

(No Model.)

W. S. POST & H. DE WOLF SAWYER.
STEAM BOILER AND FURNACE.

No. 299,578.

Patented June 3, 1884.

Fig. 1

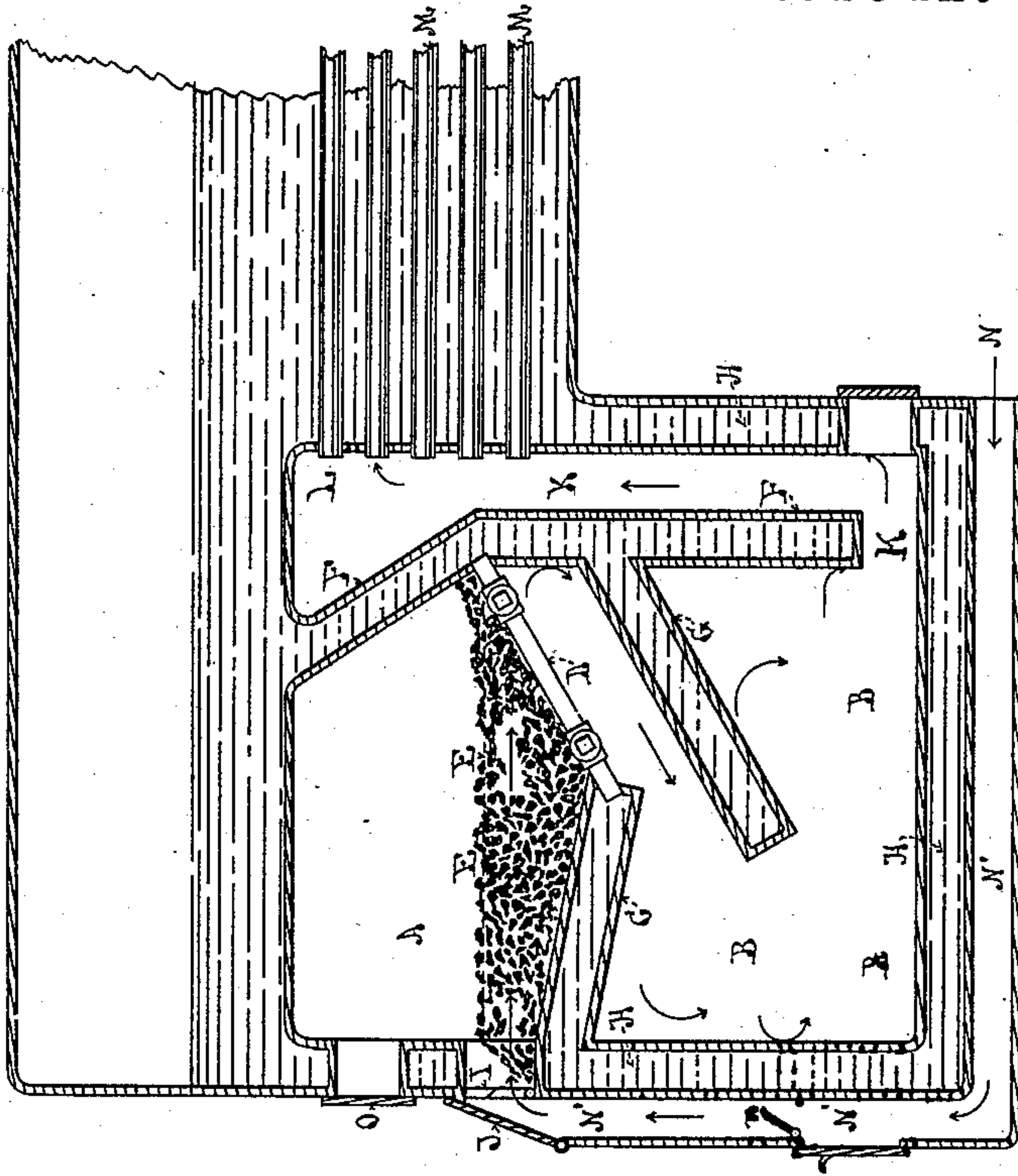
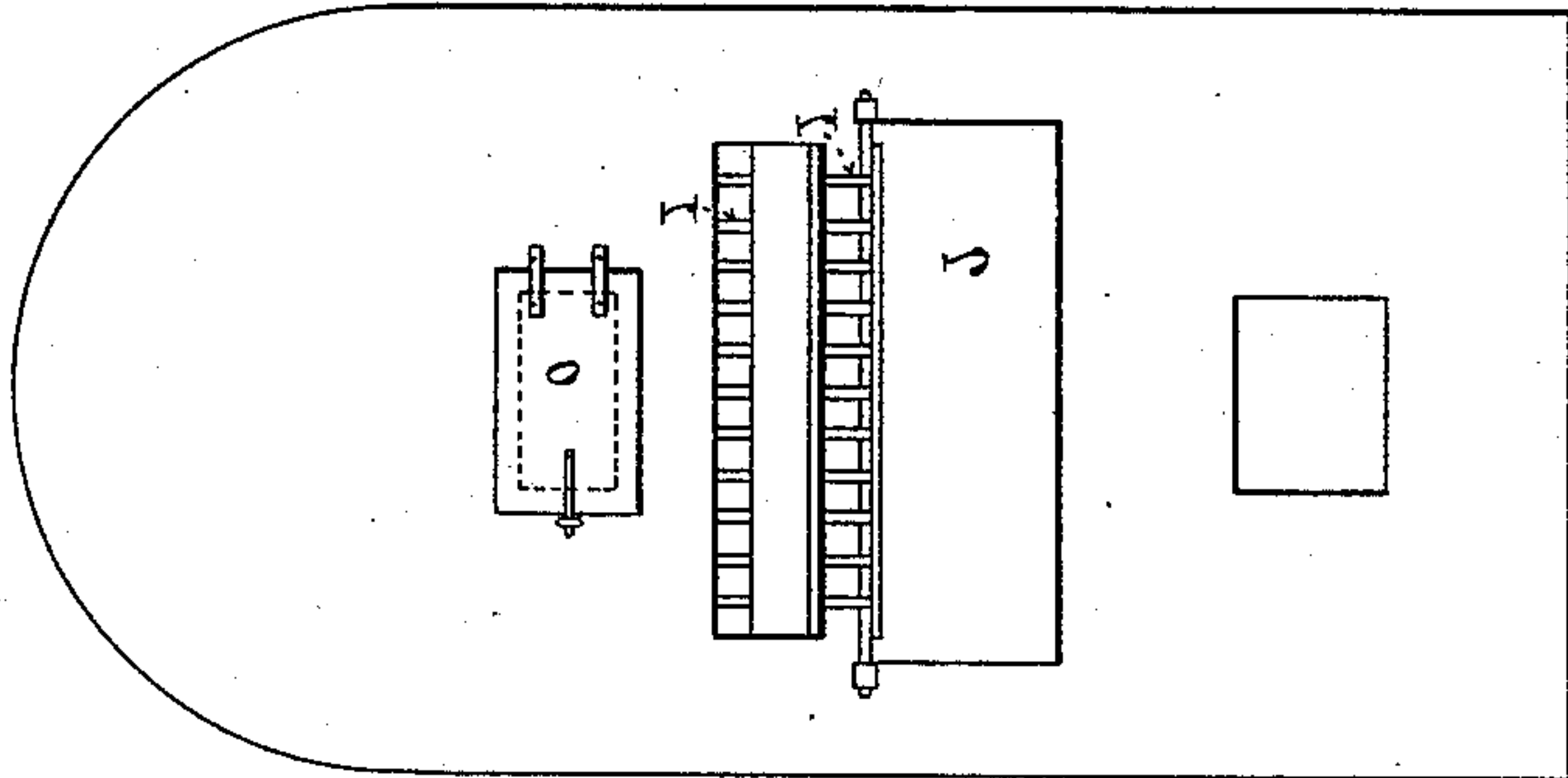


