(No Model.)

2 Sheets—Sheet 1.

C. B. COVENTRY.

LOCOMOTIVE BOILER.

No. 287,505. Patented Oct. 30, 1883.

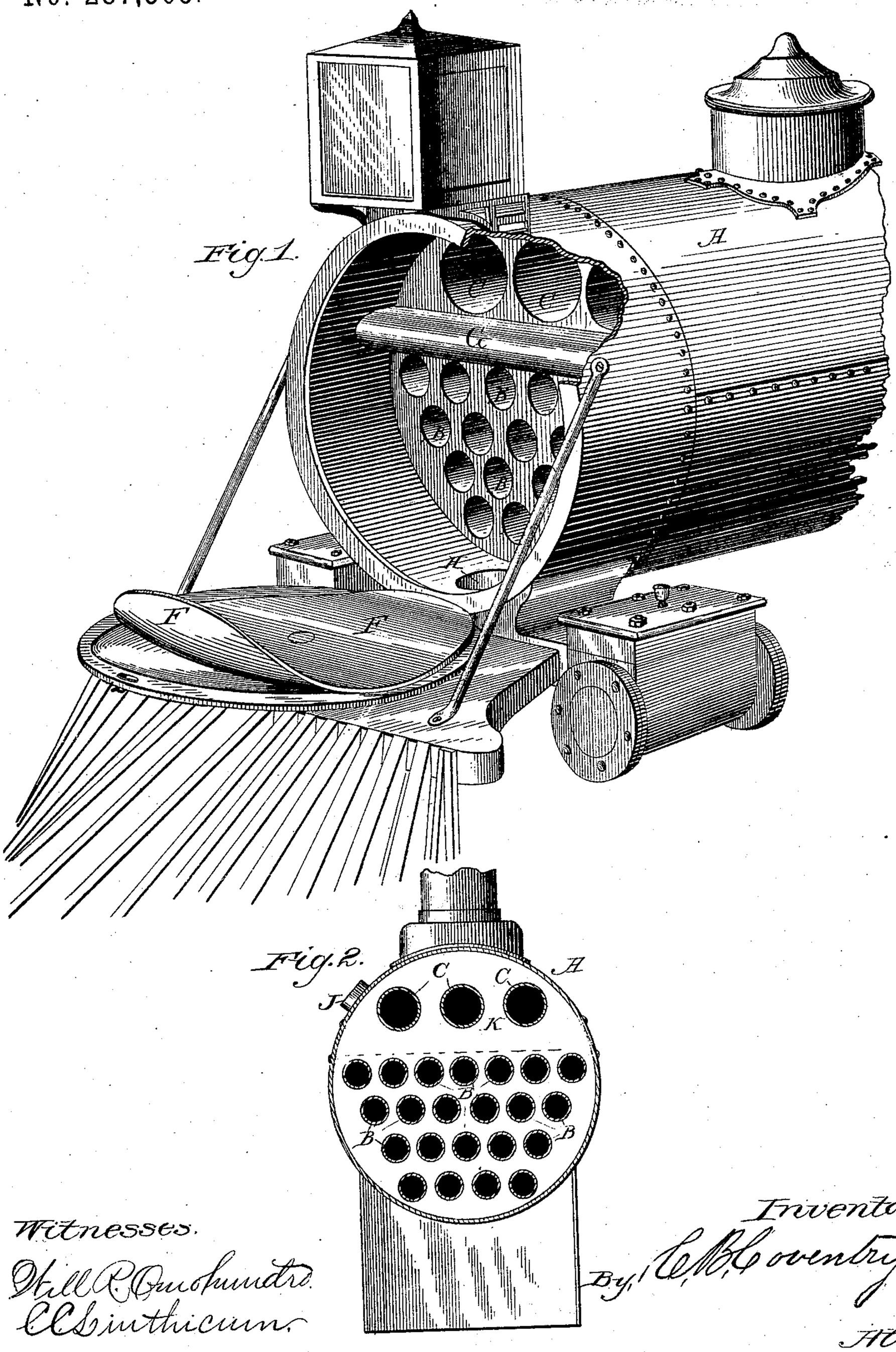

Fig. 1.

Fig. 2.

Witnesses.

Still C. Quohundro.

C. C. Linthicum.

Inventor

By / C. B. Coventry

Atty.

(No Model.)

