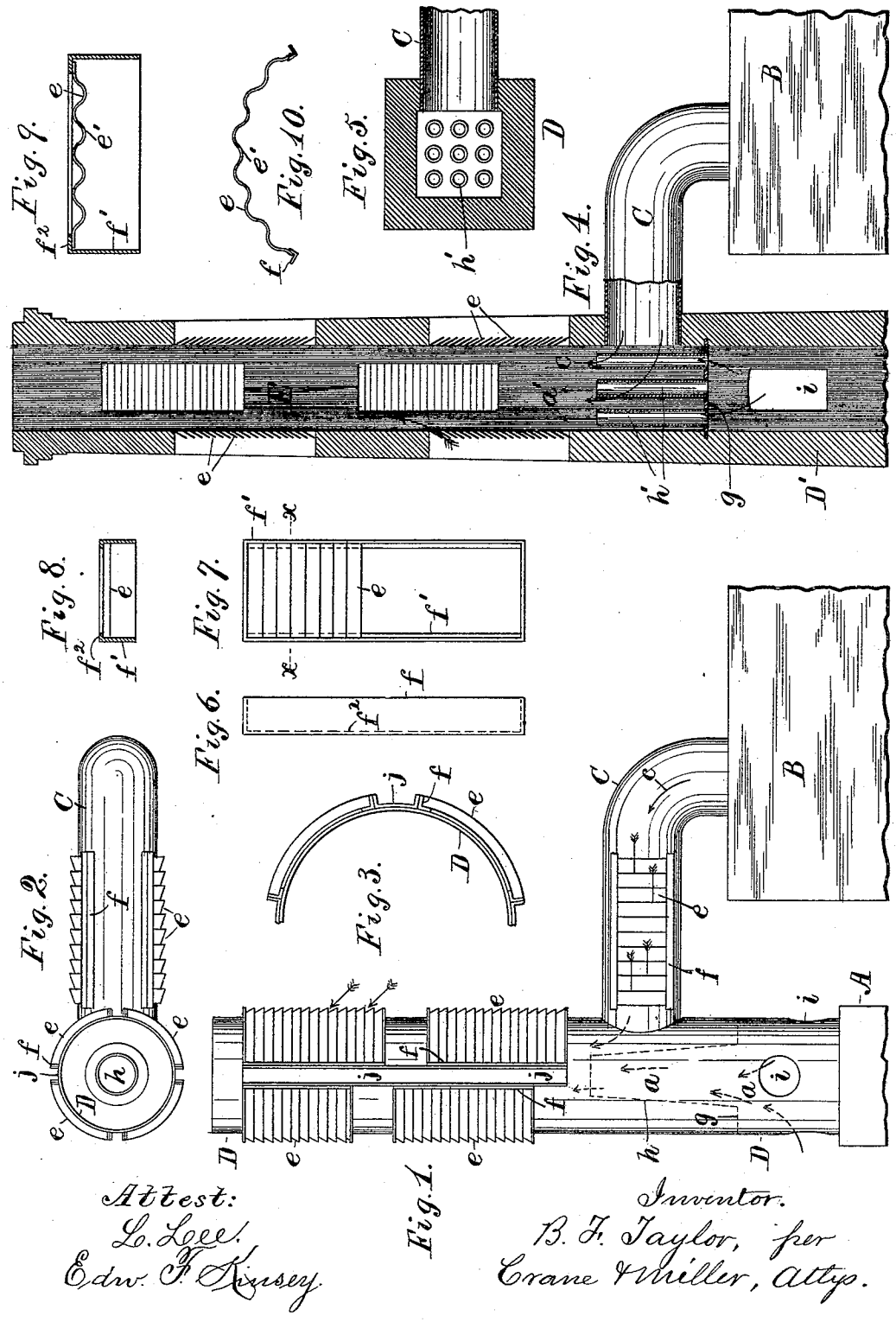
(No Model.) 2 Sheets—Sheet 1.

B. F. TAYLOR.

DRAFT DEVICE FOR STACKS.

No. 499,607. Patented June 13, 1893.



Attest:
L. Lee.
Edw. F. Kinsey.

Inventor.
B. F. Taylor, per
Crane & Miller, attys.

(No Model.) 2 Sheets—Sheet 2.

