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FLUE SANDING APPARATUS FOR LOCOMOTIVE FIRE BOXES

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Fig. 5

Fig. 6

Fig. 7

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WITNESS:
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To all whom it may concern:

Be it known that I, ALFRED H. WILLET, of West New York, New Jersey, have invented certain new and useful Improvements in Flue-Sanding Apparatus for Locomotive Fire Boxes, of which the following is a specification.

This invention has reference to an improved arrangement of flue sanding apparatus for delivery of sand or similar material to or against the flue sheet or other interior portion of the fire box where it is desired by such means to remove soot or other formation of like character which results in considerable quantity where oil fuel is used in the furnace.

One of the primary objects of my invention is the provision of an efficient means for sanding the flues where the usual method of blowing the sand in, either through the fire door or some other opening at the rear of the fire box is not satisfactory because of the interference encountered from the presence of a refractory or fire brick arch, which is supported generally on arch tubes in a position above the fire bed and located between the door opening and the flue sheet.

My invention is particularly applicable to structures in which, what is called a "Gaines wall" or transverse refractory partition, is placed at the forward end of the fire chamber, thus providing an enlargement of combustion space between the arch and the flue sheet.

The above as well as such other objects as may hereinafter appear, I attain by means of a construction which I have illustrated in preferred form in the accompanying drawings, wherein:

Figure 1 is a longitudinal vertical sectional view through a fire box, and a portion of a locomotive boiler embodying my invention; Figure 2 is a detailed enlarged view of one portion of the refractory wall; Figure 3 is a view of a portion of a fire box showing a modified arrangement of my device; Figure 4 is a view of a portion of a fire box showing still another modification of my invention; Figure 5 is a longitudinal vertical sectional view through a fire box and portion of a locomotive boiler showing an arrangement in which the sand pipe comes in at the side of the fire box; Figure 6 is a horizontal sectional view through the refractory wall of the arrangement shown in Figure 5, and Figure 7 is an enlarged sectional view of the upper part of the refractory wall showing the sand nozzle on an enlarged scale.

Referring now more particularly to Figure 1, it will be seen that I have therein shown a fire box having rear sheet 1, crown sheet 2, and flue sheet 3, and obstructed, behind the flue sheet and flues, by an upward and rearward-extending refractory arch structure including an arch proper 4 supported upon arch tubes 5 in usual position and a transverse refractory fire wall 6 in the forward portion of the fire box, against which the arch proper 4 rests at its forward end. As here shown, the wall 6 is arranged as a Gaines bridge wall, and has a number of air passages 7 leading upward from below the fire box, so as to admit air to the fire box through the openings 8 above the fire bed.

In carrying out my invention I provide a pipe 9 extending upward within the opening 7 and having a discharge elbow 10 at its upper end which is directed forwardly and is located in position to emit or discharge from the wall 6 a stream of air under pressure carrying sand through the nozzle opening 11 in the member 12. As shown, the sanding device 10 is located and protected in the part of the refractory structure that is in a manner common to arch 4 and wall 6, in the forward portion or region of the combustion space of the fire box, and discharges at or to the front of said structure upon the flue sheet and flues.

The sand may be supplied from an ordinary form of sand box or some special construction indicated at 13, the flow of the sand being subject to control by means of a handle 14 in the cab.

The oil burner is diagrammatically shown at 15 projecting through the rear wall of a chamber 16 which has an opening for additional air supply 17 in the bottom wall, and is in communication above with the space 18 beneath the refractory arch 4.

It will be seen that the door at 19 is in a position where the arch 4 obstructs the view of the flue sheet 3, and if an effort be made to blow the sand in to clean the flue sheet through either the door 19 or a supplemental opening somewhere in the rear wall of the fire box, the arch 4 will interfere and make the operation ineffective.

In the practice of my invention the
handle 14 being actuated to admit air under pressure carrying sand in suspension through the pipe 9 through the elbow 10 and outlet nozzle 11, a stream of sand will be violently projected toward the flue sheet as shown by the dotted line 20, and over the whole surface of the ends of the flames and effectively clean off any soot or other objectionable formation which may tend to choke up the passages or interfere with the operation of the locomotive.

In Figure 3 I have shown an arrangement in which I have utilized a special formation of refractory brick 21 located on the fire arch 4 at the top of the subjacent fire wall, with a pipe extending transversely therethrough and a nozzle opening 22 having its outlet in the direction of the flue sheet, the sand supply within the block 21 coming from the sides.

Still another arrangement is shown in Figure 4 in which, at 23 I have indicated a special formation of block which has the sand pipe connected therewith from underneath, and with which there is no refractory wall or partition employed. Owing to the location of the sanding device in the front of the combustion space, in much the same relation to the flue sheet as in Figs. 1 and 3, ready access of the sand blast to the flue sheet is secured.

While it will be observed that in the arrangement shown in Figures 1, 2 and 4, the sand supply pipe comes up from underneath, it may be expedient in some instances to bring the sand supply pipe in through the side walls of the fire box, and such arrangement I have shown in detail in Figures 5, 6 and 7 in which there is a pipe 24 coming in from each side of the fire box toward the center, each of said pipes being provided with a plurality of nozzles 25 opening through apertures 26 in the side of the corner brick of the refractory arch and Gaines wall structure (which structure is otherwise just about like that of Fig. 1).

In the several constructions illustrated, it will be seen, the forward and upward-discharging sanding device is sheltered and protected by the refractory structure behind and above it (and especially by the brick or block 21 and 23 in Figs. 3 and 4) from the hot furnace gases passing or sweeping forward to the boiler flues.

I claim:
1. The combination with a locomotive fire box and a refractory structure obstructing the same behind the flue sheet and flues, of sanding means for them protected in said refractory structure and discharging forward therefrom.
2. The combination with a locomotive boiler fire box and a refractory structure in its lower forward portion, of a sanding device discharging forward and upward upon the boiler flue sheet sheltered and protected by said refractory structure from the forward-sweeping furnace gases on their way to the boiler flues.

In testimony whereof I have hereunto signed my name.

ALFRED H. WILLETT.