



# UNITED STATES PATENT OFFICE.

J. J. DE HAVEN, OF READING, PENNSYLVANIA.

## REMOVABLE FIRE-BOX FOR LOCOMOTIVES.

Specification of Letters Patent No. 6,376, dated April 24, 1849.

*To all whom it may concern:*

Be it known that I, JOHN J. DE HAVEN, of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful improvements in steam boilers and in the manner of connecting and arranging them with their fire boxes, of which the following is a full and exact description, reference being had to the annexed drawings of the same, making part of this specification, in which—

Figure 1 is a perspective view of a boiler and fire box, having my improvements applied thereto, Fig. 2 is a vertical longitudinal section through the line *x x* of Fig. 1, Fig. 3 is a perspective view of the boiler and dome seen from beneath, the fire box being detached therefrom; Fig. 4 is a perspective view of the fire box, looking obliquely upon the end which joins the boiler when it is in place.

The same letters indicate the same parts in all the figures.

It is well known to engineers that in locomotive, marine, and other boilers, where coal, and especially anthracite is the fuel used, the fire box burns out long before the rest of the boiler becomes appreciably damaged, and it is no uncommon thing for the fire box to burn out a dozen times before the boiler requires any repairs whatever. The delay and labor caused by dismounting the boiler and machinery every time the fire box has to be repaired, and again remounting them, forms a very large item in the expense of running an engine, independent of the cost of the actual repairs to the fire box itself. To save this great loss in dismounting the machinery and boiler, when the fire box has to be repaired, is the main object of my present invention, which I accomplish by making the fire box removable, without displacing either the boiler or the frame upon which it is mounted; and in order that the removal of the fire box may open as few steam joints as possible, I make the boiler and dome complete and tight in themselves, and the fire box also perfectly tight in itself, connecting the lower part of the boiler with the lower part of the fire box by means of a pipe which supplies it with water, and connecting its upper part to the dome by means of a pipe, through which the steam generated within it, escapes.

In the accompanying drawings, A is the

frame of the car made in the usual or any suitable manner.

B is a tubular boiler also of the ordinary construction, and having a dome C attached to it, which projects from its end. The dome has a bottom (*a* Fig. 2) firmly riveted to it, which is strengthened by bars of iron *b*. The boiler and dome are thus made, in themselves perfectly steam tight.

D is the fire box, which is secured upon the frame by screw bolts *c* passing through the brackets *d*, which are riveted to its sides. To secure the fire box firmly to the boiler, the screws *f* on the latter pass through the eyes of brackets *e* on the former, and a nut *g* upon the bolt, acting against the bracket draws the box up to the boiler, and holds it there. To supply the sides and top of the box, which are hollow, with water, a pipe E is connected with the bottom of the boiler by means of right and left screws made respectively upon the exterior of its opposite ends, and fitting into corresponding female screws in the interior of the short sections of flanged pipe F and G respectively secured to the boiler and the fire box. The steam generated in the hollow space between the interior and exterior sides of the fire box escapes into the dome through one or more pipes H Fig. 2 which are screwed into the bottom of the dome and top of the fire box respectively, or connected with both in any other manner. To render the connection between the boiler and fire box more firm, a rib *i* is riveted upon the boiler which has a rabbet on one side so as to form a groove *m* between the inner side of its front edge and the bottom of the boiler, into which groove a lip or tongue *n* enters, which projects from the rear end of the fire box.

The grate bars *o*, doors *r* and other portions of the boiler, dome, fire box, and frame, not specially described are made and arranged in the usual, or in any convenient manner, that may be deemed expedient, and which will admit of the easy and ready detachment of the fire-box.

There are but few lines of rail road where there are more than two or three different sizes of locomotives, and therefore, by keeping on hand a few extra fire boxes in good order, whenever a fire box gives out, all that will have to be done will be to run the engine to the shop, when in a few hours the damaged fire box can be taken out, and re-

placed by another in good repair, and the one displaced, repaired at leisure, to replace in its turn one that is burnt out; and in this manner each locomotive can in the course of a year be kept running longer by at least ten per cent, than it could as at present constructed with the fire box dome and boiler, all unremovably fastened together, which when either gets out of order and requires to be repaired, involves the necessity of dismounting the whole.

The first fire box made separate from the boiler, of which I know, was that of Mr. Robert Stephenson, an English engineer, in his locomotive the Rocket, but he did this only for the sake of convenience of building it, and made no provision for removing it for repairs or replacement, without dismounting the boiler and engines from the frame; and here it may be well to remark, that my fire box is made and arranged expressly with a view to its easy detachment and removal from the boiler, whereas Mr. Stephenson's although made separate, was attached to the boiler with a view to the greatest permanence and security of connection, and it was therefore almost, if not quite as difficult to separate them, as if they had been riveted together.

I have neither described nor claimed herein a movable lining for the fire box, either of one thickness, or of more and including a water-space; and I hereby expressly declare that this specification does not, and was not intended to cover such a device; but as I am the inventor (and believe myself to be the first) of this device, I reserve to myself the right to apply, hereafter, for Letters Patent for the same.

Having thus described the improved ar-

angement of my boiler and fire box, I wish it to be understood, that I do not claim to be the inventor of the fire box made separate from the boiler and dome, and afterwards unremovably attached thereto, when set in place to generate steam for motive power; but

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

1. Attaching an independent fire box to the steam boiler, in such a manner as to render it easily removable, without displacing the boiler dome, machinery, or frame work, for the purpose of being repaired or replaced by another, whether the means of attachment be those herein described, or others capable of effecting the same object, and which have been used for analogous purposes.

2. I do not claim making the dome project from the end of the boiler, over the fire box; but when it does so project, I claim making it with a fixed and tight bottom, sufficiently strong to resist the pressure of the steam, in order that it may be unnecessary to rivet it to the fire box as has heretofore been the practice, and that one or more pipes, arranged so as to be easily detached, and of sufficient capacity to allow the free passage of the steam generated in the casing of the fire box, may be all the connection that is necessary between the latter and the dome.

In testimony whereof I have hereunto signed my name this sixteenth day of December, A. D. 1848.

JOHN J. DE HAVEN.

Witnesses:

P. H. WATSON,  
T. C. DONN.