B. F. TAYLOR.

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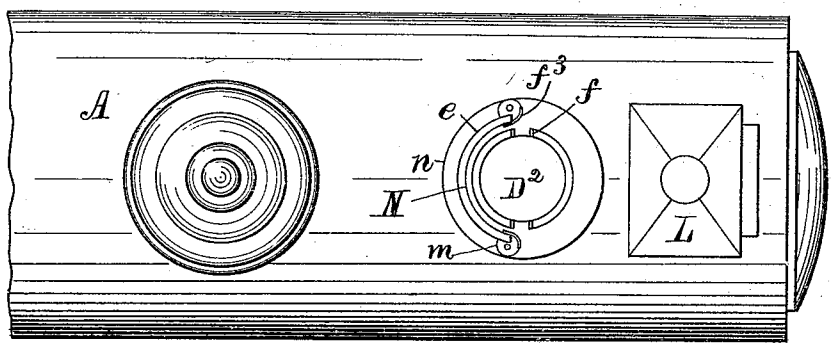

Fig. 11.

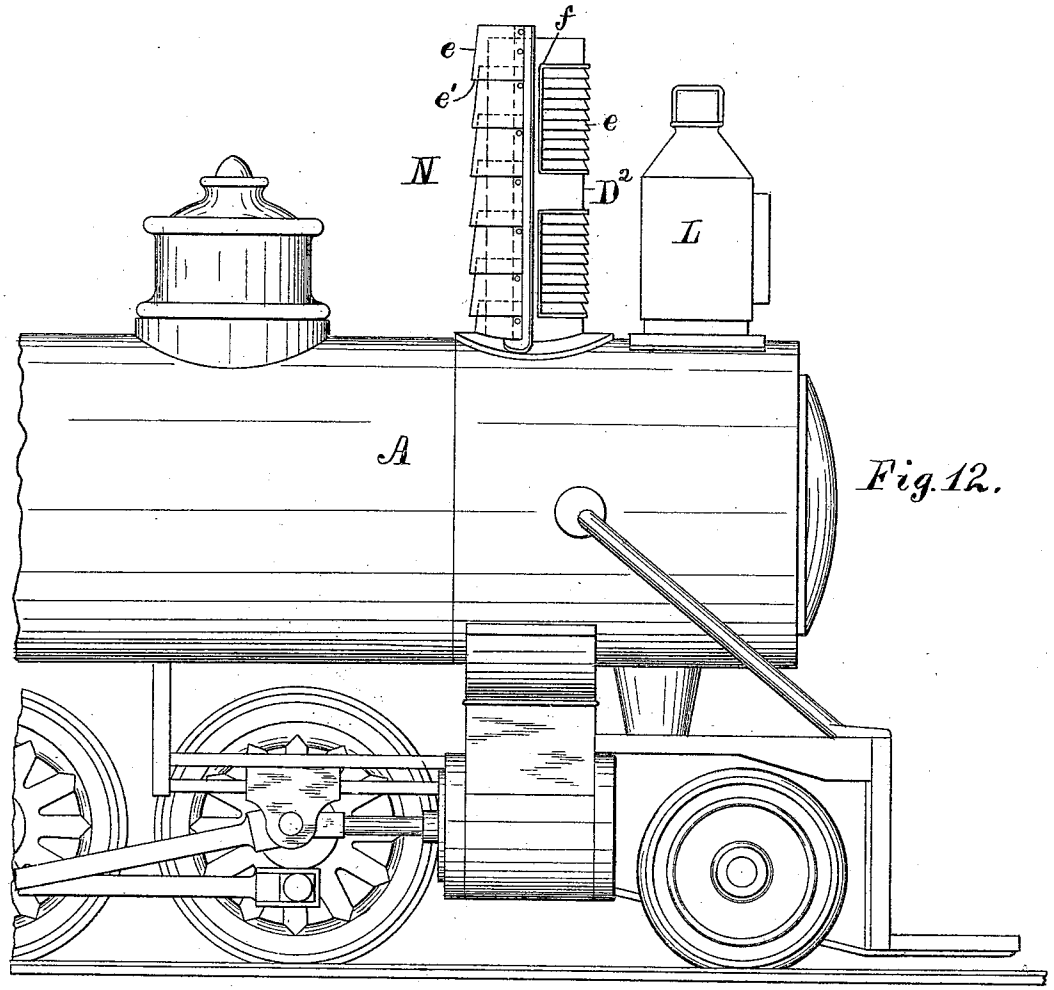

Fig. 12.

