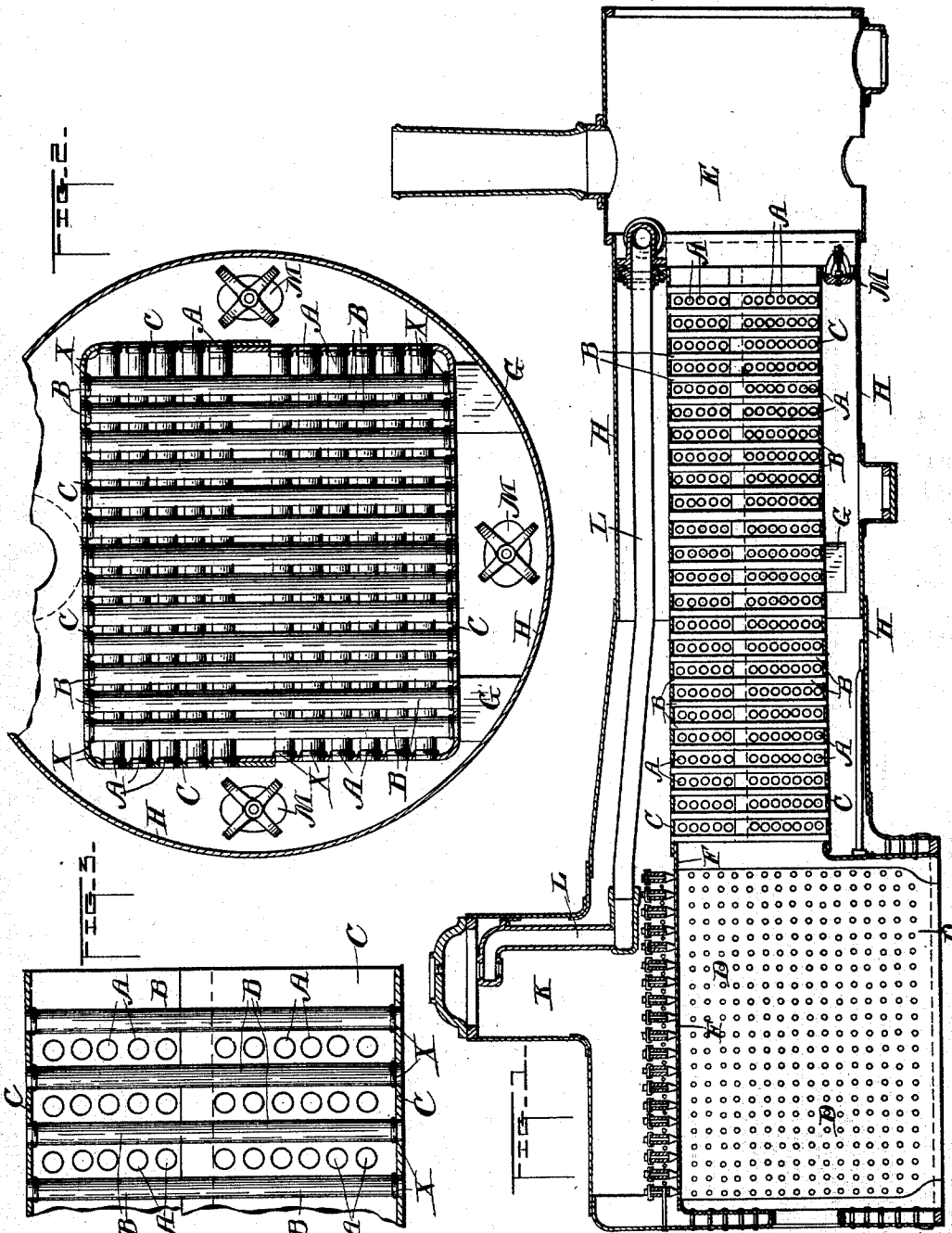


(No Model.)

G. J. PERKINS.
LOCOMOTIVE STEAM BOILER.

No. 483,473.

Patented Sept. 27, 1892.



Witnesses

Everaunce
J. M. Watkins

Inventor

George J. Perkins
By *John Wedderburn*
Attorney

UNITED STATES PATENT OFFICE.

GEORGE J. PERKINS, OF TRUCKEE, CALIFORNIA.

LOCOMOTIVE STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 483,473, dated September 27, 1892.

