(No Model.) 2 Sheets—Sheet 1.

B. F. TAYLOR.

SIPHON DRAFT DEVICE.

No. 532,496. Patented Jan. 15, 1895.

Fig. 1.

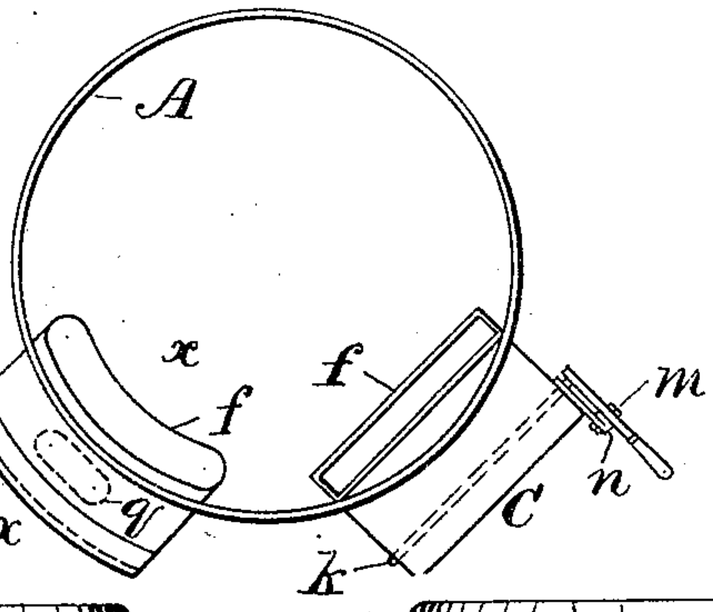


Fig. 2.

