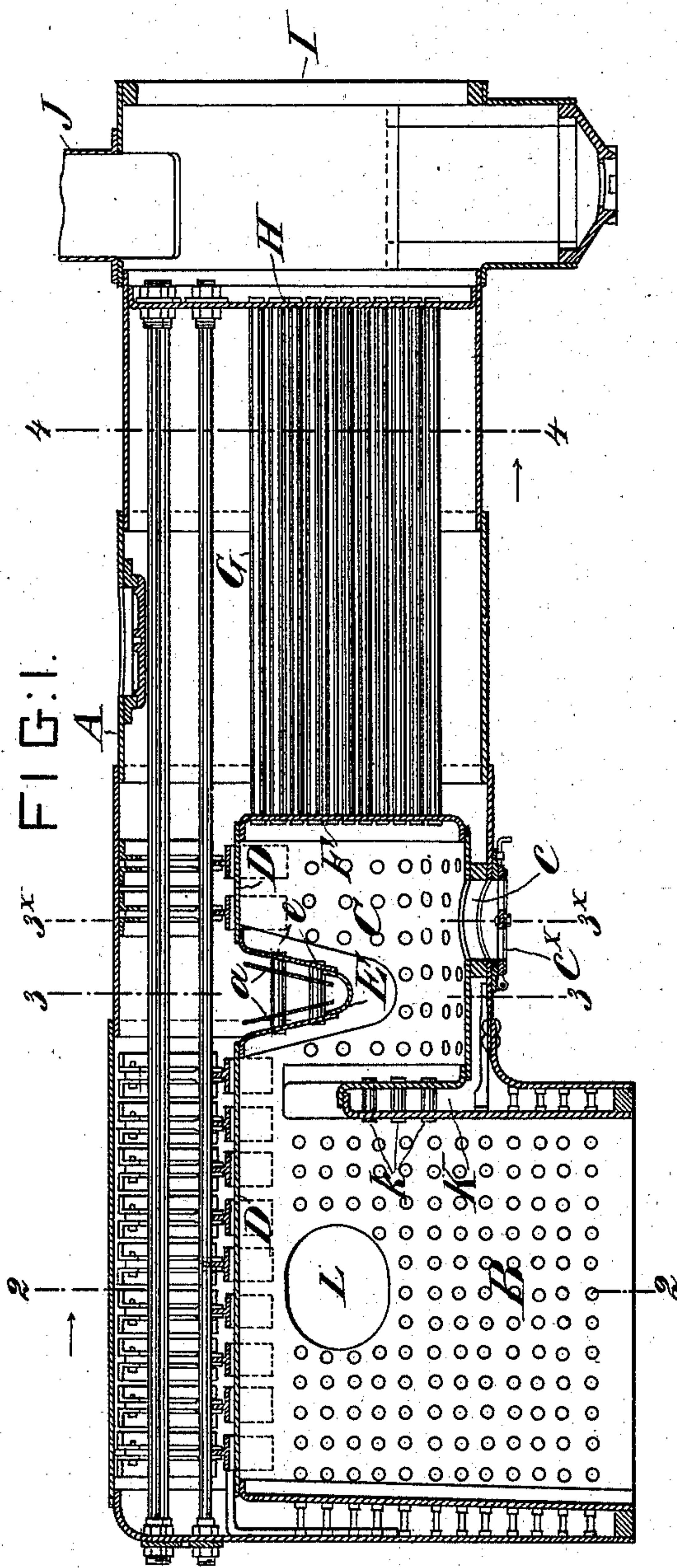


(No Model.)

W. W. SCOTT.
STEAM GENERATOR.

No. 562,342.

Patented June 16, 1896.



WITNESSES:

L. H. Gliman
Peter A. Ross.

INVENTOR:

Walter W. Scott
By *Henry Bonnell*
Attorney.

UNITED STATES PATENT OFFICE.

WALTER W. SCOTT, OF BUFFALO, NEW YORK, ASSIGNOR TO JOHN L. WHITE,
OF NEW YORK, N. Y.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 562,342, dated June 16, 1896.

Application filed October 2, 1895. Serial No. 564,379. (No model.)

To all whom it may concern:

Be it known that I, WALTER W. SCOTT, a subject of the Queen of Great Britain, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

My invention relates to steam generators or boilers of the type commonly employed on locomotives, and the object is to increase the evaporative efficiency of the boiler over those of the usual type, in proportion to the grate-surface and to the fuel consumed.

The invention will be fully described hereinafter and its novel features carefully defined in the claims.

In the drawings the invention is shown embodied in a locomotive-boiler.

Figure 1 is a longitudinal vertical axial section of the boiler. Fig. 2 is, as to its right half, a rear elevation of the boiler and as to its left half a vertical transverse section in the plane indicated by line 2 2 in Fig. 1. Fig. 3 is a transverse vertical section of the boiler, as to the right half, in the plane indicated by line 3 3 in Fig. 1, and as to the left half by line 3^x 3^x in Fig. 1. Fig. 4 is a transverse vertical section in the plane indicated by line 4 4 in Fig. 1.

A is the outer shell of the boiler; B, the fire-box; C, an inner combustion-chamber; D, the crown-sheet; E, the pendent deflector, formed in the crown-sheet over the combustion-chamber; F, the back tube-sheet; G, the tubes; H, the front tube-sheet, and I the smoke-box, on which is mounted the chimney J.

