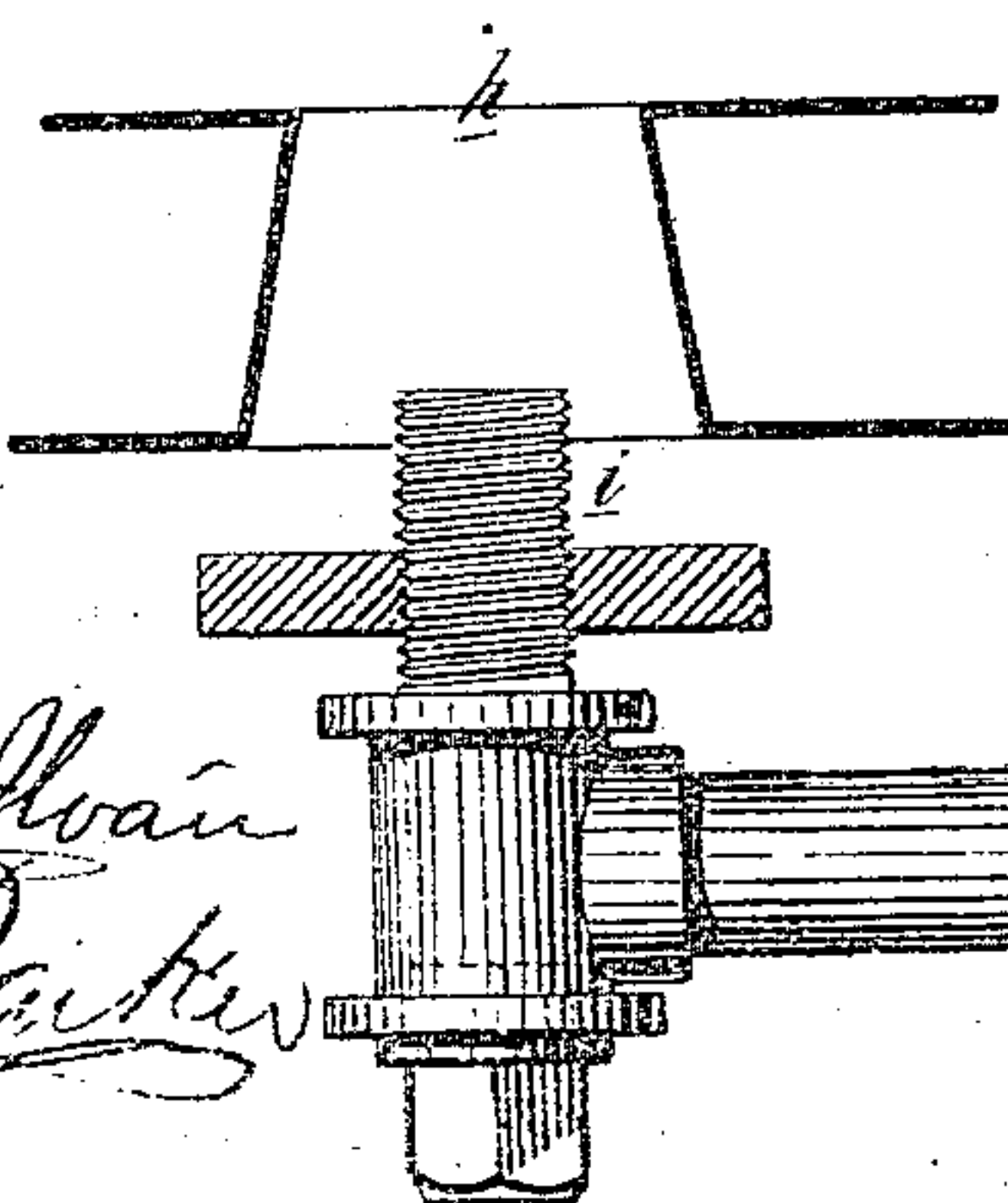
