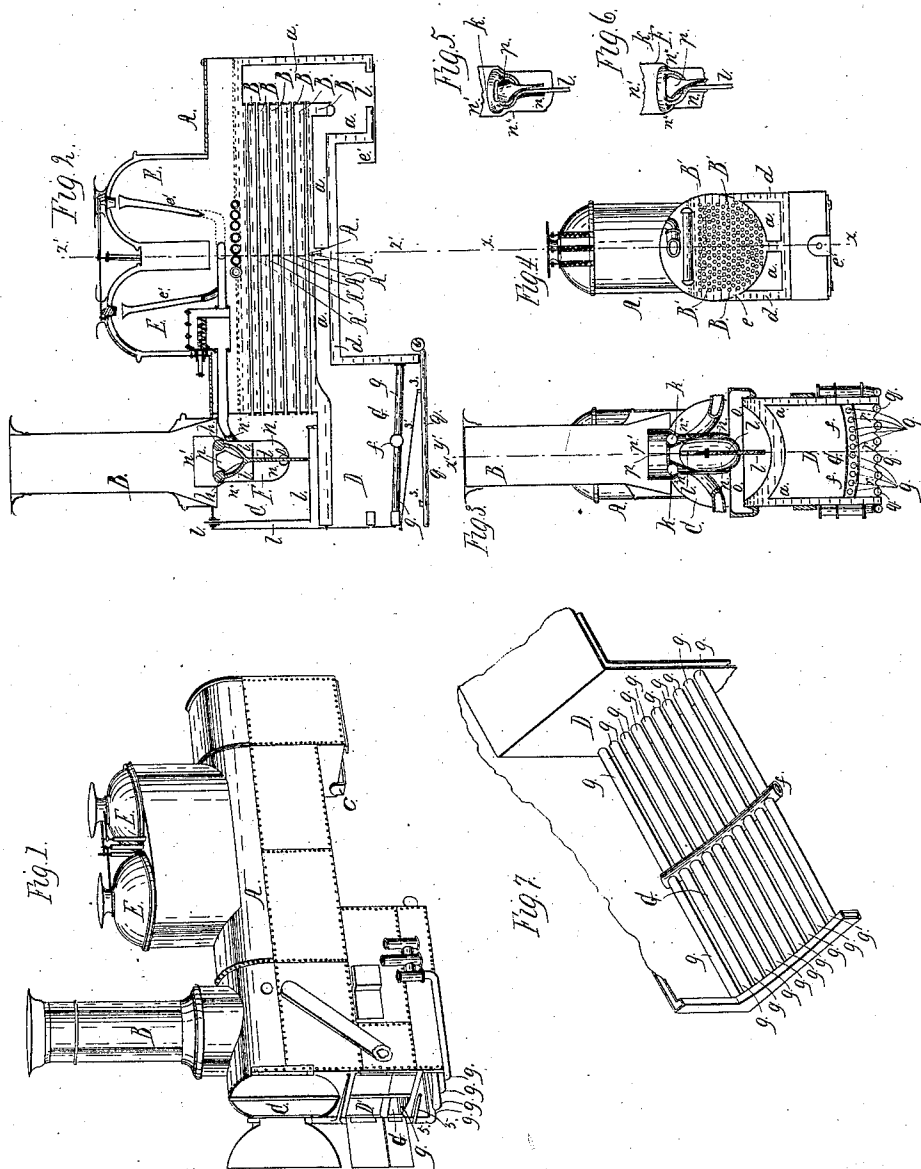


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Steam-Boiler Fire-Box,

N^o 22,303.

Patented Dec. 14, 1858.

