

E. S. MILLS.

Improvement in Steam-Boilers.

No. 132,095.

Patented Oct. 8, 1872.

Fig. 1.

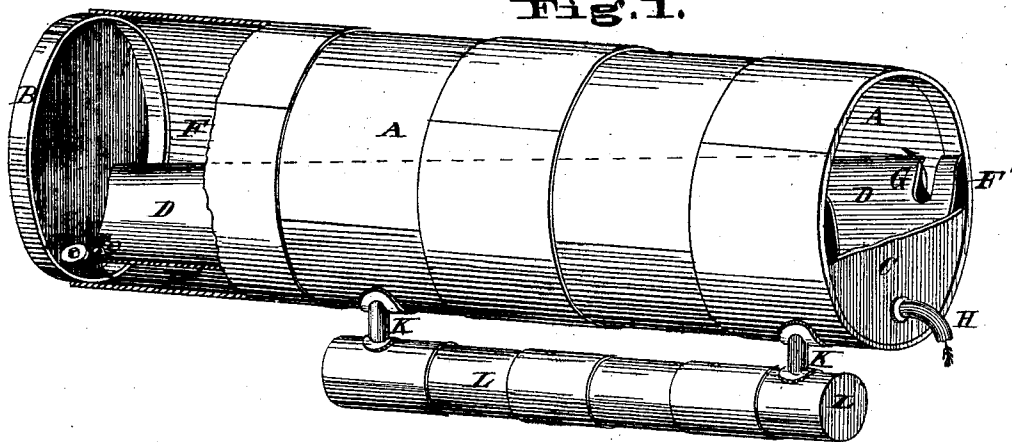


Fig. 2.

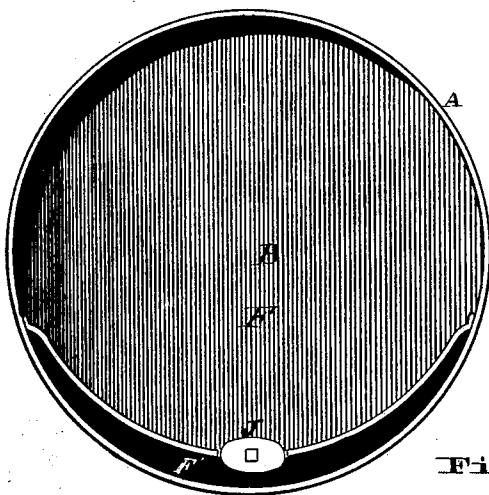


Fig. 3.

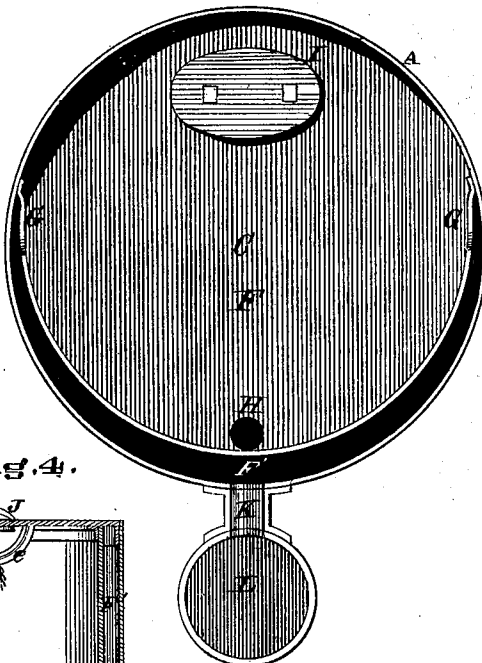
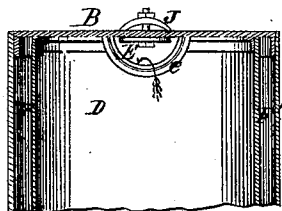


Fig. 4.