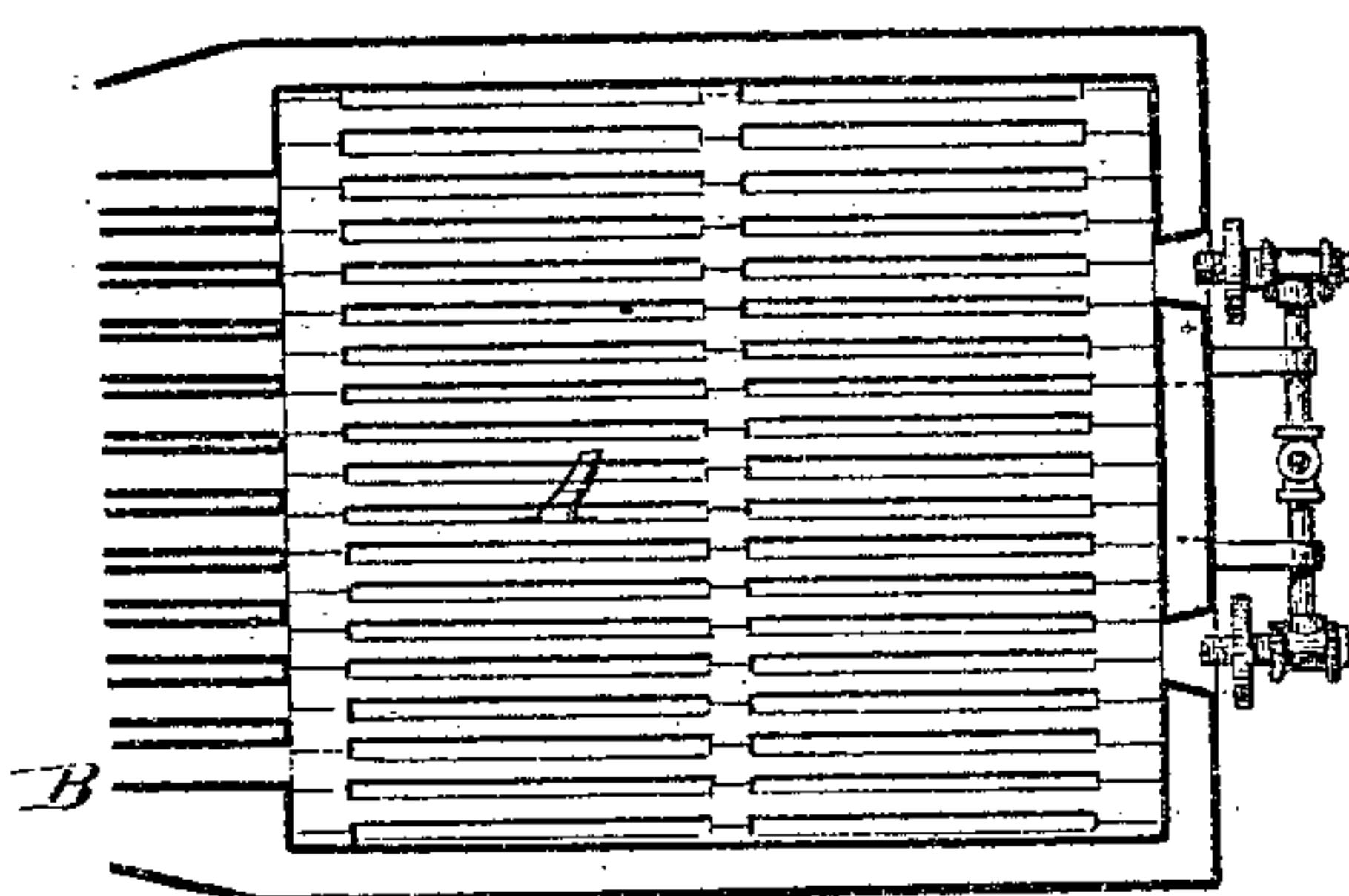