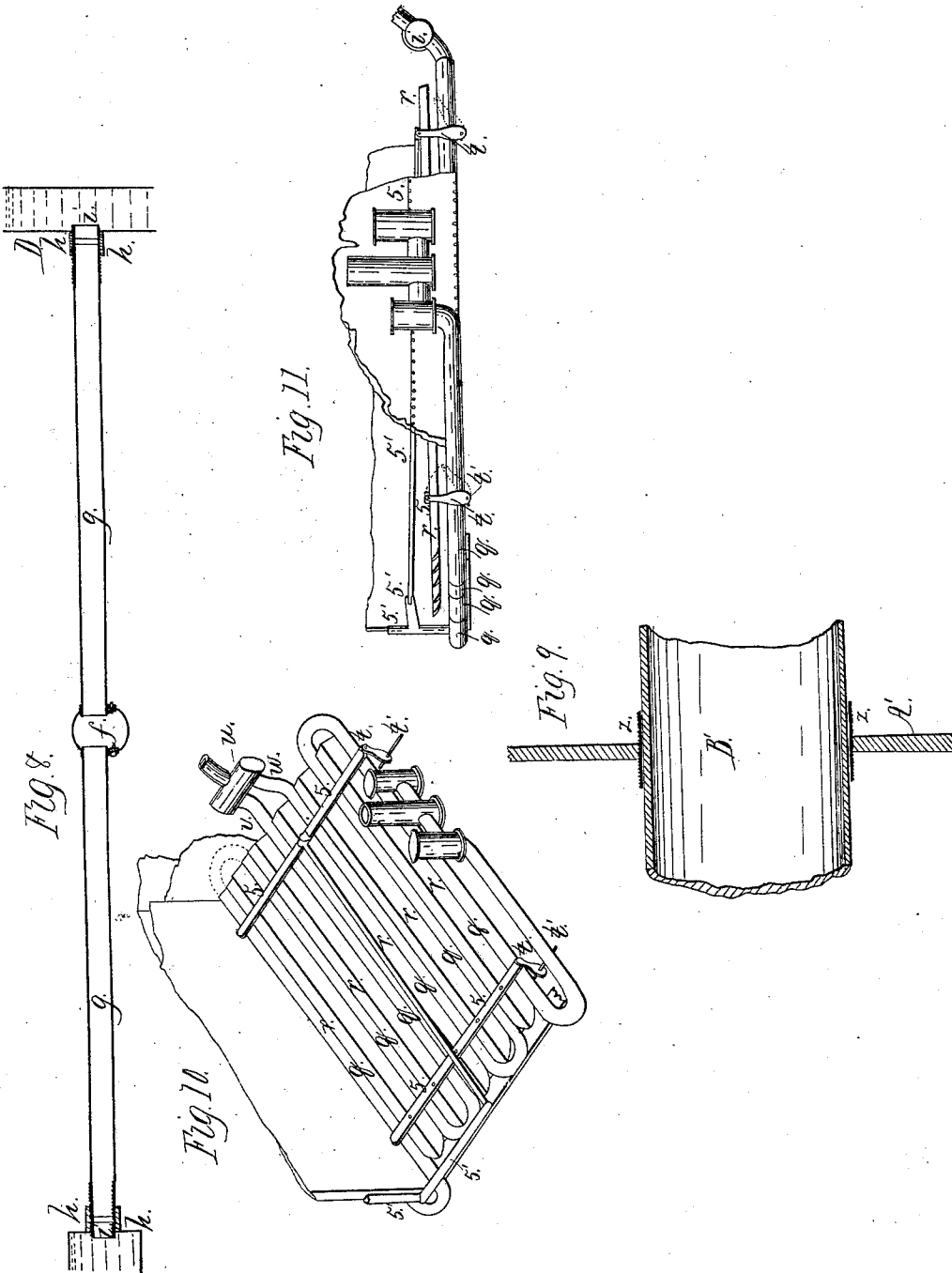


2 Sheets-Sheet 2.
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UNITED STATES PATENT OFFICE.

CHARLES J. C. PETERSEN, OF DAVENPORT, IOWA.

STEAM-BOILER.

Specification of Letters Patent No. 22,303, dated December 14, 1858.

To all whom it may concern:

Be it known that I, CHARLES J. C. PETERSEN, of Davenport, in the county of Scott and State of Iowa, have invented certain new and useful Improvements in Steam-Boilers for Locomotive and other Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1, represents a perspective view of a steam boiler constructed according to my improvement. Fig. 2, is a longitudinal vertical central section of the same the lines $x' x'$ in Figs. 3 and 4 indicating the plane of section. Fig. 3, is a transverse, vertical section, y', y' , Fig. 1, indicating the plane of section. Fig. 4, is a similar section z', z' , Fig. 2, indicating the plane of section. Figs. 5 and 6, are detached perspective views of my arrangement for regulating the draft, representing the same in different positions. Fig. 7, is a perspective view of the firegrate constructed according to my improvements. Fig. 8, is an enlarged sectional view representing the manner in which the tubes constituting the firegrate are connected. Fig. 9, is an enlarged section representing the manner in which the heating tubes pass through the plate supporting the same in the middle of the boiler. Figs. 10, and 11, are perspective views of the ashbox constructed according to my improvements representing the same in different positions.

