W. H. RUSHFORTH.

Fire-Boxes for Locomotives.

No. 223,863. Patented Jan. 27, 1880.

FIG. 1.

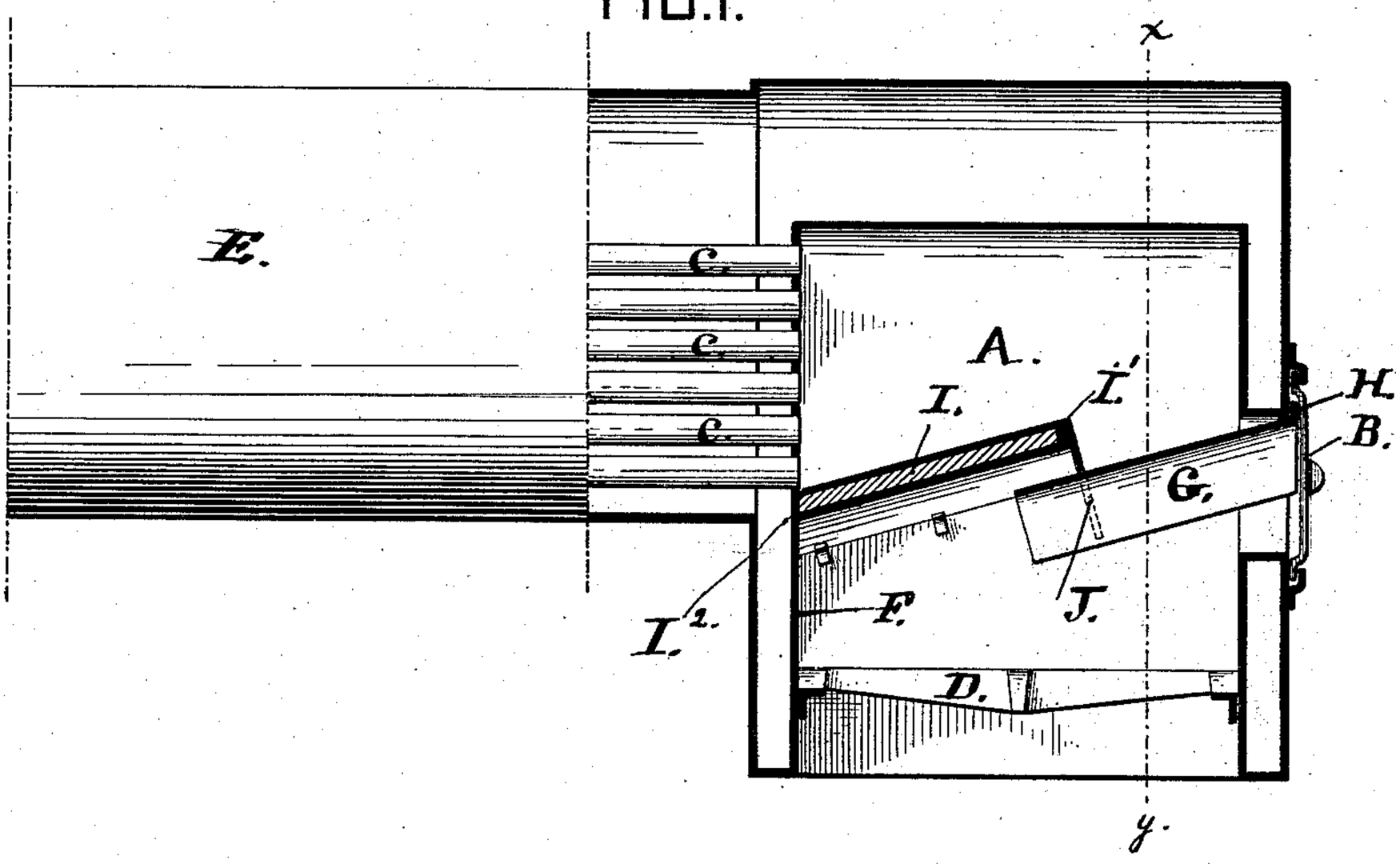
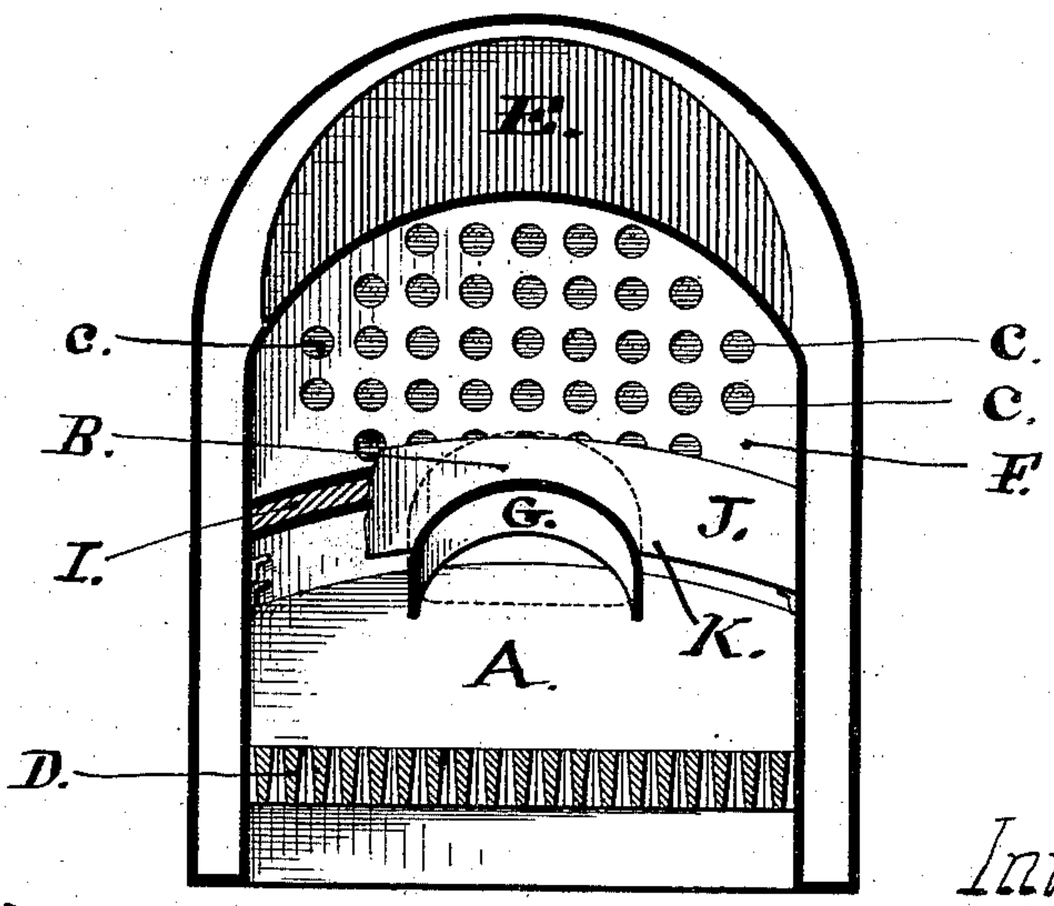


