(No Model.)

J. H. H. PENRUDDOCKE.

LOCOMOTIVE FIRE BOX.

No. 306,857. Patented Oct. 21, 1884.

Fig. 1

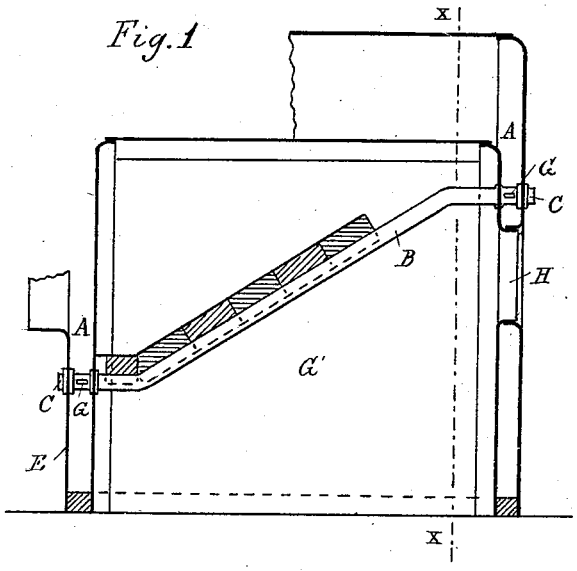


Fig. 3

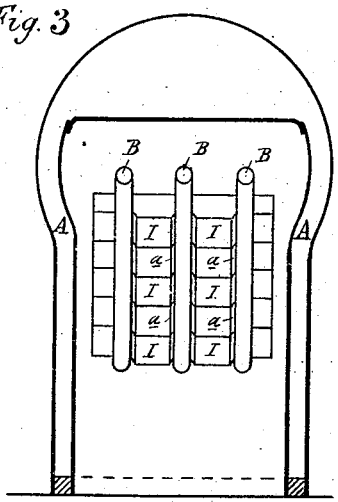
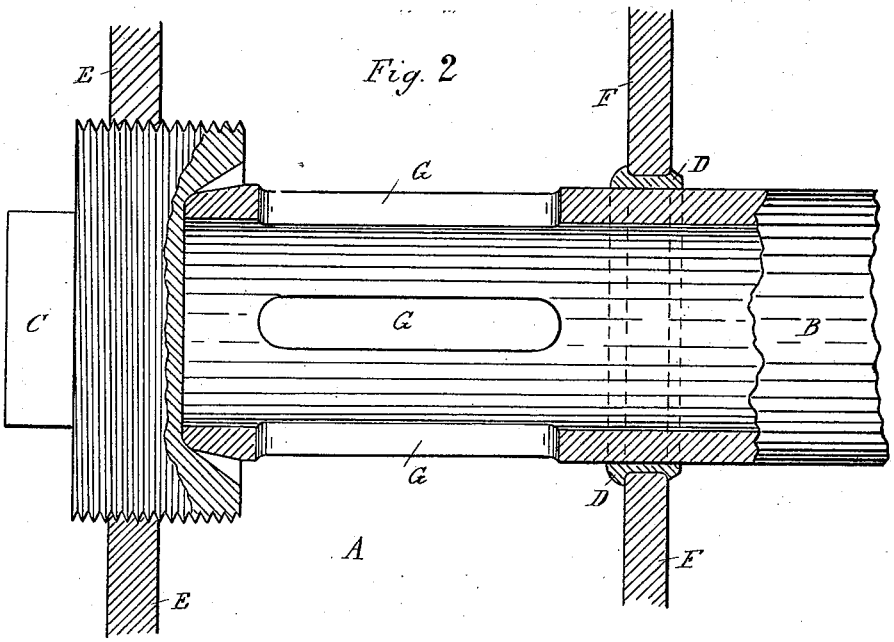


Fig. 2



Attest
J. Paul Mayer
N. J. Sprague

Inventor
John H. H. Penruddocke
By Thos. J. Sprague Atty

UNITED STATES PATENT OFFICE.

JOHN H. H. PENRUDDOCKE, OF FORT GRATIOT, MICHIGAN.

LOCOMOTIVE FIRE-BOX.

SPECIFICATION forming part of Letters Patent No. 306,857, dated October 21, 1884.

Application filed June 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. H. PENRUDDOCKE, of Fort Gratiot, in the county of St. Clair and State of Michigan, have invented new and useful Improvements in Locomotive Fire-Boxes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to certain new and useful improvements in the means employed for securing the tubes in a locomotive fire-box for the support of a brick arch therein, ordinarily termed a "smoke" or "deflecting" arch. Heretofore it has been customary to secure such tubes in the sheets which form the water-legs by an external thread upon the tube engaging with a female thread formed in the sheets, and this method of securing so weakened the tubes at this point by the cutting of the thread that the expansion and contraction of the tubes under the influence of the fire and extinguishment of the same would cause such tubes to break at these weak points, while at the same time, in case of the necessary replacing of the tubes, much trouble was had in taking out the old ones and inserting the new.

The object of the present invention is to provide means for supporting and sustaining such tubes which support the brick arch in such a way that none of the difficulties to which I have above referred occur.

Figure 1 is a vertical longitudinal section through the fire-box. Fig. 2 is an enlarged detail showing the tube and method of securing the same at one end, the opposite end being secured by a duplication of the means shown. Fig. 3 is a cross-section on the line X X in Fig. 1.

In the accompanying drawings, which form a part of this specification, A A represent the water-leg as usually constructed, which surrounds the fire-box G', such water-legs being formed with inner and outer plates, in the usual manner.

B represents one of the series of tubes affording communication between the water-leg of the front and the water-leg of the rear ends of such fire-box by means of the slots G in said tubes. These tubes at the front of the fire-box pass through the inner sheet thereof at some distance above the fire-door H, and extend diagonally downward to a point a little distance above the position usually occupied by the grates, and then pass through the inner sheet of the water-leg at the rear.

C are solid brass plugs screwed into the outer plates, to the front and rear of the water-legs, the inner face of these plugs being conically recessed, as shown in section in Fig. 2, and the ends of the tubes are slightly coned upon the outside to fit the conical recesses in the plugs C, so that when the latter are screwed to place the tubes are centered in such recess, and the plugs thus form the resistance-points for the expansion, longitudinally, of such tubes. These plugs are screwed, as already remarked, into the outer plates, E, of the water-legs of the fire-box. A copper ring, D, is driven on to the outside of the tube B at the point where such tube passes at either end through the inner plates, F, of the water-leg, and fills the orifice formed therein for the passage of the tubes. When these tubes are put in place successively, the soft copper is calked in the usual way, and forms a tight joint at that point, and the rings, being softer than the iron tubes, allow of a longitudinal contraction and expansion without their being any strain upon the tubes at this point. Bricks I are formed with lips *a*, and the bricks are of sufficient length to fill the space between each pair of tubes, the lips (shown in section in Fig. 3) resting upon the upper sides of such tubes above their axis, and by the peculiar construction of the bricks they hold themselves in place.

What I claim as my invention is—

1. In combination with the outer shell of a double-walled fire-box and the tubes which pass through the same, the plugs C, threaded within said outer shell, and constructed to close the open ends of said tubes and retain them in place, as and for the purposes set forth.

2. In combination with the fire-box of a locomotive-engine, such fire-box being surrounded by the usual water-legs, and as a means for securing the tubes therein, the combination of the plugs, as described, and the rings with the inner and outer sheets of such water-leg, substantially as and for the purposes specified.

JOHN H. H. PENRUDDOCKE.

Witnesses:
H. S. SPRAGUE,
E. SCULLY.