Similar letters in the several figures refer to corresponding parts.

My invention consists in conducting the heat from the fire through a space under that part of the boiler which contains the heating tubes, before it enters the heating tubes said space being surrounded by water and being so constructed that the ashes and cinders are deposited in the same at its end farthest from the fire where they can be drawn off by a suitable opening; and it further consists in a peculiar construction of the firegrate and of the ashbox, both of which will be hereinafter explained.

To enable others skilled in the art to fully understand and construct my improvements, I will proceed to describe the same.

A, is a steam boiler constructed according to my improvement. It is of that class of boilers, known as returned tubular boilers, the smoke being conducted under the boiler

and back through the heating tubes to the smokestack. The boiler as represented in the drawings is intended for a locomotive but it may be used for any other steam engine with the same advantage.

B is the smokestack, C is the smoke chamber, and D is the fire box. The heat from the fire is conducted through an open space a , to the back end of the boiler, where it is turned down first and where it communicates by an opening b and slide c with the open air. The object of this arrangement is to prevent the ashes and cinders from entering the heating tubes as by turning down the space a the ashes and cinders are deposited over the opening b so that they may easily be removed by the slide c . The space a , is surrounded by a water space d , which communicates with the main body of the boiler by openings e , and the heat from the space a , is conducted through the heating tubes B' , back to the smoke chamber C which is situated directly over the fire box. It must be remarked that by thus employing the space a , the heating tubes are necessarily placed higher up than usual and the space for steam is therefore reduced. To make up for this deficiency I employ two domes E, E, inclosed in a common shell. The steam is conducted to the cylinders from the upper part of these domes by the steam pipes e', e' , and the exhaust steam is conducted from the cylinders through pipes o, o , to a chamber F, which is situated in the smoke chamber C.

The fire grate G in my boilers is constructed out of a series of tubes g, g , which are inclined in a longitudinal direction as clearly represented in Fig. 2, and which screw into a central pipe f which is bent as represented in Figs. 3 and 7, its lowest part being in the middle. The pipe f as well as the tubes g , communicate with the water space surrounding the fire box and the manner in which these tubes are connected is represented in Fig. 8. Short pieces of pipe i , are screwed into the sides of the fire box, and the tubes g, g , are screwed into the central pipe f , each being provided with a nut h , which unites the same with the pipes i . The water running through the tubes g , and the pipe f , protects the same against being burned and the object of inclining the tubes g , toward the inner end, and of bending the pipe f down in the middle to those places where the fire is hottest in the fire box is to cause

the hot water from the lower points of these tubes to rise up so that it is replaced by colder water from the higher parts of the boiler, so that these tubes will never become
5 overheated.

The ashbox, which is represented in Figs. 10 and 11, is situated under the fire grate as usual and its bottom is formed by the feed pipe *g*, which forms several bends, the
10 spaces between the bends being filled up by roof shaped plates *r*, which are connected by crossbars *s*; and cranks *t* turning on rods *t'*, are attached to the cross-bars *s*, so that by an arrangement of levers *s'*, *s'*, *s'* the
15 plates *r*, may be actuated and the cranks *f* are so arranged that by moving the cross-bars *s*, toward the front of the ashbox they are caused to rise so that the plates *r*, assume a position represented in Fig. 11, and ample
20 room is left for the ashes to escape. By thus employing the feed pipe to serve as

bottom of the ash box, the feed water is heated by the hot ashes, the heat of which is generally lost altogether.

Having thus described my improvements, 25 what I claim as new and want to secure by Letters Patent is:

Arranging the feed pipe *g*, in such a manner under the fire box, that the same in combination with plates *r*, placed between 30 the bends of the feed pipe constitutes the bottom of the ash box, so that the feed water running through the pipe *g*, is heated by the ashes, said plates *r*, being so arranged that they can be raised and actuated by cranks *t*, 35 and levers *s'*, so as to leave room for the ashes to escape, the whole being arranged and constructed substantially as described.

C. J. C. PETERSEN.

Witnesses:

C. W. BEIDERBECKE,
CHAS. DELFS.