W. F. BEECHER.

Locomotive Smoke-Stack.

No. 204,522. Patented June 4, 1878.

Fig. 1.

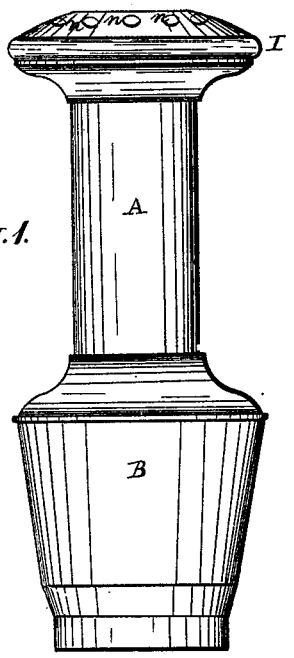


Fig. 2.

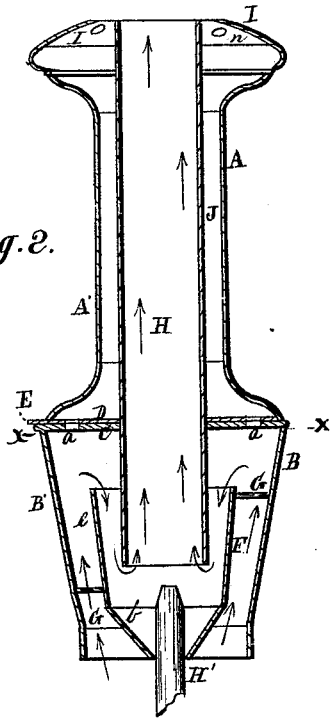


Fig. 3.

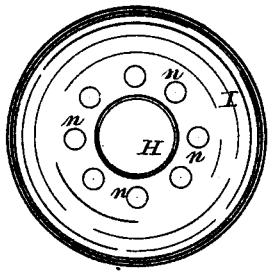


Fig. 4.

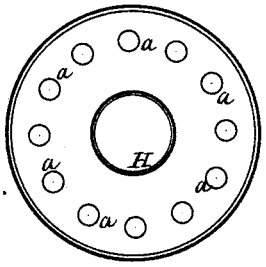
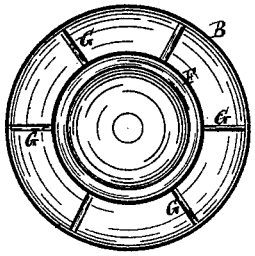


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM F. BEECHER, OF CLEVELAND, OHIO, ASSIGNOR OF TWO-THIRDS HIS RIGHT TO PHILLIP ALLEMAN AND AUGUSTUS C. GATCHELL, OF SAME PLACE.

IMPROVEMENT IN LOCOMOTIVE SMOKE-STACKS.

Specification forming part of Letters Patent No. **204,522**, dated June 4, 1878; application filed November 3, 1877.

To all whom it may concern:

Be it known that I, WILLIAM F. BEECHER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and Improved Smoke-Stack; and I do hereby declare that the following is a full, clear, and complete description thereof, reference being had to the accompanying drawings, making a part of the same.

Figure 1 is a side view of the stack. Fig. 2 is a vertical transverse section. Fig. 3 is a top view. Fig. 4 is a transverse section taken through the line *x x*, looking upward. Fig. 5 is also a transverse section, looking downward.

Like letters of reference refer to like parts in the several views.

The nature of this invention relates to certain improvements in smoke-stacks for portable marine and stationary boilers, whereby is prevented the escape of sparks from the stack without the use of wire-gauze for that purpose, and by which means a large amount of heat is retained in the fire-box, and the arrested sparks, cinders, and soot are partially prevented from falling into the smoke-box underneath the stack.

The usual large amount of sparks, soot, &c., which is carried over into the smoke-box of the ordinary construction is, by the peculiar arrangement of this stack, retained in the fire-box, and therein consumed as fuel; and, furthermore, the improvement provides for regulating the draft, so that either a direct or an indirect draft may be had at will, substantially as hereinafter more fully set forth, the same being an improvement of a patent granted to me December 7, 1869, antedated November 24, 1869, No. 97,473.

The stack above alluded to consists in part of two sections, A and B, A′ constituting the outer wall of section A, and B′ the wall of section B. The upper section rests upon the circumferential edge of section B and is thereto secured by any appropriate means.

At the junction of the two sections is a perforated diaphragm, C, Fig. 2, whereon is a rotative damper, D, which is operated from the outside by a handle, E, projecting through a slot in the base of the upper section A of the stack. In said damper are perforations corresponding to the perforations *a* in the diaphragm, which, in the drawing, are shown in open relation to each other. Fig. 4 represents an under-side view of the diaphragm.

The lower section of the stack resembles an inverted truncated cone, fully open at the bottom and at the top, through the perforated diaphragm and damper referred to. Within the wall of section B of the stack is a conical-shaped wall, F, supported in place by stays G, also shown in Fig. 5. The diameter of said wall F relatively to the outer wall B is such as to form an annular space, *e*, between the two said rolls, as shown in the drawings.

The lower end of the annular wall F is suddenly contracted or funnel-shaped, as seen at *b*, and terminates around the exhaust-pipe H′ within the circumference of the wall F.

H represents a flue or discharge-pipe secured to the crown I of the upper section of the stack, and, passing downward through the diaphragm and damper, terminates within the walls F, substantially as shown in Fig. 2.

It will be seen that between the wall of the flue H and the wall A′ of the stack is formed an annular space or chamber, J, having communication with the lower section of the stack by the perforated diaphragm C. On opening the damper D above alluded to, the space or annular flue J is open to the outside through the perforations *n* in the crown I of the stacks.

The practical operation of the above-described smoke-stack is as follows: It is to be arranged upon a locomotive-boiler or other steam-boiler, and in such relation to the exhaust-pipe of the engine that the steam may exhaust into the pipe H through the exhaust-pipe H′ referred to. When the damper D is closed, the smoke and gases pass up through the space F, and, impinging against the diaphragm, are deflected downward to and within the wall F, thence to and upward through the flue H to the outside, accelerated in its passage out by the exhausting steam. This reversion of the draft produced by the deflecting-diaphragm retards the draft, consequently retaining a large amount of heat within the

fire-box, which effectually consumes the sparks, so that none escapes along with the smoke through and out of the stack. The sparks which may not have been consumed fall back into the ash-box.

On opening the damper a direct draft is obtained through said damper and the diaphragm, thence upward along the flue or space J to the outside through the openings I in the crown of the stack.

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

1. The rotative damper D and perforated diaphragm C, in combination with the discharge-pipe H, annular chamber J, and wall A′, substantially as and for the purpose set forth.

2. In smoke-stacks, the combination of the discharge-pipe H, annular chamber J, diaphragm and damper C D, and sections A B of the annular wall F, having a funnel-shaped base, *b*, substantially as and for the purpose described.

WILLIAM F. BEECHER.

Witnesses:
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J. H. BURRIDGE.