

(No Model.)

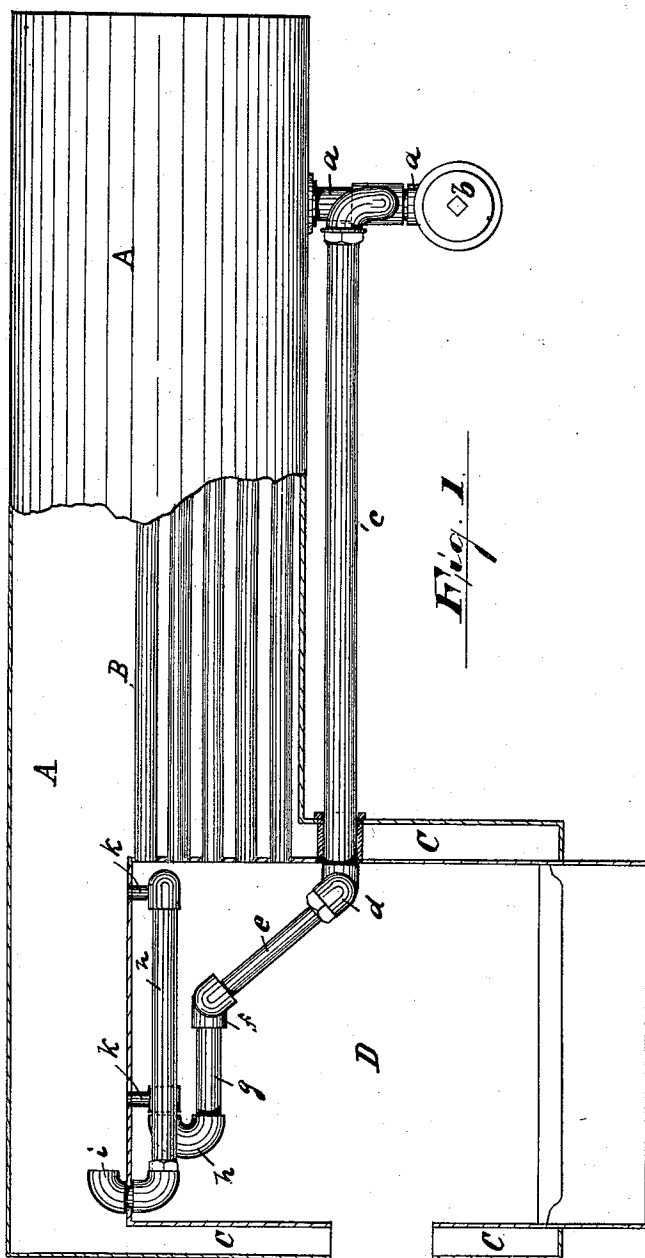
2 Sheets—Sheet 1.

J. A. ENO.

STEAM GENERATOR FOR LOCOMOTIVE BOILERS.

No. 466,274.

Patented Dec. 29, 1891.



WITNESSES:

W. D. Mell
E. L. Sherman

INVENTOR

Joseph A. Eno
BY
Gartner & Co.
ATTORNEYS

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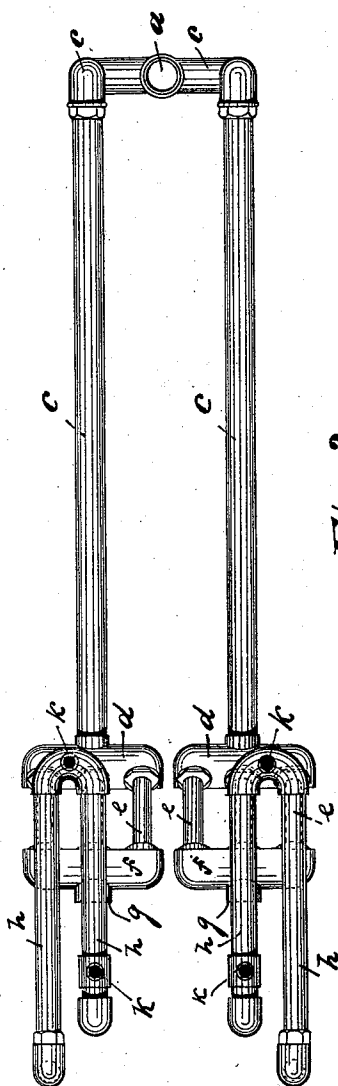


Fig. 2.

