D. WHITLOCK.

FEED WATER HEATER FOR STEAM BOILERS.

No. 105,397. Patented July 12, 1870.

Fig. 1.

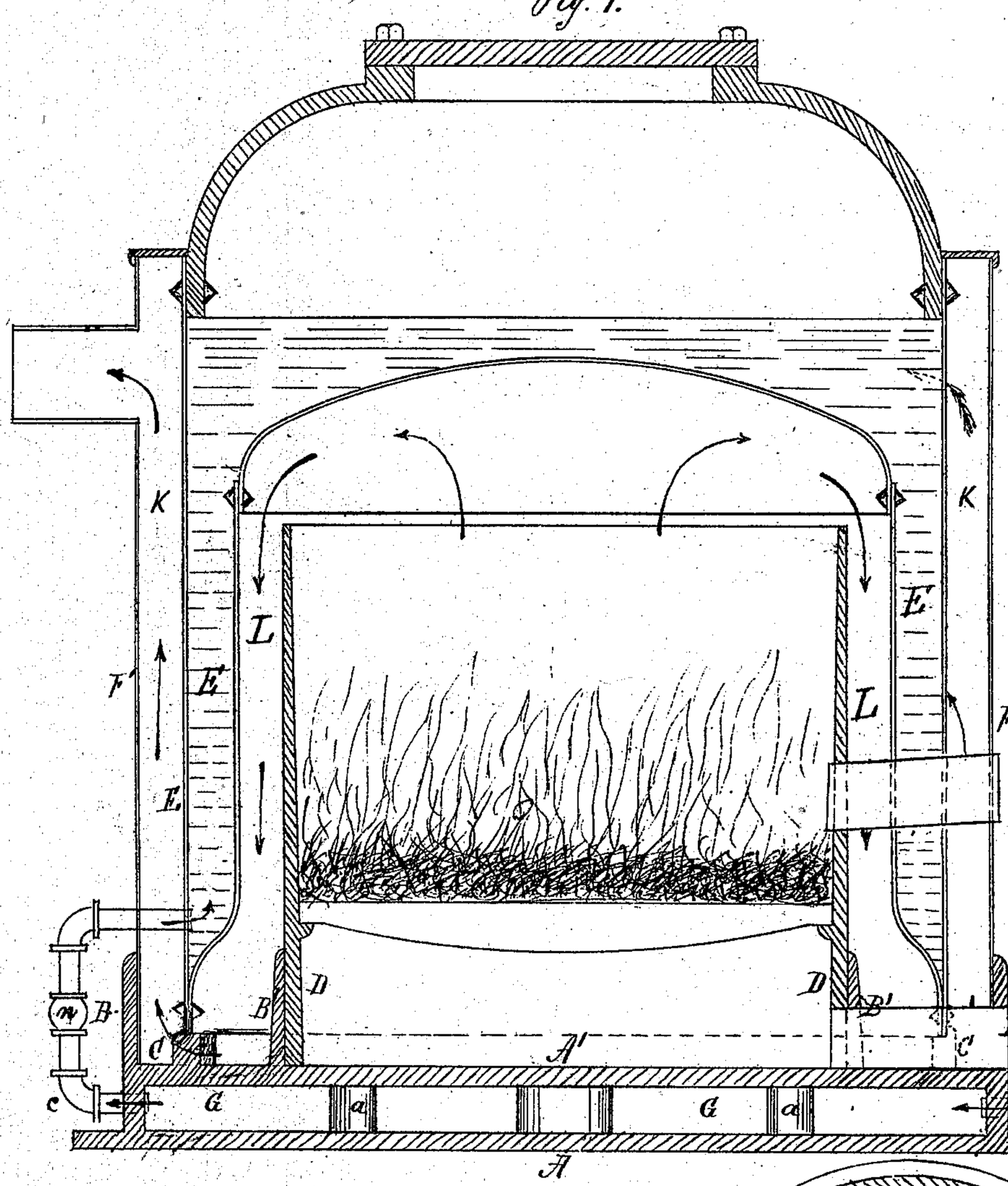


Fig. 3.