In order to increase the evaporative efficiency of the boiler, the combustion-chamber C is interposed between the fire-box B and the back tube-sheet, through which chamber the hot gases must pass on their way to the tubes; and in order to insure an intimate mixture of the hot products of combustion, including free carbon and uncombined gases, with the uncombined oxygen of air passing through the fire-box, the crown-sheet D is depressed to form a deflector E over the chamber C, and dividing it unequally, to compel the gases to turn downward on entering the combustion-chamber, and a partition K is placed between

the fire-box and the combustion-chamber, such partition rising from below about to the level of the lower edge of the deflector E. The gases in the upper part of the fire-box must pass downwardly through the contracted throat between the deflector and the partition and under the former before they can reach and expand into the forward part of the combustion-chamber.

All of the stays *k* in the partition K, as well as the stays *e* in the deflector E, are tubular and form conduits through which some parts of the gases flow. Thus such gases as pass over and about the said deflector and partition will meet with gases issuing in jets from said tubular stays, which jets impinge upon the main current of gases substantially perpendicular to its flow and thus effect a thorough agitation and intermingling of the gases, such as will conduce to complete combination. Moreover, as the hollows within the deflector E and partition K are water-legs, the hot gases flowing through the tubular stays *e* and *k* give up a part of their heat to the water in the boiler.

The boiler has a door L in the side of the fire-box for stoking and charging, and this arrangement of the fire-box is very desirable for a class of locomotives where the fuel is contained in a tank or bunker in front of the cab and alongside the boiler; but this door may be, if desired, placed in the rear wall of the fire-box as in the ordinary locomotive-boiler.

In order to afford access to the combustion-chamber C for inspection, cleaning, or repairs, a manhole *c* is provided in the bottom thereof, the cover of which has in it a register *c^x* to permit of admitting air in regulated quantities to assist in obtaining more perfect combustion.

In order to increase the circulation of the water in the boiler and thus reduce the liability to priming and the difficulties which inevitably arise from unequal heating, I provide circulating-plates *a*, set in the hollow of the deflector E, and substantially parallel with the inclined front and rear walls thereof but clear therefrom. These plates serve to produce a rapid upward flow between each plate and the respective adjacent wall of the

deflector and this current removes the steam-bubbles from the crown-sheet at these points as fast as formed.

To further promote the circulation of the water, particularly among the tubes, a space x is formed in the boiler by omitting the central vertical series of tubes, thus dividing the mass of tubes into two equal groups separated from each other by the water-space x ; and at each side of this space are arranged vertical walls formed of plates b . These plates are, by preference, held in position by providing them with hooks b^x and suspending them from the adjacent tubes by such hooks. These plates do not extend to the bottom of the boiler, and they are not absolutely essential to the production of good results. Without them the two masses of tubes will serve a good purpose as walls. The plates b are omitted from Fig. 1 as they would obscure the tubes, but when employed they may extend nearly or quite from one tube-sheet to the other. The central space x serves to cause the water in its descent to flow down through this space to the bottom of the boiler before rising again among the tubes.

Having thus described my invention, I claim—

1. A steam-generator having a combustion-chamber between the fire-box and the rear tube-sheet and separated from the fire-box by a relatively low, water-leg partition K , connected at its ends and bottom only with the water-space of the generator, and having a transverse deflector formed by a depression in the crown-sheet of the combustion-chamber, said deflector depending to substantially the level of the said water-leg partition and being situated nearer to said partition than to the tube-sheet, substantially as set forth.

2. A steam-generator having a fire-box B , a combustion-chamber C , between the fire-box and the rear tube-sheet, a low partition K , between the fire-box and the chamber C , a pendent, transverse partition E , in the combustion-chamber and dividing it unequally, and a registered air-inlet in the bottom of that portion of the combustion-chamber nearest the tube-sheet, substantially as set forth.

3. A steam-generator having a combustion-chamber C , and a transverse deflector E therein formed by a depression in the crown-sheet, and having circulating-plates a , ar-

ranged in the hollow of said deflector, such plates being substantially parallel with the walls of the deflector and adjacent, respectively, thereto, substantially as set forth.

4. A steam-generator having a combustion-chamber situated between the fire-box and the rear tube-sheet and separated from the fire-box by a low, water-leg partition K , having tubular stays k , for the passage of gases to the combustion-chamber, and a pendent, transverse deflector E , in said combustion-chamber provided with tubular stays e , for the passage of gases, substantially as set forth.

5. A steam-generator having a combustion-chamber between the fire-box and the rear tube-sheet, a low, transverse partition K between said fire-box and chamber, and a transverse deflector E , formed by a depression in the crown-sheet of the combustion-chamber, said deflector having tubular stays e , to form gas-conduits, substantially as and for the purpose set forth.

6. A steam-generator having a fire-box, a section or part provided with tubes, a combustion-chamber C between the fire-box and the rear tube-sheet, a low, transverse, water-leg partition, K , between the fire-box and said chamber C , and provided with tubular stays k for the passage of hot gases there-through, a transverse deflector E , in said chamber C and dividing it unequally, being nearer the fire-box than the tube-sheet, and said deflector having tubular stays e , for the passage of hot gases through it, substantially as set forth.

7. A steam-generator having a fire-box B , a combustion-chamber C , situated between the fire-box and the rear tube-sheet and separated from the fire-box by a water-leg partition K , the bottom of said chamber C being above the level of the bottom of the fire-box, a pendent, transverse deflector E in said combustion-chamber, and passages for hot gases through the partition K near the bottom of the chamber C , substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WALTER W. SCOTT.

Witnesses:

HARRISON C. BALCOM,
WILLIAM R. CONLEY.