W. W. HUBBELL.

FURNACE-DOOR FOR LOCOMOTIVES.

No. 191,147. Patented May 22, 1877.

Fig. 1.

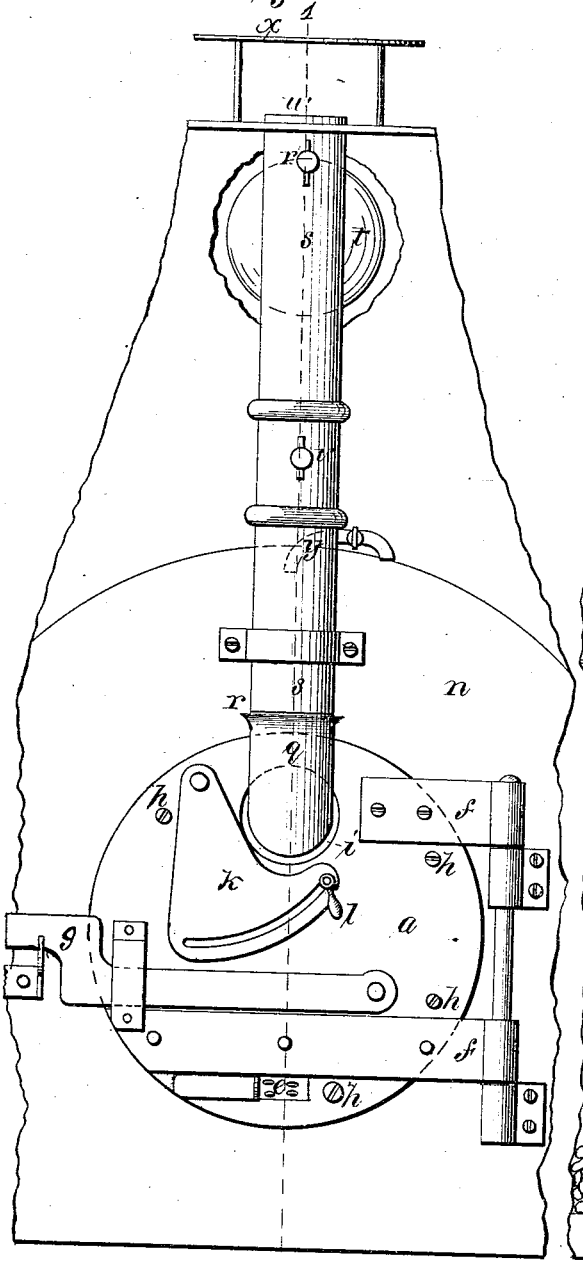
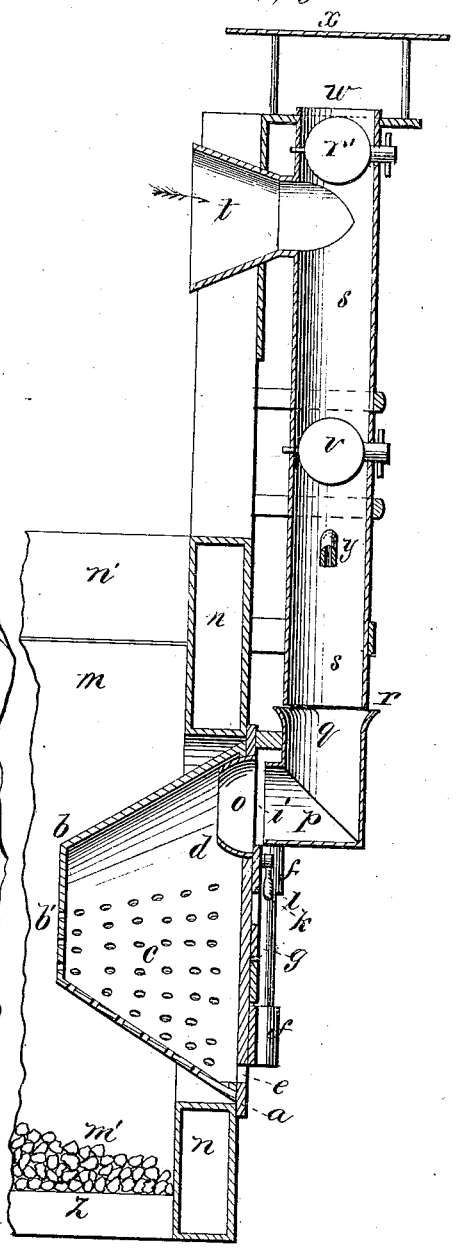


Fig. 2.



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WILLIAM WHEELER HUBBELL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN FURNACE-DOORS OF LOCOMOTIVES.

Specification forming part of Letters Patent No. 191,147, dated May 22, 1877; application filed February 15, 1877.