Fig. 2



Witnesses

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UNITED STATES PATENT OFFICE.

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STEAM-BOILER AND FURNACE.

SPECIFICATION forming part of Letters Patent No. 299,578, dated June 3, 1884.

Application filed September 7, 1883. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM S. POST and HOWARD DE WOLF SAWYER, citizens of the United States, residing, respectively, in Boston and Revere, Suffolk county, Massachusetts, have jointly invented certain new and useful Improvements in Steam-Boilers and Furnaces; and we do hereby declare that the same are fully described in the following specification and illustrated in the accompanying drawings.

This improvement relates to furnaces, locomotive and stationary boilers, and apparatus generally for the conversion of water into steam.

Our invention consists in new combinations of devices, as recited in the appended claims, whereby under an improved arrangement of drafts and water-legs the highest attainable intensity of heat is secured and the heat utilized to the utmost.

A general idea of our principal improvement will be gathered from the drawings and from the statement that the body of incandescent fuel rests upon the slightly-inclined upper surface of a water-leg, and also upon an oblique water-grate, and that over and through this fuel a lateral and indirect downward draft is maintained through said grate, and against other water-legs and surfaces standing transversely to the caloric current, that it may impinge upon them and speedily convert into steam the water contained therein.

In the drawings, Figure 1 is a vertical longitudinal section of a boiler containing the several features of our invention, and Fig. 2 is an end view thereof.

A is the fire-box, and B the ash-box, separated by the inclined hearth or water-leg C and water-grate D, which together support the fuel E, as indicated in Fig. 1. The tubes of the grate D extend obliquely and side by side from the front edge of the water-leg C to the side of another one, F, running down obliquely from the top of the fire-box to the grate D, and afterward extending vertically nearly to the bottom of the ash-box. From this vertical portion another water-leg, G, extends obliquely below and about parallel with the grate, serving to divide the ash-box into two irregular-shaped chambers, about as shown.

The walls which inclose the fire-box and ash-box are hollow, constituting water-spaces H on all sides and at the bottom thereof, the water communicating with such spaces at each side or end of the several water-legs and with the general supply in the boiler, continuously fed by a suitable inlet-pipe, as required. The darts denote the arrangement of draft and direction of the caloric current, peculiar to our invention. The supply of air which supports combustion enters the fire-box through the grated door I, and flows first laterally over that part of the fuel which rests on the water-leg C, then through the oblique grate D and the fuel resting thereon, by which the gases and light unconsumed portions of combustible material are burned and utilized as fuel. The current is then deflected downwardly and rearwardly by the water-legs F and G, upon which it impinges, and applies with great effect upon them and beneath the leg C, as well as against the water-spaces forming the walls and bottom of the ash-box. Passing the extremity of the leg G, the current again impinges on the lower end of the leg F, and is deflected against the under side of G, and passes upwardly through the flue K into a chamber, L, whence it enters the horizontal tubes M of the cylindrical part of the boiler, if such part is provided, and escapes through the stack or funnel.

When our invention is applied to locomotive-boilers, we provide an air-inlet, N, at the front of the ash-box, and a passage, N', leading thence to the draft-grate I. Rapid forward motion thus greatly strengthens the draft. Suitable dampers, n, may be provided to close the draft when desired. The grate I is provided with a door, J, which may be closed to terminate the air-passage N' and deflect the air into the fire-box; or it may be opened to bank or draw the fire. The grate I is, as shown, made in two parts, the upper part rigid and the lower turning on a pivot, that it may be turned down to give access to the fuel, which may be supplied through the opening so formed or through a separate door, O, above it.

In starting the fire no direct draft is necessary, since the fuel is first placed, mainly, on the water-leg C, and the oblique water-grate D is but thinly covered, the smoke passing through

it and along the usual path of the current, as described. When thoroughly ignited, the fuel is piled upon the grate D and a fresh supply furnished from time to time, the gases being
5 consumed in passing through the grate and fire thereon, as stated.

We claim as our invention—

1. In a steam-boiler or furnace, the fire-box having an oblique depending water-leg, forming a deflecting-wall opposite the feed-door,
10 in combination with the hearth C and water-grate D, extending obliquely from the hearth to said water-leg, substantially as and for the purposes set forth.

15 2. In a steam-boiler or furnace, the oblique water-grate D, in combination with the water-legs C F G, substantially as and for the purposes set forth.

20 3. The water-spaces H, forming walls for the fire-box and ash-box, and the water-legs F G, communicating therewith, in combination with the hollow hearth C and grate D, serving together to support the fuel and promote a lat-

eral and oblique draft through it, for the purpose set forth.

4. In a steam-boiler or furnace, the combination of the fire-box A, the door J, and the vertical and separable grate I, located below the feed-door, and forming a lateral support and guard for the fuel, substantially as set forth. 25 30

5. The fire-box and the ash-box, separated from each other by the oblique water-hearth C and grate D, in combination with the flue K and its terminal enlargement L, separated from the ash-box and fire-box by the unperforated water-leg F, extending below the grate nearly to the bottom of the ash-box, whereby the caloric current is at all times indirect, substantially as set forth. 35 40

In testimony whereof we hereto affix our signatures in presence of two witnesses.

WILLIAM S. POST.

HOWARD DE WOLF SAWYER.

Witnesses:

A. H. SPENCER,

E. A. PHELPS.