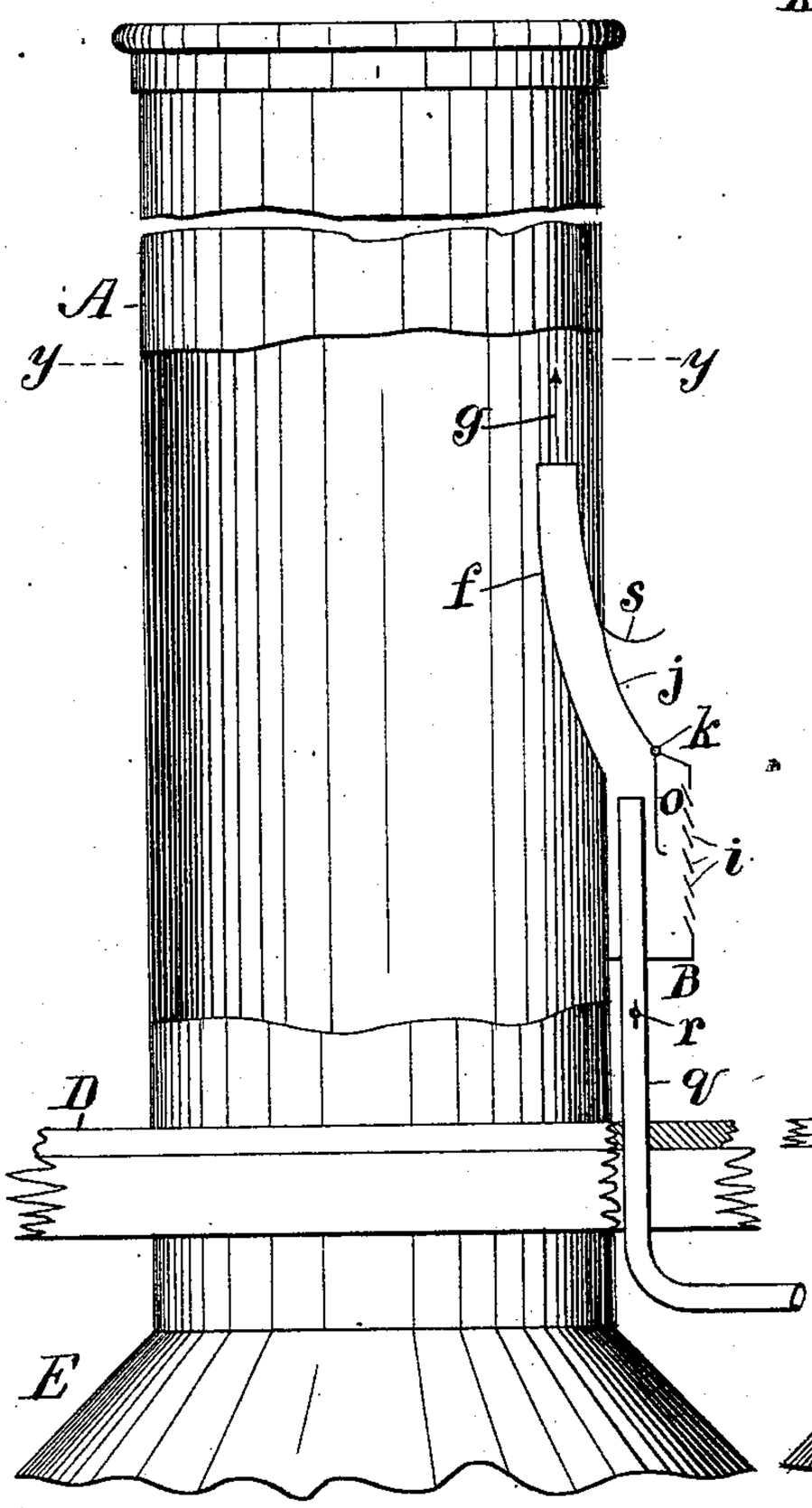
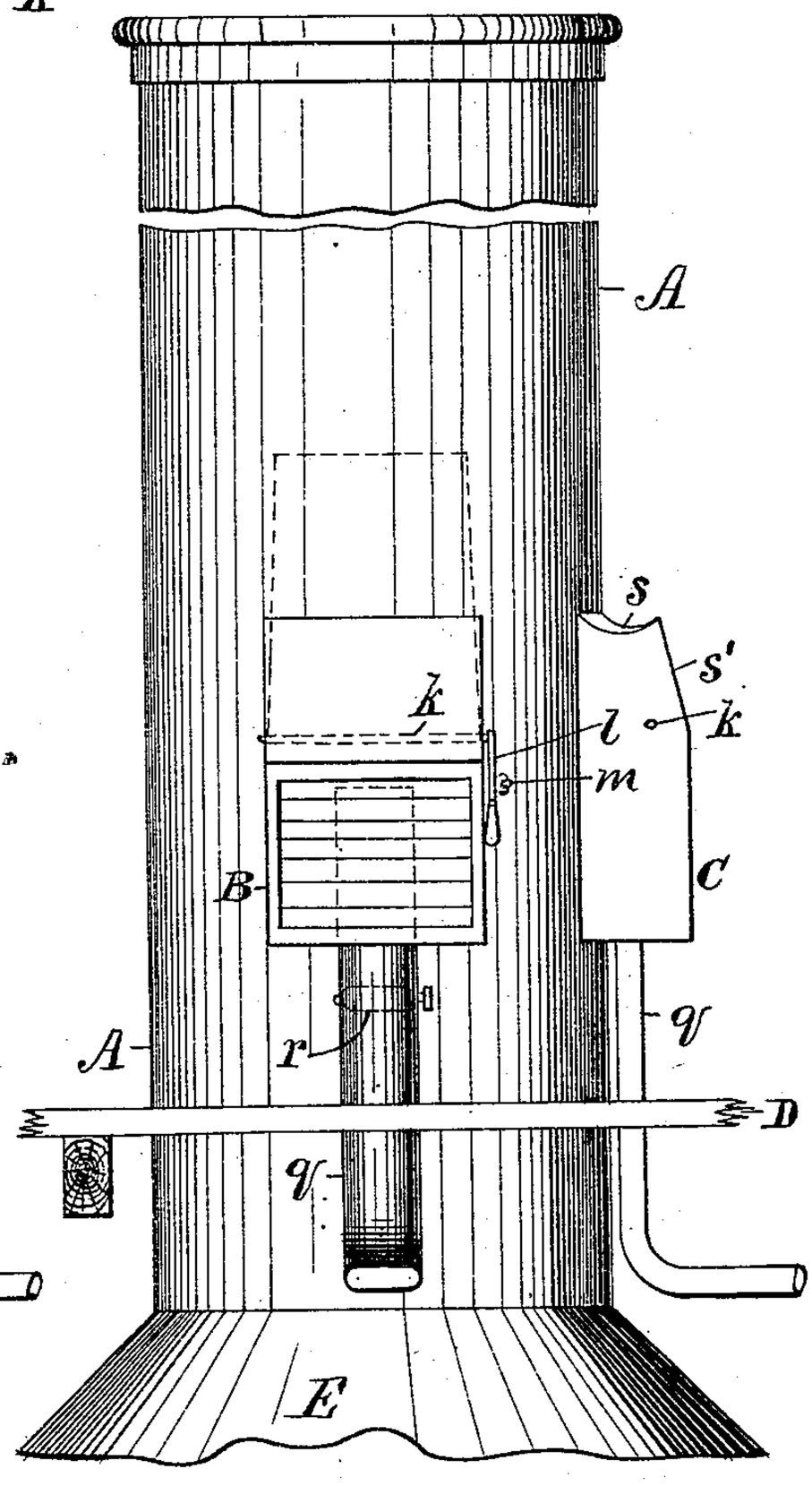


