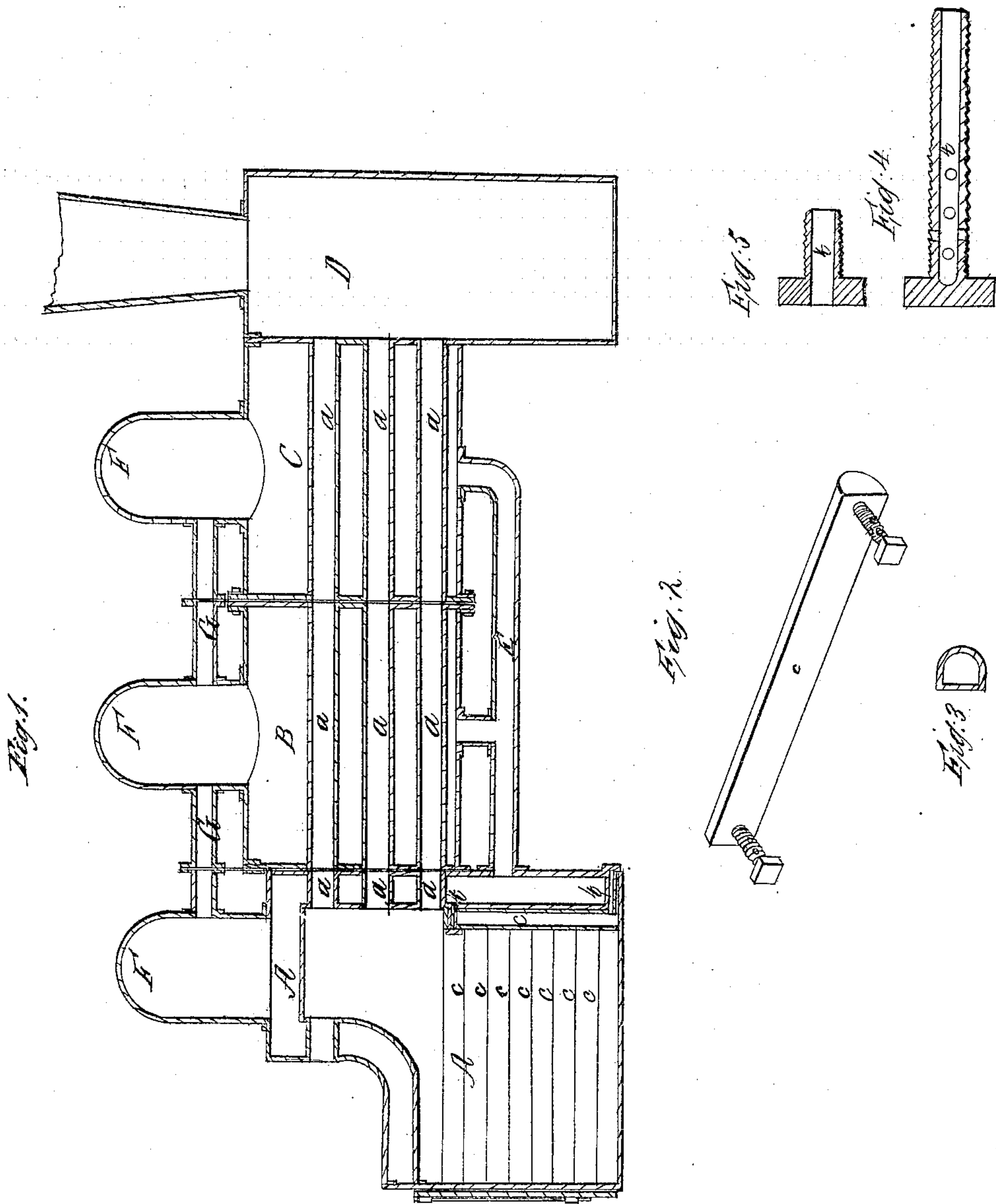


J. B. Collan,

Steam-Boiler Water-Tube.

N^o 10,103.

Patented Oct. 11, 1853.



UNITED STATES PATENT OFFICE.

JOHN B. COLLAN, OF READING, PENNSYLVANIA.

DETACHABLE LINING FOR THE FIRE-BOXES OF STEAM-BOILERS.

Specification forming part of Letters Patent No. 10,103, dated October 11, 1853.

To all whom it may concern:

Be it known that I, JOHN B. COLLAN, of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Locomotive and other Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 represents a vertical longitudinal section of a locomotive-boiler constructed according to the principles of my invention, and Figs. 2 and 3 are views of one of my D-shaped water-linings.

