W. S. HUTCHINSON.

Air-Feeding Attachment for Locomotives.

No. 197,730. Patented Dec. 4, 1877.

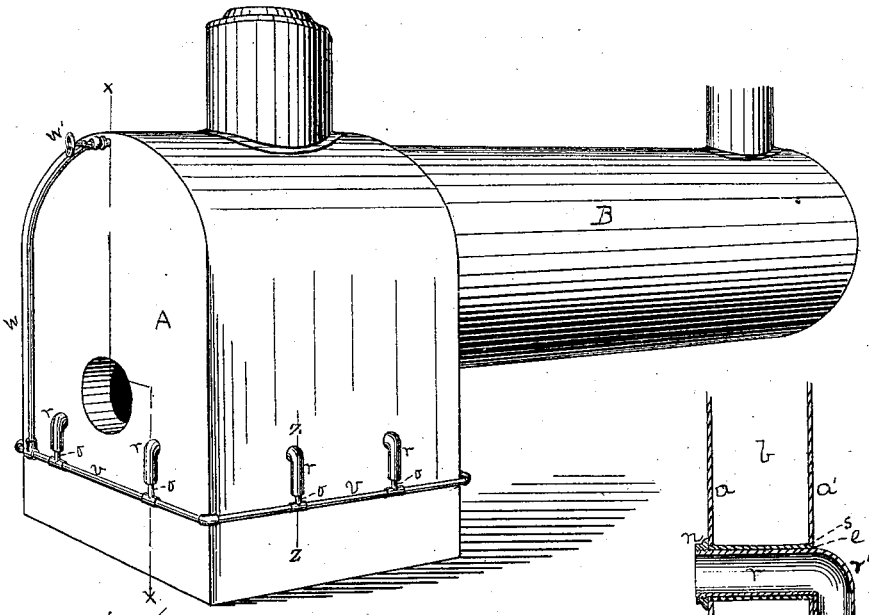

Fig. 1.

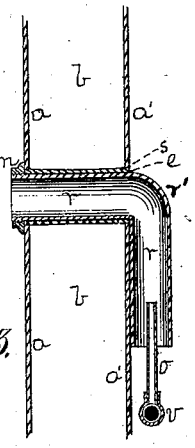

Fig. 3.

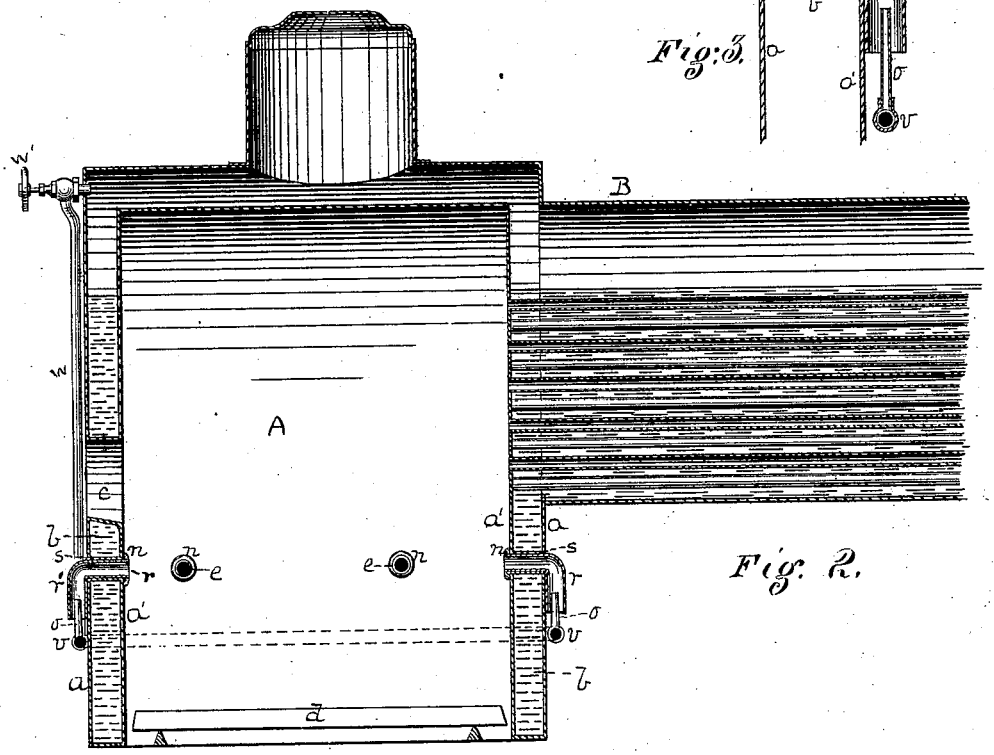

Fig. 2.