2 Sheets—Sheet 2.

C. B. COVENTRY.

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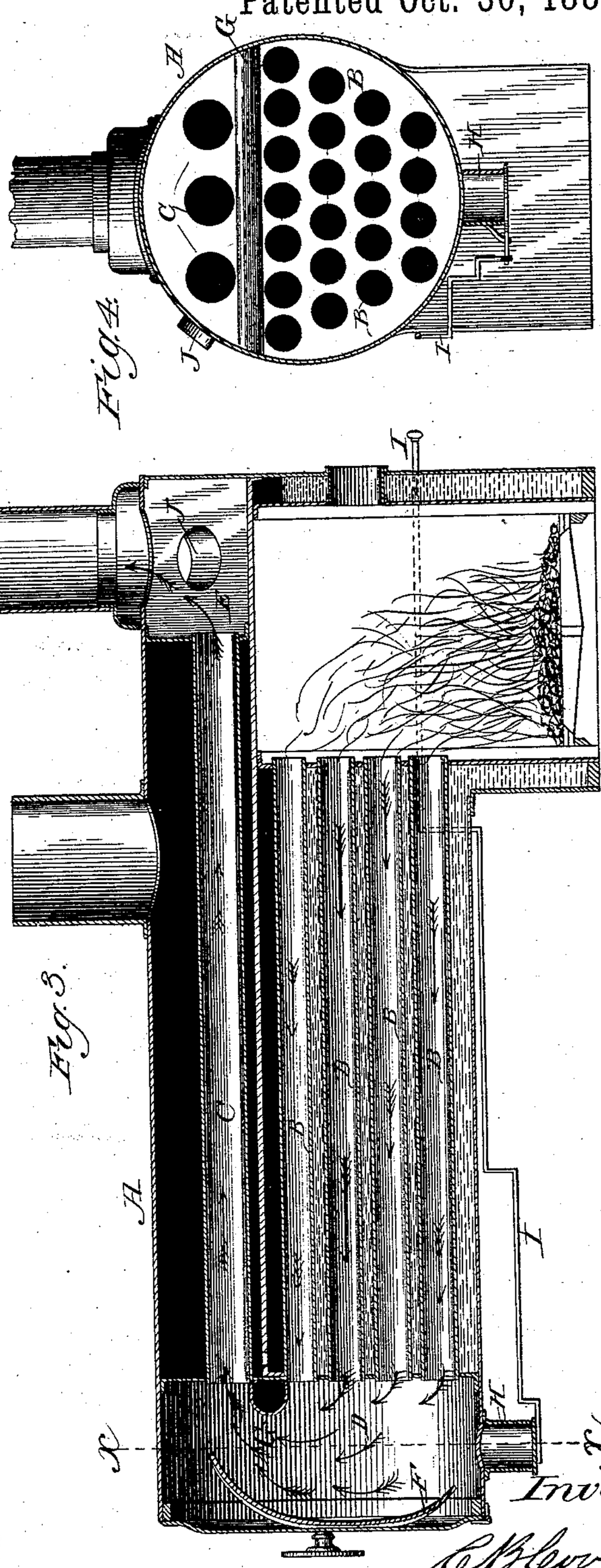

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UNITED STATES PATENT OFFICE.

CHARLES B. COVENTRY, OF CHICAGO, ILLINOIS.

LOCOMOTIVE-BOILER.

SPECIFICATION forming part of Letters Patent No. 287,505, dated October 30, 1883.

Application filed July 11, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. COVENTRY, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Locomotive-Boilers, of which the following is a specification.

The object of my invention, in general terms, is to construct a locomotive-boiler that shall contain efficient means for more fully utilizing the heat of the fuel by using it twice, and for preventing the escape of sparks and burning particles of coal or wood into the open air; and my invention consists in certain improvements on the boiler patented to me and Alvin Ford in Letters Patent No. 272,225, of February 13, 1883, which will be fully explained hereinafter.

My invention is further intended to be limited to what are known as "single," as distinguished from double, locomotive-boilers, or those having a centrally-located fire-box with flues extending in different directions therefrom. A boiler of this construction is shown in Letters Patent of the United States No. 52,117, of January 16, 1866, to Robert F. Fairlie.

In the drawings, Figure 1 is a perspective view of the front end of my improved locomotive-boiler, showing the front door open to expose the interior to view. Fig. 2 is a vertical transverse sectional view of the boiler, taken just in advance of the smoke-stack. Fig. 3 is a vertical longitudinal sectional view of the boiler, showing particularly the smoke-chamber over the crown-sheet at the rear end of the boiler; and Fig. 4 is a vertical transverse sectional view of the boiler, taken in the line *x x* of Fig. 3.

In the drawings, A represents the boiler-shell of my improved boiler; B, the heating-flues; C, the superheating-flues; D, the front smoke-chamber; E, the rear smoke-chamber; F, the flange on the front door; G, the drum or projecting piece just above the heating-flues; H, a hole or trap through the saddle of the trucks on which the front end of the boiler rests; I, a rod for opening such trap from the locomotive-cab; J, a man-hole into the rear smoke-chamber; K, a partition between the heating and superheating flues.