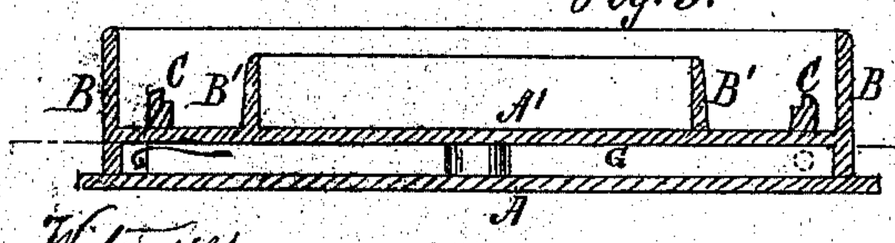
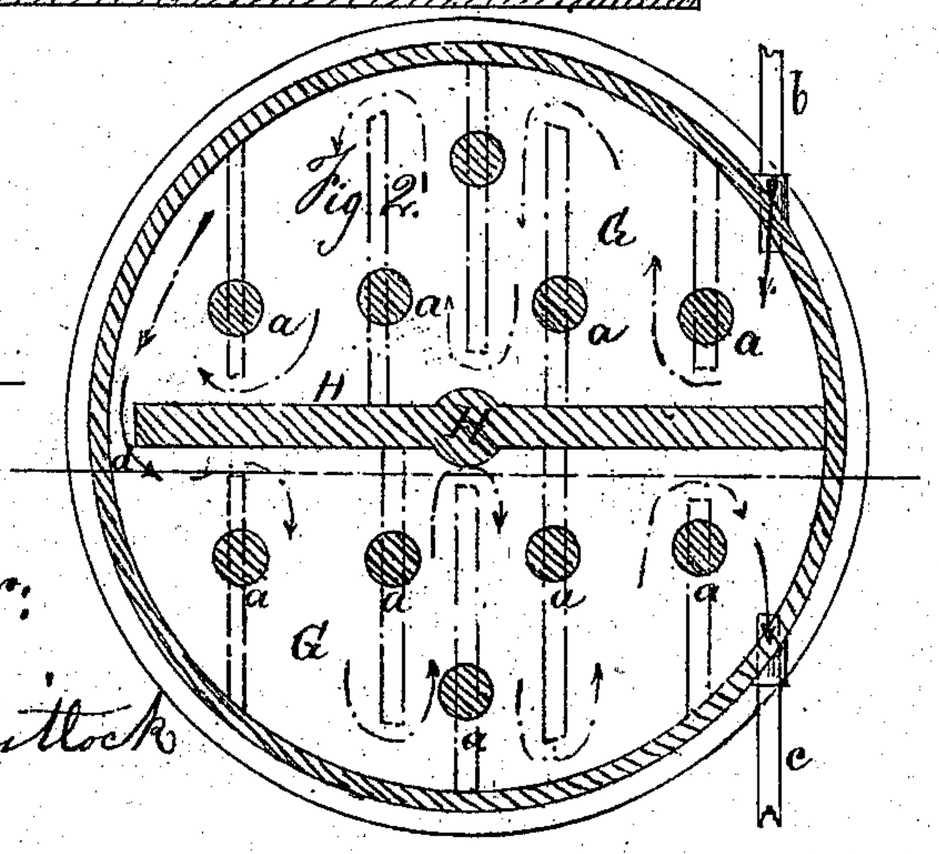


Fig. 2.



Witnesses

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DANIEL WHITLOCK, OF NEWARK, NEW JERSEY.

Letters Patent No. 105,397, *dated July* 12, 1870.

IMPROVEMENT IN FEED-WATER HEATERS FOR STEAM-BOILERS.

The Schedule referred to in these Letters Patent and making part of the same.

To whom it may concern:

Be it known that I, DANIEL WHITLOCK, of Newark, in the county of Essex, in the State of New Jersey, have invented certain Improvements in Bed-Plates of Steam-Engines and Boilers, of which the following is a specification.

In the drawing—

Figure 1 is an upright sectional view of a boiler, with the bed-plate;

Figure 2 is a top plan view of the upper side of the lower part of the bottom or bed-plate; and

Figure 3 is a reduced upright section of the bed-plate.