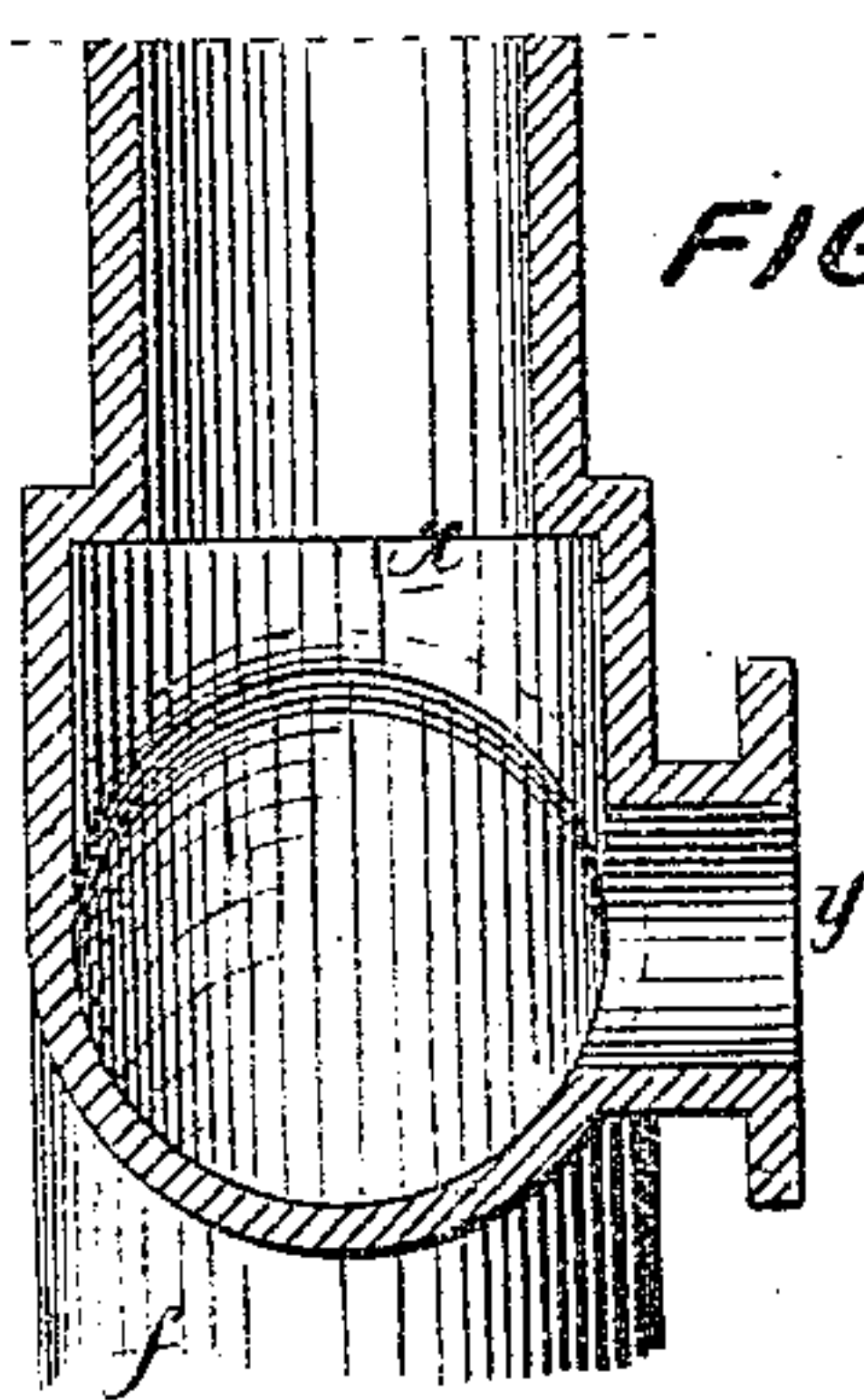
