J. V. CARR AND F. W. MATZ.

DRAFT EQUALIZER FOR STEAM BOILERS.

APPLICATION FILED DEC. 23, 1919.

1,386,050.

Patented Aug. 2, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

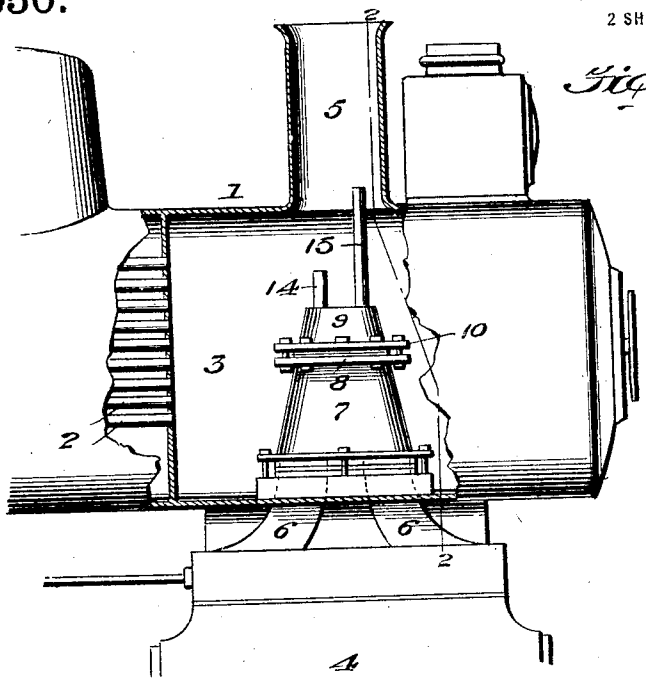
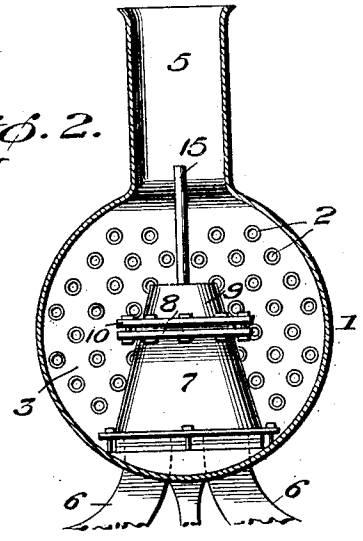


Fig. 2.



Witness

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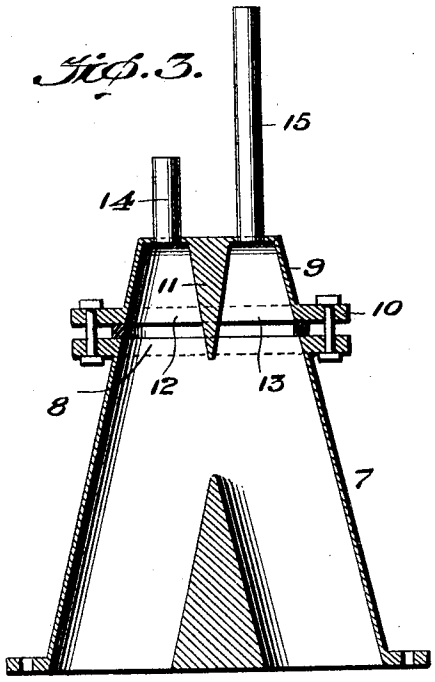
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2 SHEETS—SHEET 2.

Fig. 3.



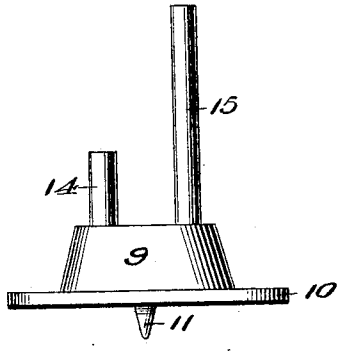


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOSEPH V. CARR AND FRED W. MATZ, OF EVANSVILLE, INDIANA.

DRAFT-EQUALIZER FOR STEAM-BOILERS.

1,386,050. Specification of Letters Patent. Patented Aug. 2, 1921.

Application filed December 23, 1919. Serial No. 347,032.

To all whom it may concern:

Be it known that we, JOSEPH V. CARR and FRED W. MATZ, citizens of the United States, residing at Evansville, in the county of Vanderburgh and State of Indiana, have invented certain new and useful Improvements in Draft-Equalizers for Steam-Boilers, of which the following is a specification.

This invention relates to draft equalizers for steam boilers.

In steam boilers, particularly locomotive steam boilers, where the exhaust is discharged into the smoke box to create a draft through the stack, it has been found in practice that the draft is stronger through the lower flues than through the upper flues, thereby causing more of the products of combustion to pass through the lower flues than through the upper flues, resulting in variation in temperatures, uneven heating of the water, and uneconomical fuel consumption.

