

(No Model.)

S. H. BENSON.
STEAM BOILER.

No. 457,103.

Patented Aug. 4, 1891.

Fig. 1.

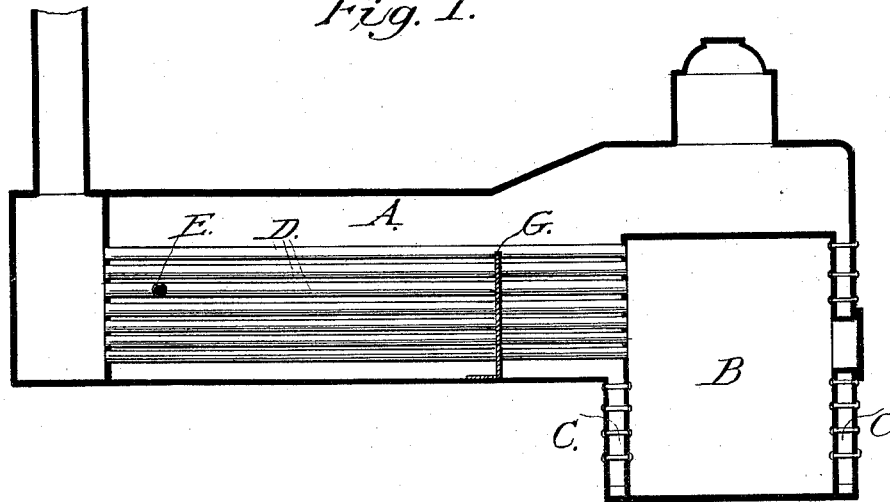


Fig. 2.

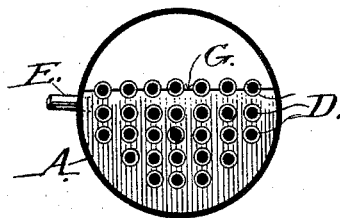
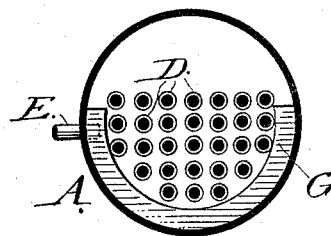


Fig. 3.



WITNESSES

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SAMUEL H. BENSON, OF SAN FRANCISCO, CALIFORNIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 457,103, dated August 4, 1891.

Application filed December 19, 1890. Serial No. 375,236. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL H. BENSON, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Steam-Boilers, and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in steam-boilers; and its object is to provide a means for preventing the cold water, when first introduced into the boiler, from coming in contact with the highly-heated parts of the fire-box and stay-bolts, whereby the latter are loosened and destroyed and the boiler caused to leak.

My invention consists of the constructions and combinations of devices which I shall hereinafter fully describe and claim.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a longitudinal vertical section showing the arrangement of my device. Fig. 2 is a transverse section taken just behind the division-plate. Fig. 3 is a modification of the plate.

A is a boiler of the locomotive tubular style, having a fire-box B, with the usual surrounding water-space C, and the tubes D, extending from the fire-box to the smoke-box at the front end of the boiler.

Water, when supplied to the boiler, is usually delivered through pipes or passages which open into the boiler, by preference near the front end, as shown at E. It is well known that the colder water will sink to the bottom of a boiler and that which is more highly heated will rise to the top. Consequently this cold water has a tendency to flow down along the sides to the bottom of the shell, and by reason of the more violent ebullition in the spaces around the fire-box the rising of the heated water tends to produce a current along the bottom of the shell, so that this cold water will immediately flow to the fire-box and pass into the water-legs before it becomes very much heated. The result of this will be to cool the walls of the fire-box and the stay-bolts, causing considerable contraction and expansion, which soon causes leaks around the stay-bolts and the walls of the fire-box to crack. To prevent this I employ a diaphragm or partition G, which is fixed across the shell of the boiler at some suitable point between the inlet-opening and the fire-box. This partition

may extend upward from the bottom of the boiler to any suitable or desired height. It may extend nearly or quite to the upper row of tubes, being perforated, so that the tubes can pass through it, or it may consist simply of an annular semicircular disk, as shown in Fig. 3, extending upward from the bottom and sides of the boiler sufficiently to prevent a current of water flowing directly along the bottom of the shell, but not high enough to prevent a free and rapid circulation of the water between the tubes.

The plate or diaphragm G in no case extends above the upper row of tubes, thus leaving several inches of water in depth above its upper edge and a clear space above the surface of the top tubes for the return of the water in its circulation. This enables the water to flow into the water-legs about the fire-box with sufficient rapidity without allowing the movement from the inlet to be too direct. The diaphragm or plate is of sufficient height to give an upward turn to the water as it flows back, and by the time it has passed over the top it is warm enough to pass into the water-legs without injury to the plates or stay-bolts by undue cooling.

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

1. In a horizontal boiler, a fire-box at one end, with surrounding water-legs, a feed-water inlet near the opposite end, and an annular plate or disk fixed across the boiler between the fire-box and feed-water inlet, having its upper edge below the upper surface of the tubes and perforated for the passage of the tubes across the line of which it extends, substantially as herein described.

2. A horizontal boiler having a fire-box at one end, with surrounding water-spaces, tubes extending from the fire-box to the front end of the boiler, a feed-water inlet near the front of the boiler, and an annular plate or disk extending across the lower part of the boiler between the feed-inlet and the fire-box and below the upper surface of the tubes, substantially as herein described.

In witness whereof I have hereunto set my hand.

SAMUEL H. BENSON.

Witnesses:

WALTER COTTON,
CHAS. BYSTROM.