Witnesses.
C. F. Parker
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UNITED STATES PATENT OFFICE.

WILLIAM S. HUTCHINSON, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN AIR-FEEDING ATTACHMENTS FOR LOCOMOTIVES.

Specification forming part of Letters Patent No. **197,730**, dated December 4, 1877; application filed October 10, 1877.

To all whom it may concern:

Be it known that I, WILLIAM S. HUTCHINSON, of Chicago, county of Cook, State of Illinois, have invented or discovered a new and useful Improvement in Air-Feeding Attachment for Locomotives; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a perspective view of an ordinary locomotive fire-box and boiler, showing my improved attachment for consuming the smoke therein. Fig. 2 shows a vertical longitudinal section of the same in the line *x x* of Fig. 1; and Fig. 3 is an enlarged view of a vertical section through the injecting device in the line *z z*, Fig. 1.

My improvement relates to an arrangement of devices for consuming the smoke and aiding combustion in locomotive fire-boxes and other kindred heating-chambers by forcing into, or onto, or a little above the burning fuel a jet of mingled air and steam.

In the drawing, A represents an ordinary locomotive fire-box, and B an ordinary flue-boiler connected therewith. As shown in Fig. 2, the fire-box A is made of an inner and outer casing, *a a'*, between which are provided water-chambers *b*, which are constructed and arranged in the usual way.

The opening for charging the fire-box is shown at *c*, and the usual grate-bars for supporting the fuel at *d*. Openings *e* are made through the walls of the fire-box, in any desired number, and arranged, by preference, on all sides of the fire, a little above the level of the burning fuel. Hollow stay-bolts *s* are employed to connect the inner and outer casings *a a'* at these openings *e*, leaving an annular space, in which are secured tubes or conduit-pipes *r*, by means of jam-nuts *n*, or in other convenient way.

A steam-pipe, *w*, with stop-cock *w'*, leads from the upper part of the boiler or steam-chamber, and connects with a pipe, *v*, which passes around the fire-box a little below the tubes or conduit-pipes *r*.

Nozzles *o* lead off from the pipe *v* by the ordinary T-connection, and project a little way within the tubes *r*, as seen in Fig. 3. The outer ends of the tubes or conduits *r* are left open, so as to furnish a free passage for air about the nozzles *o*.

It is well known that mingled air and steam are far more efficient in aiding combustion than either used alone; and I have found by practical experiment that, in order to secure the best results in mingling and introducing these two elements into a combustion-chamber, the conduit-tubes *r* should be of considerable length, or, in any case, longer than the thickness of the walls of an ordinary locomotive fire-box, so that sufficient space may be left between the discharging end of the nozzles *o* and the common opening at the inner wall *a'* for developing a positive inward current of air by the action of the steam-jet. These devices, thus arranged, will not only act as a siphon to introduce air and steam to the fire-box, but they also operate to thoroughly mingle the two before they are thus introduced.

These tubes *r* extend beyond the outer wall *a*, and are bent down in the form of an elbow. By this construction I economize space, and at the same time am enabled to make the pipes of a length sufficient to insure a positive draft of air, and also a thorough mingling of the air with the steam, in a simple and effective manner. As the steam-jet nozzles enter these pipes at their lower open ends, the current of air will be in an upward direction until it reaches the upper arm of the elbow-pipe.

I am aware that pipes with elbows have been made in connection with furnaces, and that numerous devices have been employed for creating drafts and for insuring a perfect mingling of the steam and air; but I am not aware that an arrangement of pipes similar to mine has been before made.

I claim herein as my invention—

In combination with the box A, constructed with flue-boiler B and water-chambers *b*, the pipes *r*, secured within tubular bolts between the walls *a a'* of the water-chambers, and bent down upon the exterior of the outer wall at *r'*, as shown, and the steam-jet nozzles *o*, arranged around the box below the flue, and near the base of the box, so as to enter the lower open ends of the pipes *r* below the bends *r'*, all of the said parts being constructed and arranged as herein shown and specified.

In testimony whereof I have hereunto set my hand.

WILLIAM S. HUTCHINSON.

Witnesses:

J. J. MCCORMICK,

CLAUDIUS L. PARKER.