To all whom it may concern:

Be it known that I, WILLIAM WHEELER HUBBELL, of Philadelphia, State of Pennsylvania, have invented an Improvement upon Furnace-Doors of Locomotive and other Similar Steam-Boilers, of which the following is a specification:

The object of my invention is to force air through the perforations of the chamber of the furnace-door patented by me, of date February 13, 1877, to supply with force jets of air to consume the smoke and combustible gases which arise from the fuel in the furnace, on which invention this is an improvement; and the nature of this improvement consists in constructing the furnace-door with an air-supply pipe arranged under a fixed pipe extending upward, and constructed to receive a supply of air forced down it by the movement of the engine, or by a steam-jet. The construction of the door is described in the specification of my said patent, also in this in general terms.

Referring to the drawings, Figure 1 is a front view of the door and improvement. Fig. 2 is a vertical section of the same on the line 1 2.

a is the outer face of the door; *f*, the hinges; *g*, the latch; *h*, the screw-bolts which secure the iron perforated jacket, or conical or tapering plate *b*, projecting into the furnace, and forming an inner perforated chamber, *d*, with a front end, *b'*, and perforated sides *c*. The door has an opening, *i*, through it, and adjustable slide-cover *k*, with set-screw *l* opposite the upper or unperforated part of the chamber, all of which are also described in my said patent.

The perforated chamber *d* may be a pointed cone in place of the plate *b'*. The front end of the chamber *d* may have an inverted cone-sheet, pointing to the opening *i*, instead of the plate *b'*. The top of the chamber may be flat, sloping down forward, as modifications I have contemplated, and may be perforated or unperforated.

To the inner face of the opening *i* I secure a bevel-collar, *o*, and in front of this opening *i* I attach to the door an elbow-pipe, *p*, constructed to form an annular space between its discharge-mouth at *i*, the collar *o*, the elbow-section *q* extending upward, and enlarged at *r* near the top of the door, so as to form an annular space between its mouth and the lower end of the pipe *s s*. When the door is closed the section *q* is under pipe *s s*, which extends up above the boiler, and has an enlarged bell-mouth, *t*, extending horizontally forward to the outer air, to catch the air and drive it down the pipe *s s*, through the elbow *p q* and opening *i*, into the door-chamber *d*, from which it passes with force through the perforations, among the gases and smoke, to consume together in the furnace. The upper end of the pipe *s s* at *w* is open to admit air in case the wind blows in the direction of movement of the locomotive, or of pointing of the bell-mouth *t*. This upper end *w* has a plate roof or cover, *x*, supported above it to keep out the rain, yet admit the air to enter it. A valve, *r'*, in it shuts it when not needed. A valve, *v*, in the pipe regulates the supply of air. When the engine moves forward the pressure of air on the bell-mouth *t* generally drives sufficient down to supply the chamber of the door. As an auxiliary force when needed, I extend a small steam-pipe, *y*, from the boiler into the pipe *s s* below the valve *v*, or nearer the top of the pipe *s s*, and admit a fine jet of steam downward to force the air down into the chamber; but the jet must be very fine—about a tenth of an inch—and the condensed steam runs out of the space at *i*, or a hole in the bottom of the joint *p*.

The water-space around the door is marked *n n;* the crown-space, *n';* the furnace-fuel, *m';* the furnace side, *m;* and the grate-bars, *z*. In the lower part of the door I make a cleaning-hole, *e*, with a slide-cover. The elbow-pipe *p q* may be solid to the door-plate, without the annular space at *i;* but the annular space at *i* serves to increase the supply of air, and also the annular space at *r* serves to increase and to admit air in standing or firing up in the furnace.

What I claim is—

1. The stationary supply-pipe *s s*, in combination with the elbow-pipe *p*, having an expanded mouth, *r*, and attached to the door, conical perforated chamber *d*, bell-mouth *t*, valve *r'*, and valve *v*, to force and regulate the supply of air, substantially as described.

2. In combination with a furnace-door provided with a conical perforated chamber, *d*, and bevel-collar *o*, the elbow-pipe *p*, secured to the door, and stationary pipe *s s*, the collar *o*, forming with the end of elbow-pipe *p* an annular space, as and for the purposes described.

3. In combination with a furnace-door, provided with an elbow-pipe, *p*, having a flaring end, *q*, the pipe *s s*, having mouth *w* and bell-mouth *t*, as and for the purposes set forth.

4. In combination with a furnace-door provided with chamber *d* and elbow-pipe *p*, the pipe *s s*, having bell-mouth *t*, mouth *w*, and valves *v r'*, as and for the purpose set forth.

5. The pipe *s s*, cover *x*, mouth *w*, and furnace-door, provided with elbow-pipe *p*, and chamber *d*, all combined as and for the purpose set forth.

6. In combination with a furnace-door provided with elbow-pipe *p* and chamber *d*, the stationary pipe *s s* and steam-jet pipe *y*, all arranged to operate together as and for the purpose set forth.

WM. W. HUBBELL.

Witnesses:
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