C. Dean,

Steam-Boiler Attachment.

No. 40,743. Patented Dec. 1, 1863.

Witnesses.

B. H. C. Muehle.

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UNITED STATES PATENT OFFICE.

CYRUS DEAN, OF ST. CATHARINES, CANADA WEST.

IMPROVEMENT IN FIRE-BOXES OF LOCOMOTIVES.

Specification forming part of Letters Patent No. **40,743**, dated December 1, 1863.

To all whom it may concern:

Be it known that I, CYRUS DEAN, engineer, of the town of St. Catharines, in the county of Lincoln and Province of Canada West, have invented a new and useful Improvement in the Construction of Furnaces or Fire-Boxes of Locomotive-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical section of the furnace or fire-box. Fig. 2 is also a vertical section at right angles to Fig. 1. Fig. 3 is a plan of the mechanism for opening and closing the dampers.

The nature of this invention relates to making the bottom of the fire-box solid or pan-like—that is, without grate-bars or openings through the bottom—so that the live coal will be retained in the fire-box until wholly consumed; second, in arranging the draft-flues and dampers so that the air will pass over the fire-pan and feed the fire from the four sides of the furnace and at a convenient distance above the bottom of the fire-pan, and, third, in the combination of angle-plates with a fire-box having a solid bottom.

Letters of like name and kind refer to like parts in each of the figures.

The letters G represent the walls of the furnace, made of boiler-iron in a common manner, with a water-space between the two walls.

A represents a solid iron plate, which forms the very bottom of the furnace. It is made sufficiently dishing or concave to receive within it a separate and removable fire-pan or secondary fire-box. Draft-flues are made through this bottom plate, which are indicated at the point of the arrows 1.

B represents a removable fire-pan or secondary fire-box, made dishing or pan-like in form. It is made solid, without openings or grate-bars, and is fitted to set within or upon the concave of the bottom plate A, so that the air must pass over this pan in order to feed the fire. An air-space *b'* is left between the bottom of this pan and the plate A. This pan forms the bottom of the fire-box proper, and it being made solid, as before described, the live coals are retained therein until wholly consumed, so that there is not the least scattering of coals of fire upon the track, and a more complete combustion of the fuel is thereby obtained and a consequent saving in expense. It is removable, so that it can be easily replaced by a new one when worn out.

D represents a broad rim or flange, which lies in a horizontal position partly over the fire-pan, so placed that it will direct the fuel into the fire-pan, and so that a space will be left between it and the fire-pan for the air to pass, as shown by the arrows 2 and 3. This rim is cast in four distinct plates D and then nicely fitted together. They come in close contact with the inner wall of the furnace, so that no air can pass outside of these plates.

C are angle-plates, and are made in like manner as the horizontal plates or rim D. They are set upon an angle, so that the fuel will slide down and press together in close contact as it consumes. These angle-plates, or, in lieu thereof, the horizontal plates D, may be used, as may be preferred. Only one kind is used at the same time.

E represents the dampers, which are placed over the flues made through the bottom plate A. There are four of these dampers, corresponding to the four flues through the plate A.

H, I, J, K, L, M, N, and O, Fig. 3, represent a series of levers, which are connected with the dampers and so arranged that the engineer can open and close the dampers simultaneously, in whole or in part, at pleasure. They have a common fulcrum, as shown at P.

Q represents a pin, which drops down from each damper in order to form a connection with the series of operating-levers.

R represents the tube sheet or flues; S, furnace-door.

This improvement effects a more perfect combustion of the fuel used, and hence a greater amount of steam-generating heat is obtained from a given quantity of fuel. The draft may be entirely shut off when the engine is not in motion and the combustion nearly stopped; or it may be partially shut off on downgrades, when less steam is required. There is no scattering of live coals along the track to waste fuel and endanger property. More steam-power is produced from a given

quantity of fuel, and hence there is great economy and utility in the use of my improvement.

Having now fully described my improvements, what I claim as my invention, and desire to secure by Letters Patent, is—

1. Making the fire-pan B solid or pan-like, without grate-bars or openings, for the purposes and substantially as described.

2. Arranging the draft-flues and dampers E so that the air will pass over the fire-pan and feed the fire from the four sides and at a convenient distance above the bottom of the fire-pan, substantially as described.

3. The combination of the angle-plates C with the solid fire-pan B, substantiallly as set forth.

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Witnesses:
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