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

B. F. TAYLOR.

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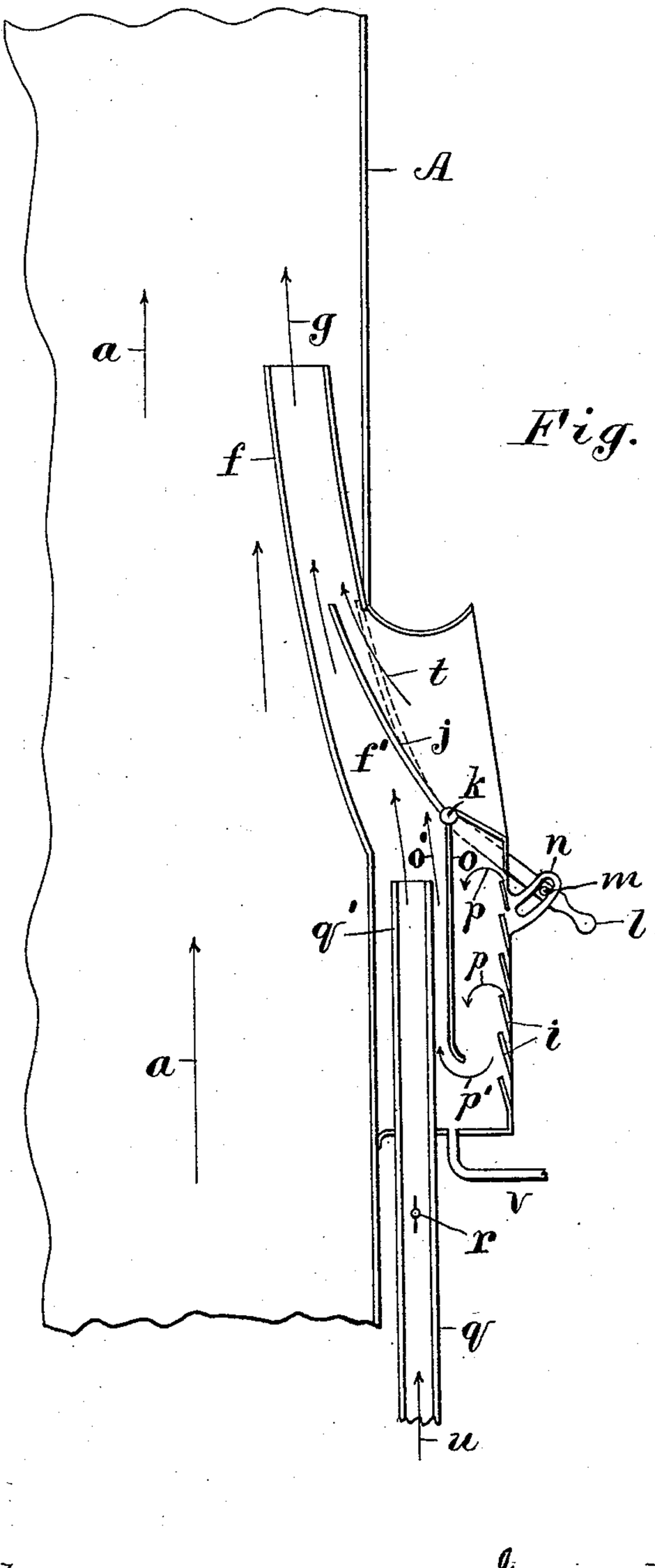