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UNITED STATES PATENT OFFICE.

BENJAMIN F. TAYLOR, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE TAYLOR IMPROVED DRAUGHT COMPANY, OF NEW JERSEY.

DRAFT DEVICE FOR STACKS.

SPECIFICATION forming part of Letters Patent No. 499,607, dated June 13, 1893.

Application filed May 28, 1892. Serial No. 434,827. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. TAYLOR, a citizen of the United States, residing at Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Draft Devices for Stacks, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention is adapted to secure the advantages, for old chimneys of brick or metal, of the improvements set forth in my application, Serial No. 407,710, filed October 5, 1891. In that application I have shown a stack having a series of conical rings superposed one upon another to furnish a continuous series of inclined draft openings in the sides of the stack. In such a construction the entire stack is composed of the inclined rings or of an endless sloping coil, but such a construction is adapted chiefly for application to new stacks.

My present invention consists in an attachment for smoke stacks, consisting in a metallic frame provided with a series of upwardly inclined metallic slats and fitted to the exterior of the flue of the stack so as to direct the air from the exterior of the stack into the contents of the same with an upward inclination. Such attachment can be applied to any stacks already in use, by cutting a suitable aperture or apertures in the side or sides of such stacks, and inserting or fastening the frame thereto upon the exterior of the flue. The inclined slats are thus applied directly to the apertures and form lateral draft openings connected with the apertures, so that the air which enters through the draft openings is forced by its inclination to mingle with the entire contents of the stack.

My attachment is especially advantageous for use upon steam boats, where large stacks are used, and where the draft is often defective, and in such case the frame and slats would be curved to fit the exterior of the stack.

In the drawings, Figure 1 is a side elevation of a sheet iron stack connected, by a breeching or intake, with one end of a boiler setting. Fig. 2 is a plan of the sheet iron stack and intake. Fig. 3 is a transverse section of part of the stack upon a larger scale. Fig. 4 is a vertical section of a square brick chimney with an intake partly in section where it is connected with the chimney. Fig. 5 is a plan of the chimney at the center of the intake. Fig. 6 is an edge view, and Fig. 7 an outside view of one of the slatted frames. Fig. 8 is a section of the frame on line x, x, in Fig. 7. Figs. 9 and 10 are similar sections showing corrugated slats. Fig. 11 is a plan, and Fig. 12 a side view of the front end of a locomotive with the stack provided with the slatted frames and an auxiliary deflector.

B represents the end of a boiler setting and C the breeching from the same; forming the intake to the stack D. The stack, in Figs. 1, 2 and 3 is shown of cylindrical form, as when made of sheet metal, resting at the bottom upon a pier A. The side of the intake is shown provided with inclined draft openings formed by a series of slats *e* attached to angle irons *f*, the angle irons themselves being secured at the edges of a suitable opening formed in the side of the intake. A bottom plate *g* is inserted in the stack below its connection with the intake, and a central pipe *h* is projected from a hole in the middle of the plate *g* upward past the inlet of the intake. Apertures *i* are formed in the sides of the stack below the partition *g* to admit air to the pipe *h*, as indicated by the arrows *a*. The course of the smoke passing through the breeching or intake is indicated by arrows *c* and enters the stack around the pipe *h*, mingling with the air which enters such pipe; as both rise within the stack.

The stack in Fig. 1, is shown upon its nearer side, provided with four vertical series of draft openings, formed like those upon the breeching C, with curved slats *e* attached to angle irons *f*.

In Fig. 1, the frames formed of the slats and angle irons are shown secured upon the exterior of the stack, suitable apertures being cut in the stack under such frames, and the frames in one vertical series breaking joints with those in the adjacent series to avoid unduly weakening the stack. The stack is strengthened vertically, between the apertures, by trough shaped channel irons *j*, clearly shown in Fig. 3, which irons stiffen the stack longitudinally while they furnish a

means of readily securing the angle irons *f*, which hold the inclined slats *e* in place.