FIG. 2.



Attest,

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UNITED STATES PATENT OFFICE.

WILLIAM H. RUSHFORTH, OF YORKSHIRE, ENGLAND, ASSIGNOR OF ONE-FOURTH OF HIS RIGHT TO JAMES KNIGHT STREET, OF CAMDEN, N. J.

FIRE-BOX FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 223,863, dated January 27, 1880.

Application filed November 6, 1879.

To all whom it may concern:

Be it known that I, WILLIAM HENRY RUSHFORTH, of Yorkshire, England, have invented a new and useful Improvement in Fire-Boxes for Locomotives, of which the following is a full specification, and sufficient to enable those skilled in the art to which my invention appertains to make and use the same.

In the drawings, Figure 1 is a vertical central longitudinal section through the fire-box and boiler, and Fig. 2 is a vertical cross-section upon the line *x y* of Fig. 1.

The object of my invention is to provide such a construction of fire-box as will insure a more perfect combustion of fuel and prevent the escape of sparks and smoke from the smoke-stack, and also enable the engine to be operated with the door of the fire-box open without the possibility of the cold air coming in contact with the boiler-flues.

My invention consists in providing within the fire-box diaphragms so arranged as to deflect the draft which comes from the fire-box door upon the fire on the grate, and subsequently allow the gaseous products of combustion and the solid matter therein contained to pass under and around said diaphragms, with the result that the smoke and solid fuel held therein in suspension are to a great degree consumed before entering the boiler-flues.

In the drawings, A is the fire-box; B, the fire-box-door hole; C C C, the boiler-flues; D, the fire-box grate; E, the boiler, and F the flue or tube plate.

G is an adjustable arched diaphragm or draft-plate fitted around the periphery of the door, and extending at an angle downward from the door and into the fire-box to the vicinity of the middle of said fire-box. This draft-plate, in the present instance, is provided with a flange, H, which, when the draft-plate is in position in the fire-box, catches against the outside of the front of the fire-box, and thus supports said draft-plate. It may, however, be supported in any other suitable manner. It is portable and may be removed at pleasure.

I is an arched diaphragm or combustion-arch, extending from side to side of the fire-box, and springing from the flue-plate F on a line, I^2, below the tubes C C C, and rising at an angle from said line toward the fire-box door to a point, I′, above and over the draft-plate G, in such manner that a draft-space is left between the under surface of the arch I and the upper surface of the draft-plate G.

The combustion-arch I is provided with a downwardly-extending flange, J. This flange is cut out so as to extend down and over the draft-plate G, as shown at K, and it serves to arrest sparks and solid matter which would otherwise escape to the smoke-stack unconsumed.

The arch I may be constructed of fire-brick or any other suitable material, and may be held in position within the fire-box in any suitable manner.

The angle of inclination of the plates I and G, as shown, is about thirty degrees. This angle may, however, be varied as the size of fire-box may require.

In operation, when the locomotive is running with the door open the draft-supply to the fire upon the grate is divided between the fire-box door and the grate-bars, by which the amount of coal consumed is materially reduced from the amount ordinarily consumed when the draft is supplied only through the grate-bars.

It will be readily seen, from the construction of fire-box above described, that the products of combustion do not pass directly to the flues and thence to the smoke-stack, but, on the contrary, air being supplied through the open door B, is directed down upon the fire on the grate by means of the plate G. Thus oxygen is supplied to the fire-box, and a more perfect combustion of fuel upon the grate results, and at the same time the gaseous products of combustion and the solid fuel suspended in the same are intimately mixed with oxygen supplied from the door, and in passing around and above the arch I are almost perfectly consumed before reaching the flues C C C.

It is obvious from the construction described that cold air from the door cannot come into contact with the boiler-flues when the locomotive is running with an open door.

A great saving of fuel results from my construction, and the escape of smoke and sparks from the smoke-stack is prevented.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

In a locomotive, the fire-box A, provided with a supply-door, B, and a draft-escape, C, and a grate, D, in combination with a draft-plate, G, and a combustion plate or arch, I, having a downwardly-extending flange, J, for the purpose specified.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 7th day of October, A. D. 1879.

WILLIAM HENRY RUSHFORTH.

In presence of—
J. BONSALL TAYLOR,
W. C. STRAWBRIDGE.