

J. FOURNIA.
DRAFT EQUALIZER FOR LOCOMOTIVE FRONT ENDS.
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Fig. 1

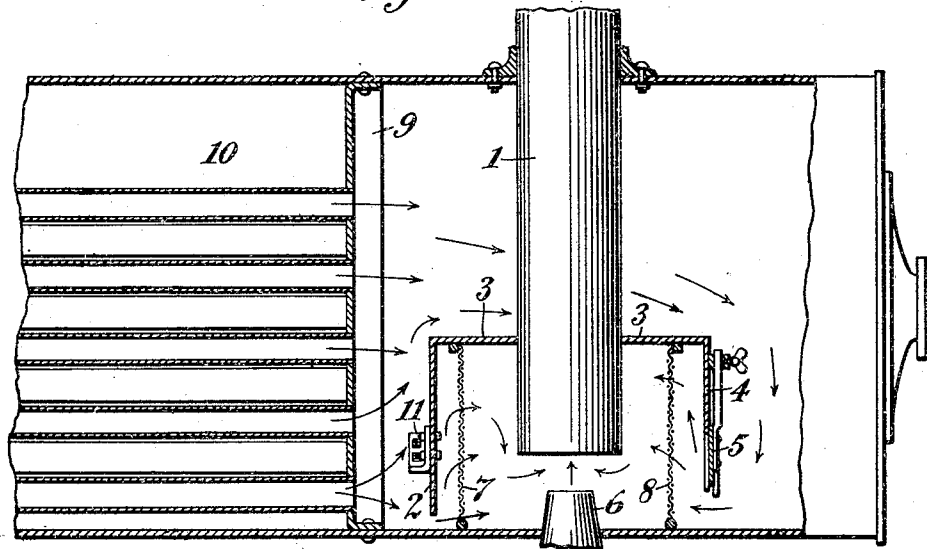
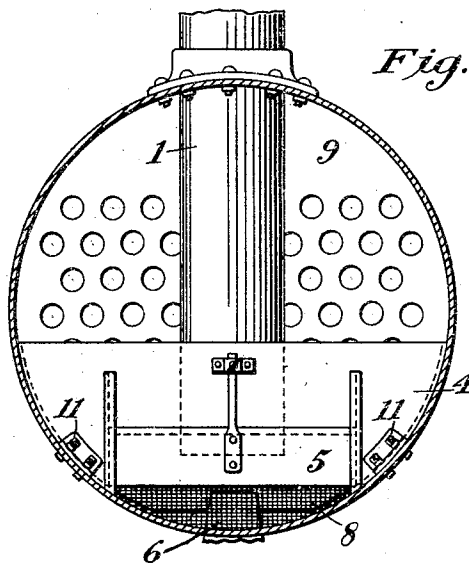


Fig. 2



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UNITED STATES PATENT OFFICE.

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DRAFT-EQUALIZER FOR LOCOMOTIVE FRONT ENDS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN FOURNIA, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Draft-Equalizers for Locomotive Front Ends, of which the following is a specification, reference being had therein to the accompanying drawings, forming part thereof.

My invention relates generally to locomotives and particularly to draft equalizers in locomotive front ends.

It is well known that the draft from the fire box of locomotives has a tendency to follow the shortest course, through the lower flues of the tubular boiler, the draft which, in cases where the smoke stack extends well down toward the bottom of the smoke-box, is consequently being naturally much stronger in the lower than in the upper flues, and, due to this unequal distribution of draft, the upper flues quickly become clogged, resulting in a waste of fuel and a loss in the power and efficiency of the locomotive. Furthermore the differences of temperature in different parts of the boiler and of the flue sheet subject the boiler to undue strains and are apt to result in broken stay bolts, leaky flues and cracked boiler sheets.

An object of my invention is to provide a draft equalizer which will obviate the necessity of using brick in the fire box, and which will cause the gases to thoroughly circulate at the bottom of the smoke box and thus keep the smoke box free from cinders and refuse.