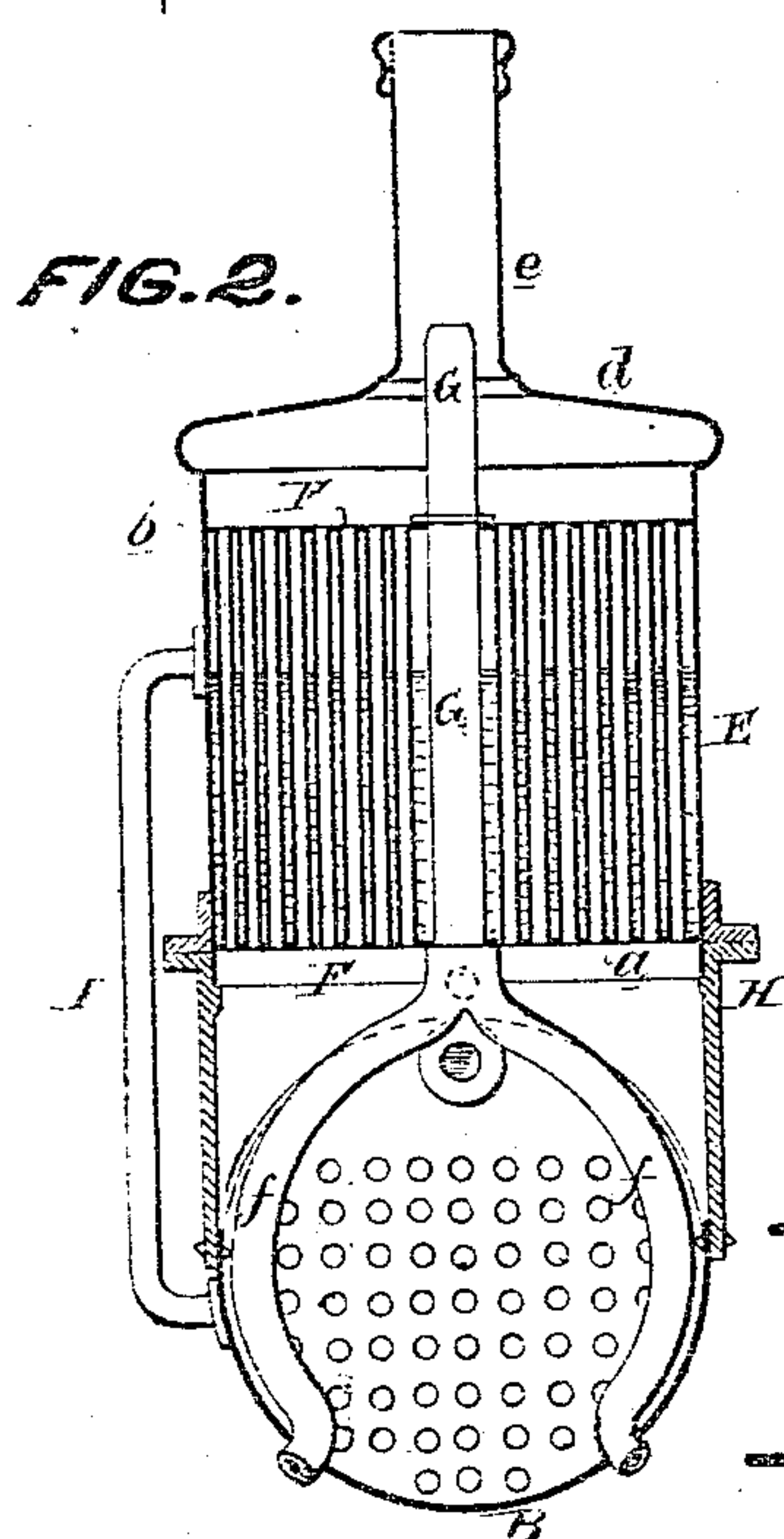