Similar letters of reference in the different drawings indicate similar parts.

In constructing a locomotive-boiler with my improvements, I place within the same boiler or shell a series of heating-flues and a series of superheating or return flues. The superheating-flues may be made larger than the heating-flues, if desired, or of the same size. In the drawings I have represented them as larger.

A partition may be used to separate the heating from the superheating flues, as in my other patent referred to, or not, as may suit the pleasure of the builder. In Fig. 2 of the drawings I have given a sectional view of my boiler with this partition omitted.

At the front end of the heating-flues, and just above them, I employ a drum or oval piece of iron, G, which may be made hollow, and which should project out over the ends of the heating-flues into the front smoke-chamber, and should extend across the end of the boiler from side to side. The object of this drum, around which the smoke and heat are drawn as they enter the superheating-flues, is to stop sparks and cinders or live coals that may be carried through the heating-flues, and prevent them from being carried on out through the return-flues into the open air. To further accomplish this same object, I rivet a flange, F, onto the inside of the front door. (Shown in Figs. 1 and 3.) This flange, by curving back and over, will be struck by the sparks and cinders, and, like the drum above described, acting as a deflecting-plate, cause them to fall to the bottom of the front smoke-chamber. In the bottom of this chamber I make a trap or hole extending down through the saddle on which the front end of the boiler rests, and closed with a sliding plate at the bottom, into which hole or tube the coals and cinders stopped, as above, in their passage will collect. This trap may be either dry or, by connecting a jet of steam with it, wet, so that the live coals may be drowned or extinguished before letting them fall to the ground. With this sliding plate a rod, I, is connected, extending back to the cab of the locomotive, by means of which the engineer may open the trap when the steam is shut off and discharge the cinders onto the track below. To more fully arrest the escape of sparks or cinders, a netting of wire may be fastened across the front ends of the return-flues, though the means above described will

generally be found sufficient unless the draft be unusually strong.

At the rear end of the superheating-flues I make a smoke-chamber, E, into which the heat and smoke pass before being drawn up through the smoke-stack. This chamber does not extend from the bottom to the top of the boiler-shell, but, as above indicated, is located in the upper half or portion of the shell, and has the superheating-flues opening directly into it.

To facilitate the cleansing of the flues, I make the front door of the boiler extend clear across the end of the boiler, as shown in Fig. 1, instead of simply making a man-hole, as is usually the case. The opening of this door exposes all the flues to view, and readily admits the fullest manipulation in their cleansing or repairing. When closed, this door may be fastened by strong thumb-screws or in any other convenient manner.

At the rear end of the boiler I make a man-hole, J, opening from the outside or from the end of the shell into the smoke-chamber E. This is shown in Figs. 2, 3, and 4, and is intended to permit access to the rear ends of the superheating-flues for cleansing or other purposes.

Careful and thorough experiments with an actual working locomotive containing the above improvements have shown me that their use enables me to produce a given amount of steam and power with the consumption of much less fuel than is required where the heat is discharged into the air after passing once through the flues, instead of being returned through a second series of flues before its escape; that the escape of sparks, cinders, and burning particles of fuel is reduced to a minimum by the use of the means above described for their stoppage and discharge, and that the arrangement of both the series of heating and superheating flues in one boiler or shell enables me to dispense with the partition between them described in my other patent above, and still make a strong and efficient locomotive-boiler capable of standing all the strains and shocks to which locomotive-boilers are subjected in actual use.

What I claim, and desire to secure by Letters Patent, is—

1. A locomotive-boiler provided with a series of heating-flues lying in the water, and through which the products of combustion are drawn to convert the water into wet steam, and a series of superheating-flues above the water-line and surrounded by the wet steam, and through which the products of combustion are returned after passing through the water or heating flues to convert the wet into dry or superheated steam, and which open directly and from substantially but one direction into a smoke-chamber, E, all arranged in one boiler or shell, substantially as described.

2. A locomotive-boiler provided with a series of heating-flues, a series of superheating-flues, and a drum or projecting piece, G, placed above and projecting beyond the ends of the heating-flues, whereby the heat shall be deflected out and around such drum before entering the superheating-flues, in combination with a door provided with a deflecting-plate, substantially as described.

3. A door for the front end of a locomotive-boiler, provided with a deflecting-plate, F, substantially as described.

C. B. COVENTRY.

Witnesses:
THOMAS A. BANNING,
C. C. LINTHICUM.