Other objects and advantages of my invention will appear from the following description.

I shall now describe my invention with reference to the accompanying drawings, and shall thereafter point out my invention in claims.

Figure 1 is a central vertical longitudinal section of my improved front end and a portion of the tubular boiler. Fig. 2 is a front end view of the parts shown in Fig. 1 with the walls of the smoke box in section.

In its broad aspect my invention comprises a baffling device or deflector located in the front end and depending from the draft pipe in front of the lower flues and arranged to deflect the draft over the deflector, thereby rendering the paths of the gases

from all the flues to the draft pipe substantially equal. In addition the deflector is arranged to cause the gases to sweep over the bottom of the smoke box and keep it clean.

In the embodiment of my invention shown in the drawings, I extend the draft pipe 1 well down toward the bottom of the smoke box. To impede the draft through the lower flues and give it a more circuitous path substantially equal to that of the gases through the upper flues, I employ a rear baffle or deflector plate 2 at the bottom of the smoke box vertically arranged between the lower flues and the bottom of the draft pipe 1. This baffle plate is substantially segmental in shape or of a shape substantially conforming at its lower edge to the lower part of the smoke box and substantially horizontal at its upper edge and fits into the bottom of the smoke box and serves to impede the direct draft from the lower flues to the draft pipe and to deflect the draft over the baffle plate.

To cause the draft to circulate at the bottom of the smoke box and keep it clean of cinders and other refuse, the deflection of the draft is continued to include the bottom of the smoke box in its path. Instead of permitting the gases to pass directly over the rear deflector plate 2 and thence to the draft pipe from the rear, access to the draft pipe from this direction is shut off by a substantially horizontal top plate 3 extending forward from the top of the deflector plate 2 and surrounding and inclosing the draft pipe, which passes down through the top plate through an opening provided for that purpose. The top plate 3 is of the proper length to make a tight fit at its sides with the walls of the smoke box.

To cause the gases to pass down and sweep the bottom of the smoke box after passing the front edge of the top plate 3, a front baffle or deflector plate 4 is employed of the same shape as the rear baffle plate 2, and extending down from the front edge of the top plate and closing the front end of the smoke box underneath the top plate except at the bottom where it is cut away as shown to provide a draft vent. To regulate the draft through this vent, a vertically slidable damper 5 is provided, sliding in guides and secured in position in any suitable way as by a set screw as shown. The front and rear baffle or deflector plates 2 and 4 may

be suitably secured to the lower part of the smoke box, as by angle plates 11, held by bolts so as to be removable.

To prevent the refuse and cinders from lodging on the bottom of the smoke box behind the deflector plate 2, the bottom edge of this plate is made of slightly smaller radius than the smoke box and is spaced substantially equidistantly around its lower edge from the walls of the smoke box, as shown best in dotted lines in Fig. 2 of the drawings, thus providing a small vent through which sufficient draft may pass to keep the bottom clean. A straight portion may be cut off from the bottom of the plate, as shown in the drawings, to provide the greatest draft where the cinders are most liable to collect.

The usual exhaust tip 6 registers with the draft pipe 1 to induce the draft. To prevent large cinders from passing out to the atmosphere, screens 7 and 8 are provided between the draft pipe and the rear and front deflector plates respectively, extending substantially parallel to the plates and completely intercepting the path of the gases, thus assuring that everything passing out to the atmosphere will be properly screened. The forced draft and the vibration of the locomotive will tend to break up these cinders against the screen.

Since my invention causes a uniform draft through all the flues, which results in a uniform temperature in all parts of the tubular boiler, a locomotive equipped with this device can have a moderate draft and still keep the bottom of the smoke box clean, since the draft is directed close to the bottom, and consequently permits the use of part of the exhaust steam for other purposes, as, for example, heating feed water. The course of the draft after the gases pass the flue sheet 9 of the tubular boiler 10 is indicated by the arrows.

It is obvious that various modifications could be made in the construction shown and above particularly described within the principle and scope of my invention.