Fig. 4.

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UNITED STATES PATENT OFFICE.

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

SIPHON DRAFT DEVICE.

SPECIFICATION forming part of Letters Patent No. 532,496, dated January 15, 1895.

Application filed November 28, 1894. Serial No. 530,222. (No model.)

To all whom it may concern:

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

The present improvements relate to the stacks of chimneys, and may be applied to stationary chimneys or to the chimneys of locomotives or steam boat boilers. The same construction may be used with any of the boilers named, but the functions of the apparatus may be varied by the use of the auxiliary draft pipe, in some cases, for ventilation by drawing the vitiated air from an apartment.

The invention consists primarily in the combination with a chimney having an aperture cut in the side, of a draft box affixed upon the outside of the chimney and provided with suitable air inlets, and a draft conductor extending from such box through the aperture upward into the chimney.

The invention consists also in various modifications and attachments, as hereinafter set forth.

The stack or chimney of a steam boat boiler is shown in the drawings, with a portion of the upper deck through which the stack projects.

In the annexed drawings, Figure 1 is a plan of a smoke stack with two draft boxes B and C applied thereto. Fig. 2 is a side elevation of the chimney, partly in section through the box B on line x, x, in Fig. 1. Fig. 3 is an elevation of the chimney viewed from the front of the draft box B; and Fig. 4 is a view like Fig. 2 (upon a larger scale) of the draft box and adjacent parts, with the direct draft flap shown open in full lines, and closed in dotted lines.

The chimney A is shown in Figs. 2 and 3 having the draft boxes B and C applied to the same above the level of a deck D, over a smoke box or breeching E. At the upper end of each draft box an aperture is formed through the shell in the side of the stack A, and a conductor f is projected inwardly and upwardly, from such aperture, to deliver a current of air upwardly adjacent to the side of the stack, as indicated by the arrow g.

Where the draft device is applied to metal chimneys, it is effected by cutting a suitable aperture in the wall of the stack and projecting the conductor f through the same. Such aperture is indicated by the letter f_1' in Fig. 4, and is covered externally by the draft box, which co-operates with the conductor in throwing the air upwardly.

The outer side of the draft box may be curved concentric with the stack, as in the box B in Fig. 1, or rectangular in shape, as in the box C in Fig. 1. The draft boxes consist of sheet metal chambers attached to the shell of the stack, and having a vertical face adapted to intercept the wind that blows horizontally toward the stack. The boxes B and C are shown in this figure upon the quarters of the stack, at the front side, the motion of the stack when the steam boat is advancing being indicated by the arrow H' in Fig. 1. Such motion brings the draft boxes into contact with a current of fresh air, and the front side of each box is formed with air inlets which are preferably provided with upwardly inclined slats i which deflect the air upward as it enters the air box.