Ordinarily, in locomotive construction, the trunk pipes from the cylinders lead to a duplex nozzle in the smoke box for the purpose of creating the draft through the flues hereinbefore referred to. Our improvements reside in an attachment adapted to be connected to the upper end of the usual duplex nozzle and having chambers to divide the exhaust, and being provided with two pipes or nozzles, one of which is relatively short and has its upper or discharge end located at a point preferably in the region of the plane between the two upper rows of flues; the other pipe or nozzle being much longer and extending up to, or into, the lower end of the stack.

Our attachment is self-contained and complete and adapted to be bolted or otherwise suitably secured to the upper end of the ordinary duplex nozzle. Consequently, the use of our improvement requires no change in the standard form of exhaust nozzle found in the smoke box of a locomotive.

Our improved attachment has a partition which forms the two chambers before mentioned so that the exhaust steam is divided, one half passing into one chamber and out through the short nozzle or pipe; the other half of the exhaust steam passing into the other chamber and upwardly through the long pipe or nozzle and discharging in the region of the base of the stack. Our attachment insures that the draft through the upper rows of flues will be the same as through the lower and intermediate rows of flues, resulting in a great saving of fuel.

In the accompanying drawings,

Figure 1 is a part side elevation and part longitudinal section of so much of a locomotive as will illustrate the application of our invention thereto;

Fig. 2 a cross section on line 2—2, Fig. 1;

Fig. 3, an enlarged detail vertical section through the old style nozzle and our equalizer nozzle which is applied thereto; and

Fig. 4, a detail side elevation of our improved equalizer nozzle.

While we have illustrated and described our invention as applied to a locomotive, it is to be understood that the improvements are just as applicable to any steam boiler as to a locomotive steam boiler.

The boiler is generally shown at 1 as having flues 2, a smoke box 3, cylinders 4 and stack 5.

The exhaust from the valve chests passes through the trunk pipes 6 to a duplex nozzle 7 according to present practice. The duplex nozzle 7 is located inside the smoke box 3 and, according to present practice, its upper end or discharge mouth 8 is located about half way the height of the rows of flues 2. Consequently, the draft is stronger through the lower flues than through the upper flues, resulting in uneven heating of the water and a decrease in efficiency, because, if the locomotive is pulling a heavy load, unless the fire is heavily banked, the draft being concentrated on only certain flues, will pull a hole in the fire.

Our improvement resides in an attachment in the form of a supplemental nozzle which is generally shown at 9 and appears in detail in Figs. 3 and 4. This nozzle is bolted in a steam tight manner in the upper discharge end 8 of the usual duplex nozzle 7 so that instead of the exhaust discharging at the point 8, it is split up into two independent streams as will presently appear.

The exhaust attachment 9 is composed of a body 10 which is of general truncated conical form and is provided with a central partition 11 subdividing its interior into two chambers 12 and 13. The partition 11 extends downwardly to a suitable degree to effect the purpose of splitting the exhaust into two streams as it passes from the usual nozzle 7. The walls of the partition 11

preferably converge to better effect the purpose of the invention. Cast integral with the body 10, or connected thereto in any preferred manner, are short and long discharge pipes or nozzles 14, 15. The pipe or nozzle 14 is of such length that its discharge mouth will be disposed in a plane lying substantially between the first and second ones of the uppermost flues 2. The pipe or nozzle 15 is of such length that its discharge mouth extends up into the stack 5 or at a suitable point in the region of the lower portion thereof.

We do not limit ourselves to the precise positions of the discharge mouths of the pipes or nozzles 14, 15 as it is not essential that they be disposed at the exact heights as shown in the drawings and specified herein. According to conditions surrounding the use of our attachment in any particular installation, the exact points of location of the discharge mouths of the pipes or nozzles 14, 15 may vary.

Our improvements obviate the necessity of providing a break arch in the fire box and also the usual petticoat rigging and draft sheet in the smoke box both of which are very expensive.

Any suitable spark arrester or construction desired in the smoke box may be employed therein which will not interfere with the operation of our improvement.

Our improvements being in the nature of an attachment, may be applied to the usual duplex exhaust nozzle in any locomotive or boiler.

Our invention insures a considerable saving in fuel for the reason that it causes the draft to be much more equally distributed among the flues than with draft nozzles as at present constructed and arranged, enabling the fireman to keep a much thinner fire, obviating the necessity of banking, and minimizing the tendency of the draft to draw the fuel through the flues.

What we claim is:

1. A draft equalizer for steam boilers comprising the combination with a steam discharge nozzle in the smoke box, of a hollow self-contained attachable and detachable discharge nozzle connected to and mounted on the nozzle aforesaid and provided with an internal partition for splitting up the steam into independent streams and a plurality of pipes extending upwardly from the top of said hollow nozzle and respectively in communication with the different chambers of the subdivided body and respectively having discharge mouths located at different heights in the smoke box.

2. A draft equalizer for a steam boiler comprising the combination with a steam discharge nozzle located in the smoke box of the boiler, of a supplemental nozzle connected to and mounted on the upper end of the nozzle first mentioned and provided with a depending partition on its under side and having a pair of branch discharge nozzles extending upwardly from its top, one of which has its discharge mouth located in the region of the uppermost rows of flues of the boiler and the other one having its discharge mouth located in the region of the lower part of the stack of the boiler.

In testimony whereof we affix our signatures.

JOSEPH V. CARR.
FRED W. MATZ.