Application filed May 19, 1892. Serial No. 433,502. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. PERKINS, of Truckee, in the county of Nevada and State of California, have invented certain new and useful Improvements in Water-Tube 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 skilled in the art to which it appertains to make and use the same.

My invention relates to steam-boilers for locomotive-engines; and its object is to provide a steam-boiler which shall contain a relatively-large extent of heating-surface economically disposed for the absorption of heat, reduce to a minimum the deposition of sediment, contain increased facilities for the removal of such sediment, reduce the expansion and contraction in its parts due to the changes of temperature, thereby lengthening its life, materially increase the efficiency of the engine by reducing the back-pressure in the cylinders, and increasing the weight of the engine, and effect considerable reduction in the consumption of fuel over locomotive-boilers at present in use on account of the increased quantity and superior quality of the heating-surface. I attain these results by the novel arrangement, construction, and combination of parts hereinafter specified, and set forth in the claims.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of a locomotive-engine, showing my improved steam-boiler in position. Fig. 2 is a cross-sectional view, on an enlarged scale, taken on the line 2 2 of Fig. 1; and Fig. 3 represents a part of Fig. 1 on an enlarged scale to show more clearly the horizontal and vertical water-tubes.

In my improved form of boiler the transverse horizontal water-tubes A and vertical water-tubes B terminate in an inner casing or tube-sheet C, approximately square in cross-section but with rounded edges. The water-tubes are formed near their extremities with beads X, which act as shoulders to support or stay the tube-sheets, and resist the collapse of the same due to the steam and water pressure between the inner and outer casings.

As plainly shown in Fig. 2, the casing C is preferably made of two sheets having their sides bent round to meet and riveted together in two horizontal longitudinal seams. The tube-sheet C extends from the fire-box D to the smoke-arch E. The top of the tube-sheet is continuous and on the same level with the crown-sheet F of the fire-box. This I consider an important part of my invention, as the crown-sheet is the most efficient heating-surface in a locomotive-engine, so that by extending this crown-sheet as far as the smoke-arch I provide an increase of heating-surface of a very superior efficiency.

The inner casing C, carrying the water-tubes, is supported by blocks G, which rest upon the outer casing H of the boiler.

I am water and steam spaces surrounding the tube-sheet and fire-box, and K and L the usual steam-dome and steam-pipe leading therefrom. In the forward end of the boiler I place three manholes M, as shown in Fig. 2, giving ready access to the water-tubes underneath and at the sides of the casing to do any necessary repairing or cleaning out of incrustation or sediment, and by removing the dome-cap the upper surface may be approached when required for like purposes. It will be seen that by the above arrangement of transverse horizontal and vertical water-tubes I obtain a much larger extent of heating-surface than has hitherto been obtained in locomotive-engines, allowing a material increase in size of the steam-exhaust, thereby reducing the back-pressure and increasing the efficiency of the engine. The action of the fire in my design in passing through between the tubes and coming in contact with and passing around each one separately enables me to thoroughly utilize the fire and consume the gases before they reach the smoke-stack, whereas in the ordinary boiler they pass directly the fire-tubes, and a large percentage of the heat escapes through the stack without being utilized. Again, these tubes being short in comparison with the longitudinal tubes hitherto used, the expansion and contraction of the tubes due to changes of temperature is proportionately reduced and the life of the boiler lengthened.

Another advantage attained by my con-

struction of boiler is that more than half of the tubes being vertical there is much less deposition of sediment than when all the tubes are horizontal. It will be observed that
5 by making the edges of the tube-sheet rounded I am enabled to use a larger tube-sheet or inner casing in proportion to the size of the outer casing.

On account of the additional weight which
10 I obtain both from the increase of the tube-surface and also from the four sides of the tube-sheet the tractive power of the engine is materially increased—an advantage which is greatly needed in the ordinary locomotive-
15 engine.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

In a locomotive steam-engine, the combination, with the fire-box, of a tube-sheet made
20 of two overlapping sheets of metal, said tube-

sheets being approximately square in cross-section, with rounded corners, having its upper surface a continuation of the crown-sheet of said fire-box, and therefore on a level with
25 same, and communicating at one end with the fire-box and at the other end with the smoke-arch, water-tubes arranged transversely thereto, and an end wall or sheet at the forward end of the boiler, said end sheet
30 being provided with manholes and said water-tubes being provided near their extremities with heads, substantially as and for the purpose set forth.

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

GEORGE J. PERKINS.

Witnesses:

C. W. LUKINS,
W. F. BROWN.