The operation of the slatted frames, as claimed in my application, Serial No. 407,710, is to utilize the wind, which may be blown from any direction, to promote a strong upward draft within the stack, as such wind enters the stack in an upwardly inclined direction through the openings between the slats *e*, as indicated by the arrows *b* in Fig. 1, and thus produces a strong upward forced draft. The air entering the sides of the stack necessarily mingles with the smoke inside the same, and a current of air is also by the upward draft, drawn into the pipe *h*, and diffused within the smoke and gases entering from the intake. Air is thus mingled with the smoke externally and internally as it passes upward in the stack and is discharged from the stack in a highly diluted condition, so that the smoke constitutes little, if any nuisance. The effect of the inclined openings in the breeching is of course the same as in the stack itself, producing a strong upward draft of its contents into the stack D, if the wind be allowed to strike the same; and otherwise admitting air to dilute the smoke passing through the breeching.

From the illustration in Fig. 1, it will be seen that the frames provided with the inclined slats may be applied to any cylindrical sheet metal structure, and Figs. 4 to 8 inclusive show the means of applying such attachments to brick chimneys.

The chimney D′ shown is in section in Fig. 4, and a partition *g* is shown fitted in below the intake C, but provided, instead of the single tube *h*, with a series of small tubes *h′* which are adapted to mingle the air thoroughly with the entering smoke; the air being shown by the arrows *a′* and the smoke by the arrows *c*.

An arched aperture *i* is shown in the brick chimney below the partition *g*, to admit air to the pipes *h′*.

The stack is shown provided upon several sides with apertures E, in each of which would be inserted a metallic frame or casing *f′*. The casings are omitted from Fig. 4 on account of the smallness of the drawing, but is shown upon twice the scale in Figs. 6 to 8 inclusive; the casing consisting preferably in a square casting like a door frame provided upon its inner edge with strips or ribs f^2 to which the inclined slats *e* may be secured in the same manner as to the angle irons *f* shown in Figs. 1 to 3 inclusive.

The slats *e* are partly omitted in Figs. 7 to show the strips or ribs f^2 upon the inner edges of the frames *f′*.

The angle irons *f* shown in Figs. 1 to 3 inclusive may be connected by cross bars *l* at the top and bottom, independently of the slats, where a rigid frame is desired; to strengthen the metallic stack shown in Fig. 1.

The openings E are shown at different levels in the adjacent sides of the chimney to avoid weakening the brick work, and the introduction of metallic frames or casings within such openings operates to restore and preserve the strength of the stack in the desired manner.

Figs. 9 and 10, show the slats corrugated transversely to form corrugated openings *e′* where the lower edge of one slat overlaps the upper edge of another. The corrugation of the slats serves to increase the length of the inclined openings between the angle irons *f* to which the slats are secured. By such means any stack or chimney already in use may be provided upon any of its sides with a continuous series of lateral draft openings adapted to admit numerous inclined jets of air to expel the contents of the stack by numerous upward impulses received from the external air entering between the slats; and the draft through any furnace connected with the stack and chimney may be correspondingly increased.

In forming new stacks it may be more economical to use conical rings or coils of metal to produce the inclined openings; but the present construction is designed to afford the advantages of the invention to previous chimney constructions, by altering the metal or brick work of the stack to admit the desired attachments.

By the use of the tube or tubes *h*, it will be seen that a volume of air is introduced within the body of the smoke while at the same time the exterior of the column of smoke rising within the stack is mingled with the air which enters through the lateral openings. The chilling of the smoke and gases which is produced more or less by the mingling of the air with the same would be detrimental to the draft if it were not found in practice that the inclination of the apertures in the sides of the stack more than compensate for such chilling effect, by producing a strong upward movement of the entire contents of the chimney. The result of the draft device is thus two-fold; first, it improves the draft of the furnace with which the stack is connected, and, second, it operates to dilute the smoke and gases discharged from the stack so that they are less offensive both to sight and to smell.