Scale of Sections 1"-1"
inches

ATTEST,
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UNITED STATES PATENT OFFICE.

EDWARD S. MILLS, OF MANKATO, MINNESOTA.

IMPROVEMENT IN STEAM-BOILERS.

Specification forming part of Letters Patent No. 132,095, dated October 8, 1872.

To all whom it may concern:

Be it known that I, EDWARD S. MILLS, of Mankato, in the county of Blue Earth and State of Minnesota, have invented a certain Improvement in Steam-Boilers, of which the following is a specification:

My invention relates to a diaphragm that may be nearly concentric with the lower part of the boiler, said diaphragm having an orifice at the bottom at one end of the downward passage of the water, and orifices at the upper edges at the other end for the upward passage of the heated water and the steam. The descending opening has an upwardly-extending marginal flange to keep back the sediment. The feed-pipe extends through the rear end just above the diaphragm, so that the water will become gradually heated in its passage forward and deposit its sediment upon the upper side of the diaphragm before reaching the descending orifice at the front end. The mid-height of the hand-hole is level with the lower part of the diaphragm, and connects with the descending orifice, so that said hand-hole communicates with both the upper and lower chamber of the boiler.

Figure 1 is a perspective view of the boiler, a part of the rear head and part of the side at the front end being broken away to show the interior. Fig. 2 is a transverse section through the descending orifice. Fig. 3 is a transverse section through the ascending orifices. Fig. 4 is a longitudinal section of a portion of the front end looking downward, the scale being reduced.

A is the cylindrical part of a horizontal steam-boiler, having a front end, B, and a rear end, C. D is a diaphragm that may be in the main nearly or quite concentric with the lower part of the shell. This diaphragm has, at its front end, a segmental opening, E, through which the water descends from the chamber F above the diaphragm to the chamber F' beneath it. The sides of the diaphragm should have an upward inclination toward the rear end. G are openings through the highest parts of the diaphragm for the escape of water and steam from the chamber F'. H is the water feed-pipe leading into the upper chamber F at the rear end, and immediately above the lowest part of the diaphragm. I is the man-hole. J is the hand-hole, whose mid-height corresponds with the lowest part of the diaphragm, and whose position corresponds with that of the

descending opening E, so that both the main chamber F and the lower chamber F' may be reached through the hand-hole. K are stand-pipes communicating with a mud-drum, L, for the collection of sediment. The descending opening E has an upwardly-extending flange, e, to cause the detention of sediment upon the diaphragm. This flange may have a flaring form. The opening E is in front of the hottest part of the bottom, so that the descent of the water will not be materially checked.

The water, in passing backward from the descending opening to the ascending opening G, scours along the bottom of the boiler, and prevents the deposition of sediment or formation of scale, the stand-pipes receiving sediment from the water. The rapid circulation of water causes the steam to form quickly, as my carefully-conducted experiments have fully demonstrated. In these experiments a plain boiler was placed over a flame, and the quantity of water evaporated in a certain time noted. A boiler having my diaphragm and the same quantity of water of equal temperature was placed over the same flame, and the evaporation found to be much more speedy. Any sediment deposited within the boiler would be upon the diaphragm, because of the circulation of the water being less rapid above than beneath the diaphragm and the feed-water becoming gradually heated in its forward passage. The deposit of sediment upon the diaphragm would have no bad effect, as no direct heat from the fire affects it, and consequently there would be no great hardening of the deposit; and it is undesirable for much heat to pass through the diaphragm.

My diaphragm may be associated with flues or tubes of any ordinary construction, as the diaphragm would be no impediment to their introduction. The circulation through the chamber F from end to end would tend to keep the water-surfaces inside the boiler clean.

I claim as my invention—

The transversely-curved diaphragm D, inclined as described, tightly secured at its edges to the shell of the boiler, and having descending and ascending openings E G, substantially as described.

EDWARD S. MILLS.

Witnesses:

GEO. H. BREWSTER,
JOHN N. HALL.