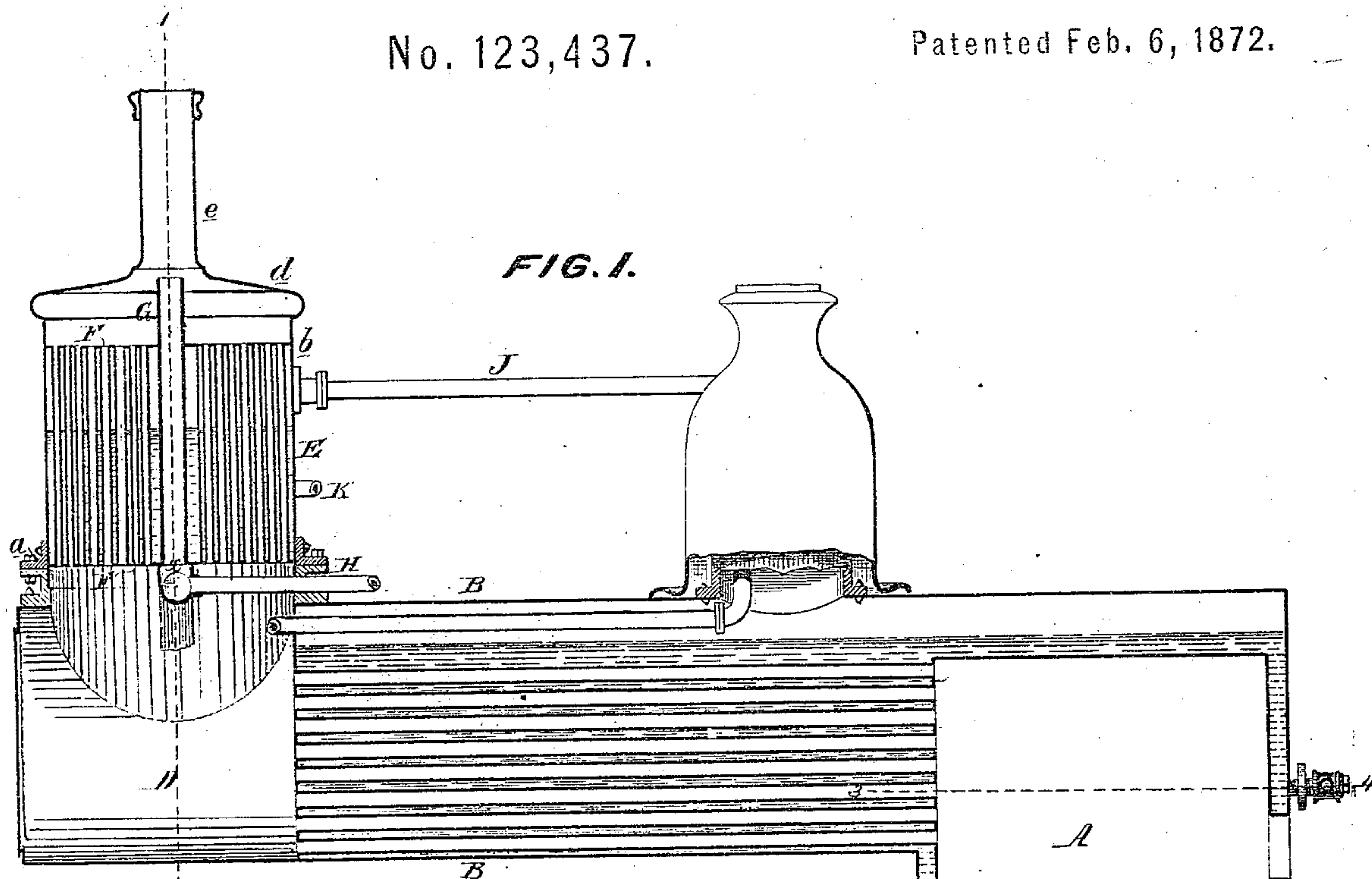