The object of this invention is to construct the bed-plate of steam-boilers so that there shall be a water-space therein, and with flanges and lugs that support the boiler, outside jacket, and fire-box, whereby flues are formed in such manner as that the products of combustion shall impinge upon and heat the water contained in such water-space in the bed-plate, thus utilizing the heat in its passage around the boiler, to heat the water in the water-space of the bed-plate before it is fed into the boiler.

A and A′ form a cast-metal bed or base-plate for the boiler, and has therein a water-space, G, and upright flanges B B′ and lugs or flanges C, which support the outside jacket F, boiler E, and fire-box D.

P is an opening for the admission of air to the furnace, to supply the combustion.

n is a check-valve in pipe *c*, for the purpose of closing the communication between the water-space G in the bed-plate and the boiler, and for regulating the amount of water passing from the water-space G into boiler E.

In the water-space G of the bed-plate are supports *a a*, and a central partition-plate, H; also, apertures for the insertion of inlet-pipe *b* and outlet-pipe *c*.

The top A′ of the base-plate forms the bottom of the ash-box, where cinders and hot ashes are continually falling, whenever the fire is burning in the fire-box.

The products of combustion, in leaving the fire-chamber, impinge against the under side of the arch of the boiler, and are then deflected down the annular flue L, in contact with the inside of the boiler, to the top A′ of the base-plate, when they rise through annular flue K, in contact with the outside of the boiler, and between the boiler and jacket to the exit-pipe.

By this process the top A′ becomes highly heated, and thereby heats the water in space G, nearly to the temperature of the water in the boiler E, thus requiring but little additional heat in the boiler to form working steam beneath it, as there is nothing but the water to communicate heat thereto.

The water-space G is always full of water, and the water is continually moving, when the engine-pump is in motion, because the water which supplies the boiler has to pass through the space G, before it can enter into the boiler E, by the mode of forcing the water through pipes *b* and *c* into the boiler through space G.

This space is so much larger than the exit-pipe *c*, that the water circulates slowly through it, and it is purposely so constructed that the water must circulate to all parts of the space before it finally makes its exit through pipe *c*, as the supports *a* and partition-plate H are so placed in space G, with relation to pipes *b* and *c*, that the water cannot pass directly from pipe *b* to pipe *c*, but must pass around the supports *a* and the extreme end of partition H, at opening *d*, before it can approach exit-pipe *c*, which causes the water, in passing through the space G, to come in contact with all parts of the inside of the bed-plate before leaving it, and by such contact the water becomes heated before it enters the boiler, and thus utilizes the heat, to heat the water that would otherwise be lost in heating the bottom-plate, and, at the same time, the water in space G acts as a protection against communicating fire from an overheated bed-plate.

The supports within space G of the bed-plate A A′ can be constructed in a variety of ways, in order to prolong the time of passing the water through the space, as such supports may be partitions, as shown in broken lines in fig. 2, which will cause the water to pass alternately from the division-partition H to the outside of the space around the end of a partition, and then return again to the center division-plate, and so continue until it passes the end of partition H, and traverses the partitions again in a zig-zag course on the other side of the partition, to exit-pipe *c*.

I am aware that water-spaces have been used in the bed-plates of steam-boilers, previous to my invention, and I do not claim such water-space in the bed-plate of a steam-boiler, but confine my claim to invention to the construction of the bed-plate, to accommodate and maintain the water-space therein, disclaiming any construction where the bed-plate is a part of the boiler.

Having thus described my invention,

What I claim, and wish to secure by Letters Patent, is—

1. The bed or base-plate A A′ of steam-boiler, when said base-plate is made with water-space G,

either with or without the partition H and supports *a a*, and having apertures for water-pipes *b* and *c*, flanges B B′, which form the support for the outside jacket F and fire-box D, lugs or flange C that support boiler E, and thereby forming the annular flues K and L, in the manner and for the purpose described.

2. The bed-plates of steam-boilers, when attached to the boiler E, boiler-jacket F, and fire-box D, in the manner above described, so that the products of combustion shall pass down flue L, and impinge upon the top A′ of the bed-plate, and rise in flue K, thereby heating the feed-water in space G, as herein described.

DANIEL WHITLOCK.

Witnesses:

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R. M. HARRISON.