Figs. 11 and 12 show an additional device for increasing the draft when the stack is attached to a moving vehicle, as a steam-boat or locomotive, and providing for the maintenance of the draft when the motion of such vehicle is reversed. One side of the stack, when upon such a vehicle, may be regarded as the forward side, and the motion of the vehicle drives the air against such forward side only. The additional device consists in a curved deflector projected at the sides of the stack and extended around the rear side of the same, so as to throw the air into the draft openings upon such rear side. A moving stack provided with such deflector is thus subjected not only to the wind produced by the motion upon its front side,

but an equally active draft is produced upon the rear side also. Such deflector may be termed a wind controller, and is shown in Figs. 11 and 12 of a semi-cylindrical shape sustained a little distance in the rear of the smoke stack D^2 with its edges curved outwardly from the sides of the stack to intercept the air through which the vehicle is moving.

The wind controller is shown formed of upright angle irons f^3 having their edges curved outwardly from the stack and provided at their lower ends with feet m secured to the flange n at the bottom of the smoke stack. The wind controller is also shown formed with inclined slats e with their adjacent edges overlapping, forming spaces e' between which the air may enter and move upwardly when the motion of the vehicle is reversed.

The stack is shown provided upon its front and rear sides with frames containing inclined slats, like the stack shown in Fig. 1, the frames being lettered f, and those upon the rear side of the stack being omitted (in Fig. 12), to avoid obscuring the drawing.

A headlight or lantern L is shown upon the locomotive boiler A, and it is obvious that such headlight would prevent the direct access of the air to the front of the smoke stack at its lower part. The air passing the stack is however caught by the curved edges f^3 of the wind controller and carried into the inclined slats upon the rear side of the smoke stack, through which it enters the interior of the stack in an upward direction, and thus promotes the draft as desired. When the motion of the vehicle is reversed, it is obvious that the air would enter the spaces e' between the slats of the wind controller, and would thus be deflected upward between the inclined slats upon the rear side of the stack; while the overlapping edges of the slats in the wind controller would prevent any material portion of the air from escaping when the vehicle is moved forward. It is obvious that the deflector may be applied to a stationary stack as well as to one in motion, and may be adapted to turn about the stack so as to catch the air from any desired quarter. As the air when in motion strikes one side of the stack only, it is obvious that the deflector greatly increases the draft by throwing the air into the inclined slats upon the opposite side of the stack.

As the wind controller is adapted to promote the draft whether the wind approaches the inclined edges f^3, or the outer side of the controller which is provided with the inclined openings e'; it will be seen that it is adapted to increase the draft of a stationary smoke stack even if it be fixed rigidly in relation thereto.

I am aware that inclined slats have been used in many devices for promoting draft, and I do not therefore claim such slats except in the specific constructions herein set forth. My present invention is intended as an attachment for cylindrical chimneys, and consists in a frame curved to fit the chimney for which it is intended, and adapted to be readily secured upon the exterior of the same; the frame being provided with upwardly inclined slats as herein set forth.

Having thus set forth the nature of the invention, what I claim herein is—

1. An attachment for smoke stacks, consisting in a curved metallic frame provided with a series of upwardly inclined metallic slats and fitted to the exterior of a cylindrical stack, as set forth.

2. The combination, with a smoke stack having apertures formed in different sides, of the metallic strips j secured vertically upon the stack, and frames secured to the strips over the apertures and provided each with a continuous series of inclined slats, as and for the purpose set forth.

3. The combination, with a smoke stack having an open top and provided with a continuous series of lateral draft openings inclined upwardly, of a breeching or intake connecting the boiler with the stack, and provided in one or more sides with a continuous series of lateral draft openings, as and for the purpose set forth.

4. The combination, with a smoke stack provided in one or more sides with a continuous series of lateral draft openings inclined upwardly, of a breeching or intake connecting the boiler with the stack, a bottom in the stack below the intake, and one or more air pipes projected upward from the partition and supplied with air by inlets from below the same, as and for the purpose set forth.

5. The combination, with a smoke stack provided upon opposite sides with a series of lateral draft openings inclined upwardly, of an inclined wind controller fixed adjacent to one side of the stack and provided with projecting edges adapted to deflect the air inward against the stack, as and for the purpose set forth.

6. The combination, with a smoke stack provided upon opposite sides with a series of lateral draft openings inclined upwardly, of a wind controller formed of a series of inclined slats, and fixed adjacent to one side of the stack and provided with projecting edges to deflect the air inward against the stack, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

BENJAMIN F. TAYLOR.

Witnesses:
THOMAS S. CRANE,
L. LEE.