HENRY W. ADAMS.

## Improvement in Steam Boilers.

No. 123,437.

Patented Feb. 6, 1872.



**WITNESSES**

Phos. McLean  
John Parker

J. M. Adams  
By his Atty.  
H. W. Adams



# UNITED STATES PATENT OFFICE.

HENRY W. ADAMS, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. 123,437, dated February 6, 1872.

Specification describing Improvements in Steam-Boilers, invented by HENRY W. ADAMS, of the city and county of Philadelphia and State of Pennsylvania.

### *Improvement in Locomotive-Boilers.*

My invention consists of the combination, described hereafter, with a locomotive-boiler or with any boiler having horizontal flues or tubes, of a supplementary steam-generator for increasing the steam-generating capacity of the boiler; also, in devices for facilitating the employment of a portion of the exhaust steam for warming the water in the tank of the tender or other water-heater; the several features of my invention being too fully explained hereafter to need preliminary description.

Figure 1 is a vertical section of my improved boiler; Fig. 2, a transverse vertical section on the line 1 2, Fig. 1; Fig. 3, a sectional plan of the fire-box on the line 3 4; and Figs. 4 and 5, detached views, drawn to an enlarged scale.

The fire-box A and tubular body B of the boiler are of the usual shape and construction, but the smoke-box D is somewhat longer than in ordinary boilers of this class. Immediately above this smoke-box and to the body B of the boiler is secured a vertical cylindrical shell, E, across which extend the tube-plates *a* and *b*, and to the opposite ends of the latter are secured a series of vertical tubes, F, as shown in the drawing. The shell E should be of sufficient diameter to admit so many of these tubes that their aggregate areas will be equal to that of the series of larger horizontal tubes or flues in the main body of the boiler. The cylindrical shell is mounted with a cap, *d*, having a central chimney, *e*, at or near the lower end of which terminates the upper end of the exhaust-pipe G, communicating with the exhaust-ports of the cylinders through branches *f f* in the usual manner. The exhaust-pipe G is slightly contracted at *x*, so that the upper portion is less in area than the combined areas of the branch pipes *f f*; hence, the passage of the exhaust steam will be somewhat retarded at this point, immediately below which is a branch, *y*, communicating through a pipe, H, with the water-tank of the tender, or other reservoir containing water. The free escape of the exhaust steam, therefore, is not impeded by throttling the pipe at *x*, for the pipe

H affords a sufficient channel for the escape of a portion of the exhaust steam which is impelled through the pipe G by the interruption in the pipe H, and which is utilized by causing it to warm the feed-water.

Water is fed into the shell E through a pipe, K, and overflows into the main boiler through a pipe, L. The shell E with its tubes, in fact, form a supplementary generator, the steam-space of which is connected with that of the main boiler through the medium of the pipe J. In front of the fire-box, and directly opposite the ends of the horizontal tubes of the main body of the boiler, I make two openings, *h*, and into each opening is projected a jet of live steam from a tube, *i'*, communicating with the steam-space of the boiler, the tube being less in diameter than the hole *h* in the fire-box, so that with the jet of steam a volume of air must be projected into the fire-box, and the combined air and steam serves the twofold purpose of increasing the heat derived from the products of combustion and of disintegrating, to a considerable extent, the particles of fuel which in ordinary locomotive-boilers are drawn through the tubes.

Although my invention is especially applicable to locomotive-boilers it may be applied to any boilers of a like class; such, for instance, as those used for portable engines.

I do not here claim the introduction of gas and air into the furnace, as described, as this will form the subject of another application for Letters Patent; but

I claim—

1. A steam-generator, consisting of the boiler B, the combustion-chamber D, and the boiler E, the latter communicating by a pipe or pipes with the boiler B, and having vertical flues communicating with the combustion-chamber, all substantially as described.

2. The combination of the subject-matter of the first claim, the chimney *e*, central exhaust-pipe G, extending from the combustion-chamber into the chimney and contracted at the part *x*, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

Witnesses: HENRY W. ADAMS.

WM. A. STEEL,

JOHN K. RUPERTUS.