I claim:

1. A draft-equalizing device in locomotive front ends comprising, in combination with a flue sheet and a draft pipe, a baffling device embracing the draft pipe and extending downward in front and rear thereof and having its principal draft opening in the front thereof at the bottom of the smoke-box.

2. A draft equalizer in locomotive front ends comprising, in combination with the flue sheet and a draft pipe extending below the center of the smoke-box, a baffling device disposed wholly in front of the lower flues and embracing the draft pipe and arranged to deflect the draft from the flues to the draft pipe over said baffling device and

thence down over the bottom of the smoke-box.

3. In a locomotive front end, in combination with the draft pipe extending below the center of the smoke-box, a draft-equalizing device embracing the lower end of the draft pipe and arranged to deflect the draft over said device and thence down over the bottom of the smoke box.

4. A locomotive front end comprising, in combination with a draft pipe extending below the center of the smoke-box, a draft-equalizing device comprising a deflector extending downward from the draft pipe and arranged to deflect the draft over said deflector and thence down over the bottom of the smoke box.

5. A locomotive front end comprising, in combination with a draft pipe extending below the center of the smoke-box, a draft-equalizing device comprising a deflector extending downward from the draft pipe and across the smoke box and arranged to permit the draft to clean the bottom of the smoke box in the rear of the deflector, and to deflect the draft over said deflector and thence down over the bottom of the smoke box.

6. A locomotive front end comprising, in combination with the flue sheet and a draft pipe extending below the center of the smoke-box, a draft-equalizing device embracing the lower end of the draft pipe and extending downward wholly in front of the lower flues and arranged to permit a direct draft underneath said device sufficient to keep the bottom of the smoke box clean, and to deflect the remainder of the draft over said device and thence down over the bottom of the smoke box.

7. A locomotive front end comprising, in combination with the flue sheet and a draft pipe, a draft-equalizing device comprising a deflector plate in the rear of the draft pipe and arranged wholly in front of the lower flues, a deflector plate in front of the draft pipe and arranged to permit draft only underneath said plate, and a top plate embracing the draft pipe and joining the rear and front plates.

8. A locomotive front end comprising, in combination with the flue sheet and a draft pipe extending below the center of the smoke-box, a draft-equalizing device comprising a deflector plate in the rear of the draft pipe and arranged wholly in front of the lower flues, a deflector plate in front of the draft pipe and arranged to permit draft only underneath said plate, a top plate embracing the draft pipe and joining the rear and front plates, and means for regulating the draft underneath the front plate.

9. A locomotive front end comprising, in combination with the flue sheet, a draft pipe and an exhaust tip registering with the draft

pipe, a draft-equalizing device comprising a substantially segmental plate extending across the smoke box and of slightly smaller radius than the smoke box and disposed between the lower flues and the bottom of the draft pipe, a substantially segmental plate disposed in front of the draft pipe at the bottom of the smoke box and arranged to permit draft only underneath said plate, and a top plate joining the two segmental plates and embracing the draft pipe.

10. A locomotive front end comprising, in combination with the flue sheet, a draft pipe and an exhaust tip registering with the draft pipe, a draft-equalizing device comprising a substantially segmental vertical plate extending across the smoke box and of slightly smaller radius than the smoke box and disposed between the lower flues and the bottom of the draft pipe, a substantially segmental plate disposed in front of the draft pipe at the bottom of the smoke box and

arranged to permit draft only underneath said plate, a top plate joining the rear and front plates and embracing the draft pipe, and means for regulating the draft underneath the front plate.

11. A locomotive front end comprising, in combination with the flue sheet and a draft pipe, a draft-equalizing device comprising a deflector plate in the rear of the draft pipe, and arranged wholly in front of the lower flues, a deflector plate in front of the draft pipe and arranged to permit draft only underneath said plate, a top plate embracing the draft pipe and joining the rear and front plates, and screening devices arranged between the deflector plates and the draft pipe.

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

JOHN FOURNIA.

Witnesses:

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