The draft box is preferably arranged as shown in Fig. 4, near the lower end of the aperture f', so as to permit the introduction of air directly to such aperture when desired. A flap i is shown hinged by a rod k upon the top of the box, and provided with a handle l to set the flap in any desired position. When adjusted, the handle may be secured by a bolt m fitted to a slotted segment n upon the draft box. The flap closes upon the upper side of the aperture, which is formed in the stack at the base of the conductor f. Flanges s and s' are projected from the aperture at the top and sides to direct the air into the aperture. The flap when closed, as in Fig. 2, directs the air upwardly from the inlets of the draft box; but when opened wholly or in part, as shown in Fig. 4, it operates to admit the outer air directly within the conductor. The flap J when closed forms the upper part of the draft box, operating to exclude the external air from the conductor when required, and when such

flap is not used or required in the construction the draft box would necessarily be arranged or applied to cover the whole of the aperture f'.

A partition o is extended downward within the draft box from the top, and the air entering through the slats i is deflected first (as indicated by the arrow p) to the bottom of the box, and thence upward to the conductor f (as indicated by the arrow p'). An auxiliary draft pipe q is shown inserted through the bottom of the draft box behind the partition o, and is provided with a damper r below the box. Such auxiliary pipe extends upward between the partition and the stack toward the aperture f' leading to the conductor f. The partition, when used, possesses a double function, first, to prevent the discharge of sparks from the draft box when blown down the chimney by a back draft, and, second, to form an ejector in connection with the pipe q. Both of these functions are fully described hereinafter; but the partition is not required where the construction does not attempt the performance of such functions.

The partition may be made short, as in Fig. 2, where it is to operate in conjunction with the pipe q, but where it is to prevent the discharge of sparks, it should be extended nearly to the lowest slats i, as shown in Fig. 4.

The flap j is useful chiefly upon stacks in motion, as on a steam boat, and the operation of the draft box, the conductor, and the flap j is as follows: When the wind is toward the draft boxes, the flap j may be partially opened, as shown in Fig. 4, and the air then reaches the conductor f through the slats i, and also past the flap, as indicated by the arrow t in Fig. 4; the latter current of air serving to drive upward that within the conductor, and thus increasing the movement of the air through the slats. When the wind is not toward the draft boxes, the flap is closed, as shown in Fig. 2, and the forward motion of the chimney then forces the current of air through the slats alone into the draft box. The conductor f is directed upward close to the side of the stack, and the air discharged therefrom (as indicated by the arrow g in Fig. 4) mingles with the smoke and gases rising within the chimney A (as indicated by the arrows a). The air from the conductor thus greatly stimulates and accelerates the movement of the smoke and gases, and increases the draft through the boiler furnace as desired.

The conductor is inclined inward in a slight degree from the side of the chimney A, and the air from the conductor is thus projected at a slight angle toward the center of the chimney so that the entire contents of the chimney are influenced thereby. In firing up before the steam boat is in motion, a back draft is liable to occur from a change in the direction of the wind, and sparks may thus be blown down the chimney into the conductor f. The object of the partition o is to trap such sparks and retain the same in the bottom of the draft box. They are thus prevented from escaping between the slats i and igniting surrounding objects.

The apparatus may be used with the parts just described, or may be supplied with the draft pipe q, and may then perform several additional functions.

First, the draft pipe q may be extended in any direction, and used for ventilating the fire room, cabin, or hold of a vessel, as the movement of air past the nozzle or upper end of the draft pipe produces a suction or a reduction of pressure therein, and draws the air upward in the draft pipe, as indicated by the arrow u in Fig. 4.

Second, where the draft box is applied to a locomotive chimney, the draft pipe q may be connected to one side of the exhaust steam nozzle, and the suction in the draft pipe then operates to reduce the back pressure upon the exhaust, and a portion of the steam is discharged from the nozzle q' of the draft pipe into the conductor f. In such case, the nozzle acts as an ejector in connection with the adjacent walls of the draft box and partition o, and tends greatly to accelerate the movement of the air upward within the same, as indicated by the arrow o'. Where the exhaust steam of a locomotive is thus used it is condensed by contact with the current of cold air, and its volume is thus diminished in a very desirable degree, while the air operates efficiently in improving the draft.

