

No. 846,310.

PATENTED MAR. 5, 1907.

G. W. HULLINGS.
BOILER FIRE BOX.

APPLICATION FILED JULY 23, 1906.

2 SHEETS—SHEET 2.

Fig. 3.

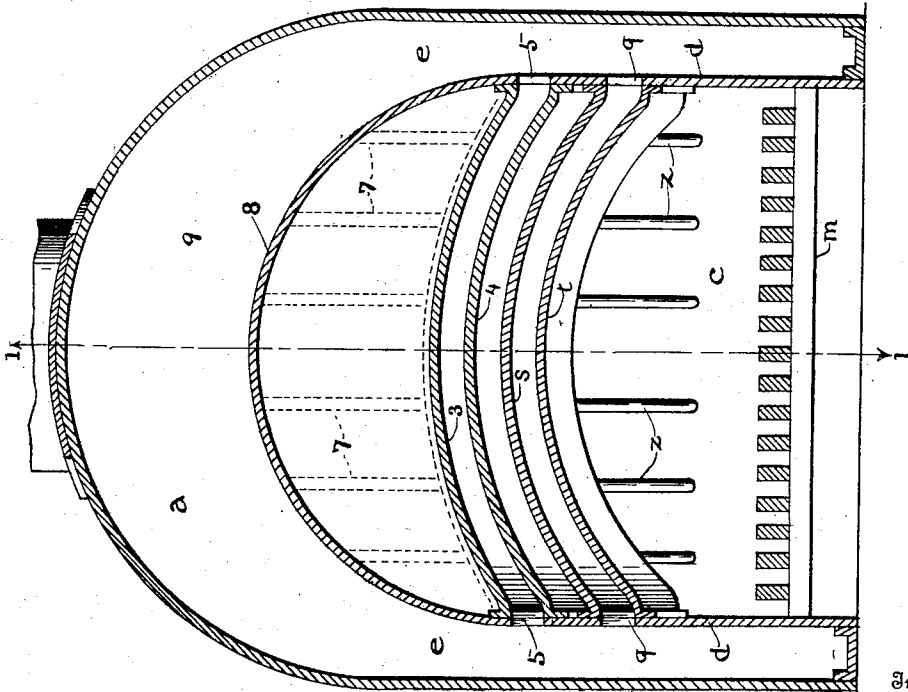
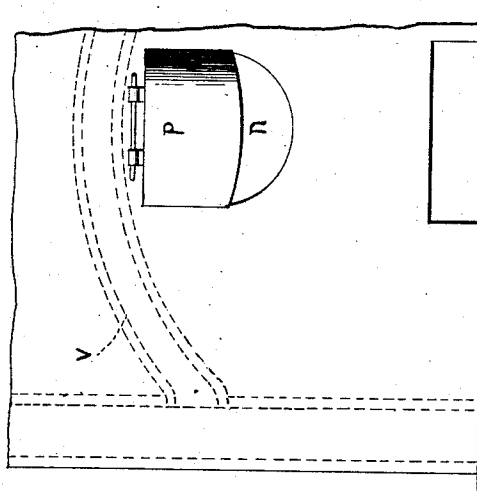


Fig. 2.

Witnesses

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BOILER FIRE-BOX.

No. 846,310.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES W. HULLINGS, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have made a certain new and useful Invention in Steam-Boiler Fire-Boxes; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the invention, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Figure 1 is a section on the line 1 1, Fig. 2. Fig. 2 is a transverse vertical section of the invention as applied on the line 2 2, Fig. 1. Fig. 3 is a fragmentary front view of the invention as applied.

The invention has relation to smoke-consuming fire-boxes for the boilers of locomotives and similar engines; and it consists in the novel construction and combinations of parts, as hereinafter set forth.

In the accompanying drawings, illustrating the invention, the letter *a* designates the boiler, through which extend the draft-flues *b* from the fire-box *c*, which is bounded on the sides by the inner walls *d* of the lateral water-legs *e e* of the boiler, in front by the inner wall *f* of the front water-leg *g*, and in rear by the inner wall *h* of the rear downward extension *k* of said boiler. In the legs *e* and *g* and in the rear extension *k*, which form hollow walls of the fire-box, the water from the boiler is designed to circulate.