In locomotive-boilers, and particularly in those in which anthracite coal is used as a fuel, those portions of the boiler which are most directly exposed to the flame from the coal deteriorate much more rapidly than those portions on which the flame acts with less intensity; hence the former require frequent renewals before the strength of the latter is materially impaired. The parts of the boiler most liable to injury from this source are the fire-box and the flue-sheet, from which the flues pass which convey the flame to the smoke-box.

My invention is intended to facilitate the repair of boilers thus injured; and it consists in lining the interior of the fire-box with a series of contiguous tubular water-spaces, which are connected with the adjacent water-spaces of the boiler in such manner that the water can circulate through them and the steam escape, and so that they can be readily removed and replaced as occasion may require.

The boiler represented in the accompanying drawings is composed of three sections, each of which is a steam-tight vessel. The first section, A, contains the fire-box A', in which the fuel is burned. The flame generated by the burning fuel is conducted through tubular flues *a* to the smoke-box at the opposite extremity of the boiler. These flues are each made up of sections corresponding in number with the number of sections of which the boiler is composed. As the plates of the fire-box, and particularly that portion of it from which the flues start, is more exposed to the flame than the remaining portions of the boiler, those portions of the tubular flues

which are in this section of the boiler are short, as shown at *a'*. The next section, B, of the boiler is cylindrical, and contains tubular flues, corresponding in number and positions with those of the first section, so that the flame passing through the flues of the first section shall pass on in unintercepted currents toward the smoke-box. The last section, C, contains the smoke-box D and a series of tubular flues, *a*, similar to those of the second section; hence when all the sections are secured to each other the flame from the fire-box passes in unbroken currents through the corresponding flues of the successive sections in the same manner as it would if passing through entire flues each of which was as long as the united lengths of the corresponding flues of the several sections.

In order to allow a free circulation of water, the several sections are connected at their lower sides with a water-pipe, E, and in order to allow the steam in each section to escape freely each is provided with a separate steam-dome, F, and all the domes are connected by steam-pipes G. In the example here represented the several sections are bolted directly to each other, and are not surrounded by a distinct exterior shell; but cases may arise where it will be expedient to insert a portion or the whole of the several sections in an exterior shell of sufficient size to contain them. To facilitate the cleansing and repair of the sections, the bottom of each may be provided with a man-hole which is fastened in the usual manner.

As those parts of the fire-box which are in contact with the burning fuel are corroded rapidly by the sulphur and other substances given off in burning, I line the interior of the fire-box with removable contiguous vessels *c*, which in this instance are D-shaped. These are of the form represented in perspective at Fig. 2, and each is connected with the adjacent water-space, in this case by means of tubular bolts *t*. These may be either inserted through the water-space and perforated at the side and one end, as shown at Fig. 4; or they may be tubular, as shown at Fig. 5, in which case they are inserted through openings which are made in the outer shell of the water-space, and which are closed by a screw-plug after the tubular bolts have been inserted. These

tubular bolts effect the twofold purpose of securing the D-shaped vessels to the boiler and of permitting a free circulation of water between them and the adjacent water-space and the escape of steam. As these vessels are independent of each other, any one can be removed and replaced without affecting the others. From their position in the fire-box they are exposed to an intense heat, which causes the water in them to ascend rapidly and pass out at the upper tubular bolts, while fresh portions of water are supplied through the lower tubular bolts. As these vessels cover and protect the water-space to which they are secured, the water in the latter is not exposed to so high a temperature as that in the vessels. Consequently the water in the water-space will descend as the heated water in the vessels ascends, and therefore a constant and rapid circulation is effected, which not only facilitates the production of steam, but also diminishes the liability of the vessels to burn out. By this improved arrangement the repairs of the fire-box are effected at a great saving of both time and expense.

The sectional lining can be made of tubes of any form that experience may determine

to be the best. The cylindrical tube would be the strongest; but the rectangular, and perhaps one having an oblong section, would be found on the whole the best.

Several tiers of short upright pipes may be substituted for the horizontal ones represented on the sides of the fire-box in the drawings, and the sections of the tubular portions of the boiler may be made of any desired length, and the steam may pass from one section to another directly, instead of passing into a dome, if the latter arrangement should not be deemed preferable.

What I claim as my invention, and desire to secure by Letters Patent, is—

The lining herein described for the sides and ends of fire-boxes of steam-boilers, consisting of a series of narrow tubes which are connected with the adjacent water-space by means of hollow bolts or their equivalent, substantially as herein set forth.

In testimony whereof I have hereunto subscribed my name.

JOHN B. COLLAN.

Witnesses:

P. H. WATSON,
CLEM. F. STULL.