A drain pipe v may be applied to the bottom of the draft box to conduct condensed water to any desired point.

The appliances I have described are cheaply made, and readily secured to the exterior of any metallic chimney with scarcely any change in the latter. The different parts of the device are, by their construction, enabled to perform several functions, by suitable adjustment, and the apparatus is thus adapted for use under many conditions.

I am aware that a steam jet has been used in various kinds of apparatus to propel smoke or air upward within a chimney stack; but the use of steam involves the consumption of fuel, whereas my invention is adapted to operate without the consumption of any power, or the use of any extraneous agency, by utilizing the atmosphere under its normal conditions to increase the chimney draft.

My appliance is adapted to increase the furnace draft upon the upper side of the grate bars, and thus obviates the necessity of increasing the air pressure below the grate bars, which can only be effected by considerable expense, and involves more or less injury to the grate bars, and a wasteful consumption of the fuel.

I have termed my invention a siphon draft device, as it operates like other blower si-

phons, to propel one current of air by frictional contact with another. Such action not only takes place within the stack when the air flows upward from the conductor *f*, and drives the gases before it, but where the air enters at one side of the flap *j* and propels the air moving upward upon the other side of the flap within the conductor. The same effect is produced when the ventilating pipe *q* is open and a current of air is driven from the same by the movement of the air upward within the draft box, as indicated by the arrow *o'* in Fig. 4.

The draft appliance may be made in a single structure adapted for attachment to a stack of given diameter, and in such case the draft conductor *f* will necessarily project upwardly from the opposite side of the draft box to that upon which the inclined slats *i* are provided.

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

1. The combination, with a chimney having the aperture *f'* formed in its side, of the draft conductor *f* projected upward from the inner side of the aperture, and the draft box applied to the exterior of the stack and operating to shield such aperture from the external air, and provided with suitable air inlets for admitting the adjacent air currents to the conductor, as herein set forth.

2. The combination, with a chimney having the aperture *f'* formed in its side, of a draft conductor *f* projected upward from the inner side of the aperture, a draft box having air inlets upon its exterior applied to the lower end of such aperture and provided with an adjustable flap *j* to close the outer inlet of the conductor when desired, as herein set forth.

3. The combination, with a chimney having an aperture in its side, of a draft conductor *f* projected upward from the inner side of the aperture, a draft box with air inlets upon its outer side applied to such aperture, and a partition extended downward within the box from the top, as set forth.

4. The combination, with a chimney having an aperture in its side, of a draft conductor *f* projected upward from the inner side of the aperture, a draft box with air inlets upon its outer side applied to such aperture, a partition extended downward within the box from the top, and an auxiliary draft pipe extended upward through the bottom of the draft box between such partition and the chimney, as herein set forth.

5. The attachment for sheet metal chimneys, consisting in the draft box having the inclined slats *i* upon its outer side, and the conductor *f* extended upward from its opposite side, as herein set forth.

6. The attachment for sheet metal chimneys, consisting in a draft box exposed to the air upon the front side and having the conductor *f* extended upward from its rear side, the auxiliary draft pipe *q* projected upward through the bottom, and a partition *o* extended downward within the box upon the front side of such draft pipe to form a siphon in connection with the same, substantially as herein set forth.

7. The attachment for sheet metal chimneys, consisting in the draft box having the inclined slats *i* upon its outer side, the conductor *f* extended upward from its opposite side to fit within the stack, and a partition *o* extended downward within the box from the top to intercept the sparks, substantially as herein set forth.

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

BENJAMIN FRANKLIN TAYLOR.

Witnesses:
GEORGE M. KEASBEY,
FREDERICK W. KEASBEY.