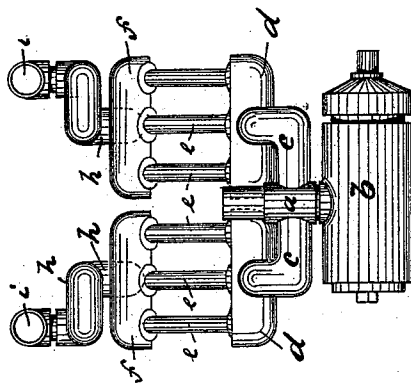


Fig. 4.

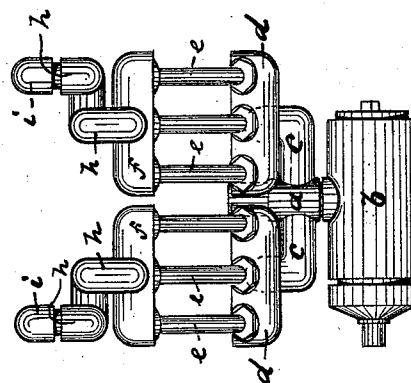


Fig. 3.

WITNESSES:

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UNITED STATES PATENT OFFICE.

JOSEPH A. ENO, OF NEWARK, NEW JERSEY, ASSIGNOR OF ONE-HALF TO
FRANCIS E. FITCH, OF ELMIRA, NEW YORK.

STEAM-GENERATOR FOR LOCOMOTIVE-BOILERS.

SPECIFICATION forming part of Letters Patent No. 466,274, dated December 29, 1891.

Application filed April 6, 1891. Serial No. 387,815. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. ENO, a citizen of the United States, residing at Newark, Essex county, and State of New Jersey, have
5 invented certain new and useful Improvements in Steam-Generators for Locomotive-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others
10 skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

15 This invention relates to steam-generators and water-circulators for boilers, and more especially to the class of locomotive-boilers; and its object is to provide an additional and effective steam-generator for boilers of this
20 class, whereby a perfect and complete circulation of the water is obtained, readily applied to or removed from a boiler, occupying small space, and adapted to prevent the formation or collection of sediment or foreign
25 deposits in the boiler.

The invention consists in the improved steam-generating device for locomotive-boilers and the combination and arrangement of the various parts thereof, substantially as
30 hereinafter more fully described, and finally embodied in the claims.

Referring to the accompanying drawings, in which like letters of reference indicate corresponding parts in each of the several figures, Figure 1 is a side elevation of a locomotive-boiler with my improved steam-generator
35 attached, the fire-box and a portion of the boiler being shown in section. Fig. 2 is a top plan view of the steam-generator disconnected from the boiler. Fig. 3 is a rear elevation, and Fig. 4 is a front elevation of the same.

40 In said drawings, A represents a locomotive-boiler with flues or tubes B.

The forward end of the boiler is constructed
45 in the usual manner with dependent water legs or chambers C, surrounding a fire-box D. Near the rear end of the boiler is secured a pipe *a*, connecting with the bottom of the boiler and provided at its lower end with a
50 mud-drum *b*. To this pipe *a* is connected one

or more feed-pipes *c*, extending under the boiler and forward to and through the rear water leg or chamber and into the fire-box, as shown in Fig. 1. To the forward end of the feed-pipe *c* is secured a header or cross-pipe
55 *d* within the fire-box and directly below the open ends of the flues or tubes B. To this header or cross-pipe *d* are secured a series of short generating-pipes *e*, extending upward and diagonally over the fire and directly in
60 front of the flues or tubes B. The upper ends of these generating-pipes *e* are connected with a header or cross-pipe *f*, in which is secured and extends horizontally forward therefrom
65 a generating-pipe *g*. To the forward end of the pipe *g* is secured one end of an upwardly-curved and horizontally-extending generating-pipe *h*. The other end of this pipe *h* is
70 turned upward and inward where it enters the boiler through the crown-sheet of the fire-box, as shown at *i*, Fig. 1. This pipe *h* extends rearward and returns horizontally before it enters the boiler, as shown in Fig. 2.