The fire-box is provided with a grate *m* and in the rear wall above the same with an opening *n*, through which the fuel is designed to be introduced into the fire-box. This opening is doorless, but is provided with a hinged reflector *p*, which extends downward and outward, covering about half the opening and serving to reflect light from the fire downward upon the apron. In the daytime it may be hooked up. It should never be large enough to obstruct the draft through the fire-box above the coal-bed which is required for the proper action of the parts and devices constituting the invention.

The inner lateral walls *d* of the fire-box are slotted forward and downward from points opposite the draft-opening, as indicated at *q*, and to the upper and lower margins of these inclined slots are respectively attached the

lateral edges of the upper arched baffler-sheet *s* and the lateral edges of the lower arched baffler-sheet *t*, which is parallel to said upper sheet, or nearly so, the two sheets forming the upper and lower walls of a transverse hollow forward and downward inclined baffler. The forward end of this baffler is closed, as at *u*, and the rear end is in communication with the rear downward extension *k* of the boiler through an arched slot *v* in the inner wall thereof, to the margins of which the upper and lower arched sheets of the baffler are secured. The front or lower end of the arched retainer or baffler is closed, as at *w*, except that it is provided with pipes *z*, extending forward and downward to the forward water-leg *g* of the boiler, inside of which said pipes are designed to terminate.

Extending upward and rearward over the forward portion of the baffler and some distance past its end is the deflecting or consuming arch 2, which is parallel, or nearly so, to the baffler, and consists of parallel sheets 3 and 4, the lateral edges of which are secured to the margins of the lateral inclined slots 5 and the forward arched edges of which are secured to the arched slot 6 in the inner wall of the forward water-leg of the boiler. The upper or rear end portion of the deflector-arch is provided with tubes 7, which extend upward to the top sheet 8 of the fire-box, to which they are secured and through which they communicate with the water-chamber 9 of the boiler. The inclined baffler constitutes, therefore, a transept or forward extension-chamber of the boiler, and the inclined deflector is a rearward extension-chamber of the boiler, overlying by its rear end the forward end of the baffler, between which and the rear end of the deflector is the reverting-passage 10. These extension-chambers are water-passages in which the water of the boiler is highly heated by the fire and through which the water of the boiler circulates freely and in such wise as to protect the baffler and deflector from undue injury on account of the heat.

The operation of these devices is as follows: The fuel which is being consumed on the grate is subject to air-draft through the coal-bed to provide oxygen for its combustion, and to an air-current through the draft-opening *n* over the fuel-bed. The unconsumed cinders are carried by this air-current forward around the front end of the baffler and upward against the deflector, whereby they

are retarded and deflected downward somewhat for further subjection to the heat of the coal-bed by which they are consumed, the gases being drawn through the reverting flue or passage 10 between the ends of the baffle and deflector into the upper portion of the fire-box, whence they pass off through the flues 6 of the boiler.

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

1. The combination with a locomotive-boiler having a fire-box bounded by lateral and forward water-legs, and by a rear downward extension of said boiler, of a downward and forward inclined transverse water-passage attached to and communicating with said lateral water-legs and said rear downward extension, a parallel rearward and upward inclined transverse water-passage attached to and communicating with said lateral and forward water-legs, and overlying the forward end of said downward and forward inclined water-passage, pipes connecting the front end of the latter water-passage to the forward water-leg, and pipes

passage to the boiler above the fire-box, substantially as specified.

2. A locomotive-boiler having in its fire-box, above the grate, a rear downward-inclined arched water-passage attached to and communicating laterally and in rear with water-holding portions of said boiler, and a front upward-inclined arched water-passage, parallel to the first-named passage, and attached to and communicating laterally and in front with water-holding portions of said boiler, the last-named passage overlying the first-named passage at or about the middle of the fire-box to provide a reverting-flue, pipes connecting the underlying passage to the front water-holding portion of the boiler, and pipes connecting the overlying passage to a water-holding portion of the boiler over the fire-box, said parts being combined together substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES W. HULLINGS.

Witnesses:

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