To firmly secure the pipe *h* to the crown-sheet, two or more combined stay and generator
75 pipes *k* are employed to support and hold the generator-pipe *h* in position, and at the same time furnish additional inlets through the crown-sheet to the boiler to aid in the complete circulation of the water. These
80 pipes *k* can be connected to the pipe *h* in any desired position to support it or as shown in Fig. 2.

I have shown the mud-drum and pipe connecting with the feed-pipe as at the forward
85 end of the locomotive; but such location can be changed when desired, according to arrangement and construction of the driving machinery under the boiler. I have also
90 shown an arrangement of two feed-pipes connected with the supply-pipe; but one or more feed-pipes can be employed when desired. The generating-pipes and their connections
95 should be so arranged in the fire-box that they shall receive the direct heat from the fire and the combustion of the gases before it passes into the boiler-flues.

In operation the water passes from the bottom of the boiler through the supply-pipe to the feed-pipes, which are thus kept constantly
100

full of water. This water then passes into the generating-pipes, where it is quickly heated, and, being partly converted into steam, passes into the boiler and is at once replaced
 5 by water from the feed-pipes, thus creating a continuous and complete circulation. All scale and sediment will descend into the mud-drum, where it can be blown off or removed in any desired manner.

10 Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A water-circulator and steam-generator for locomotive-boilers, combining therein a
 15 supply-pipe connected with the bottom of the boiler, a mud-drum attached thereto, a feed-pipe under the boiler and connected with said supply-pipe, and a series of generating-pipes connected with said feed-pipe at the water-
 20 leg and arranged on an incline within the fire-box, said generating-pipes being connected at the other end with a circulating-pipe connected with the crown-sheet of the fire-box, all said parts being arranged and adapted to
 25 operate substantially as described, and for the purposes set forth.

2. In a water-circulator and steam-generator for locomotive-boilers, a series of generating-pipes arranged diagonally and horizontally
 30 within the fire-box and connected at their upper or forward ends with the boiler, the lower or rear ends of said generating-pipes being secured to a feed-pipe connected with the rear of the boiler, substantially as described and set forth.

3. In a water-circulator and steam-generator for locomotive-boilers, the combination,
 with the boiler, of a vertical supply-pipe connected with the bottom of the boiler, one or
 40 more horizontal feed-pipes connected with said supply-pipe, a series of inclined generator-pipes connected with said feed-pipe, and a pipe-coil connecting said series of generat-

ing-pipes with the crown-sheet of the boiler, substantially as described and set forth. 45

4. In a water-circulator and steam-generator for locomotive-boilers, a continuous-feed
 pipe extending from the bottom of the boiler to and through the water-leg and within the
 fire-box and arranged under and parallel with
 50 the boiler and adapted to connect the boiler with the generating-pipes, and a pipe-coil parallel with the crown-sheet and inside of the fire-box, said pipe-coil being adapted to
 connect the generating-pipes with the front
 55 part of the boiler, substantially as described and set forth.

5. In a water-circulator and steam-generator for locomotive-boilers, combined stay and
 generator pipes *k*, adapted to support the gener-
 60 ating mechanism on the crown-sheet, said generating mechanism consisting of a series of pipes arranged on an incline with the fire-box and a pipe-coil arranged horizontally and
 parallel with the crown-sheet, and provided
 65 with openings connecting said generating mechanism with the boiler, substantially as described and set forth.

6. In a water-circulator and steam-generator for locomotive-boilers, the combination,
 70 with a supply-pipe connected to the boiler, a horizontal feed-pipe, and the generating mechanism consisting of a series of pipes arranged on an incline with the fire-box and a pipe-coil
 arranged horizontally and parallel with the
 75 crown-sheet, of a mud-drum connected to said supply-pipe below the connection with the generating mechanism, substantially as described and set forth.

In testimony that I claim the foregoing I
 80 have hereunto set my hand this 28th day of March, 1891.

JOSEPH A. ENO.

Witnesses:

E. L. SHERMAN,
 ALFRED GARTNER.