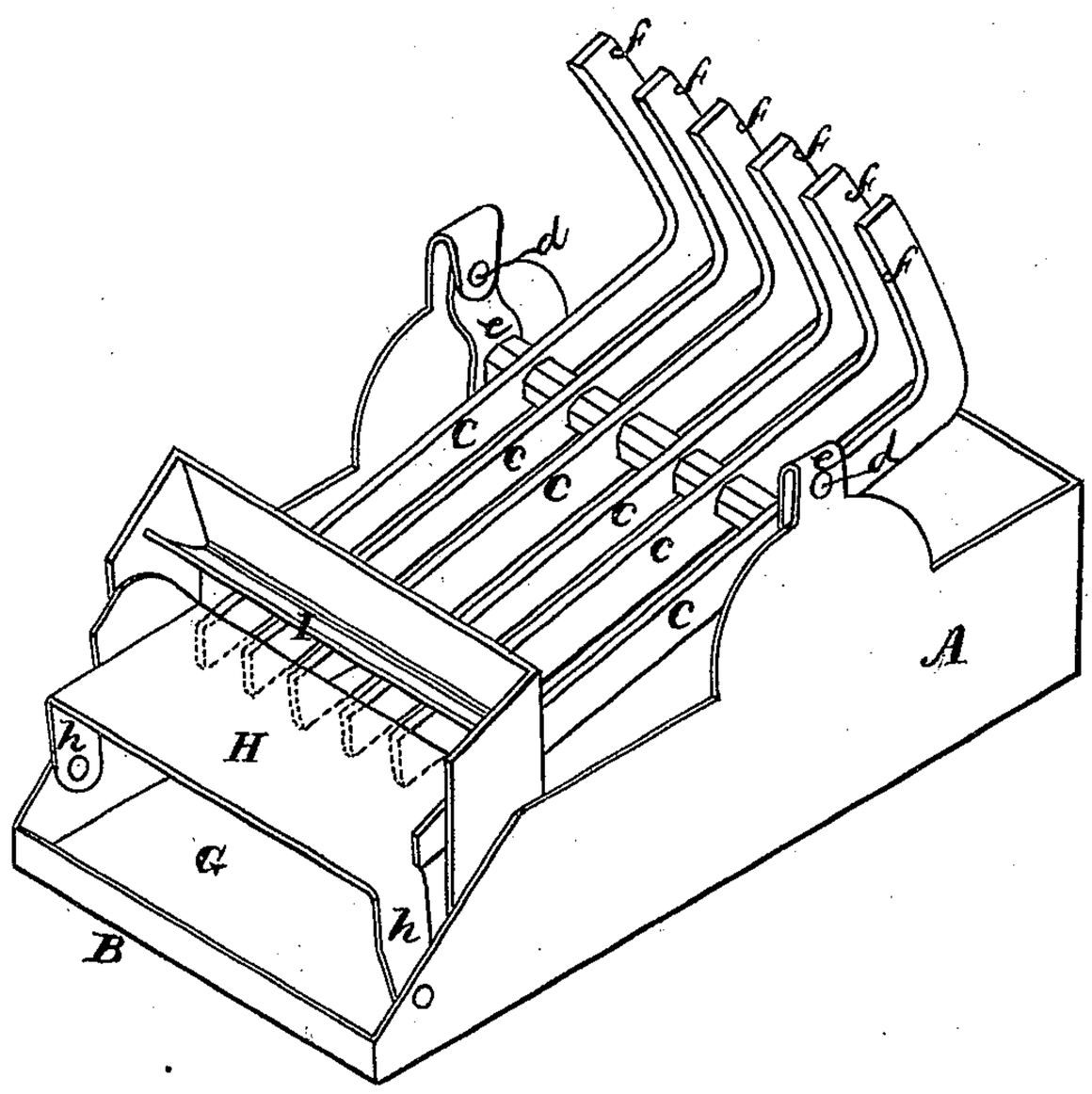
M. LAUFENBURG.

STEAM BOILER FURNACE.

No. 174,826. Patented March 14, 1876.



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MICHAEL LAUFENBURG, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN STEAM-BOILER FURNACES.

Specification forming part of Letters Patent No. **174,826,** dated March 14, 1876; application filed January 4, 1876.

To all whom it may concern:

Be it known that I, MICHAEL LAUFENBURG, of San Francisco city and county, State of California, have invented Improvements in Furnaces to Steam-Boilers; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvement without further invention or experiment.

My invention relates to an improved arrangement for feeding straw to the furnaces of steam-boilers and burning it as a fuel for generating steam.

It consists of a peculiarly-constructed door which can either be applied in place of the ordinary furnace-door, or it can be located directly in front of the grate-bars and extend entirely across the front of the furnace.

The grate-bars I suspend upon journals at or near the middle of the furnace, and weight their rear ends. I then connect the door with the front ends of the grate-bars, so that whenever the door is opened and closed the grate-bars will be shaken or jarred, while the weighted rear ends of the grate-bars serve to close the door.

In order to more fully illustrate and describe my invention, reference is had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 a perspective view of my improvement.

Let A represent the boiler-furnace, and B the boiler-front.

In the present instance I have represented the door as being located directly in front of the furnace-grate and extending entirely across the furnace front; but, as will hereinafter be shown, it can be applied in a similar manner with the grate.

c c c are the grate bars. These bars are secured together in any suitable manner to form the grate, and the grate thus formed is suspended at or near its middle by journals *d d* from the sides of the furnace, or it may be suspended from hangers *e e*, as represented in the present case, the latter method giving a swinging motion to the grate, which is preferable. The rear end of the grate I make heavier than the front end, either by placing a weight upon them or preferably by making the rear ends of the bars longer than the front ends, and then bending the extensions *f f f* upward so as to form a vertical grate in the rear of the horizontal grate, the whole being combined together in one grate.

The furnace front I cut entirely away from a line directly in front of the surface of the grate-bars. I also extend the sides and bottom of the furnace forward so as to form a projecting box, G, in front of the furnace, below the level of the grate.

The front half of the grate-bars project far enough forward to have their front ends strike against the lower edge of the boiler-front, where it is cut away. A door, H, is placed at an incline directly above the box G so that its inner or upper edge will also rest upon the forward ends of the grate-bars while its outer or lower edge is pivoted to the sides of the box, as shown. Usually I mount the front edge of this door on legs or standards *h*, which are pivoted to the sides of the box G so as to raise the edge of the door and provide a space between it and the front edge of the box through which air can pass under the grate.

A flange, I, is secured to the lower edge of the boiler-front outside of the furnace. This flange is inclined upward at an angle opposite to the angle of the door, as shown, and can be formed by merely turning a portion of the boiler-front upward, thus forming a flaring or V-shaped approach to the door-opening.

The straw is fed to the furnace by placing it in the V-shaped angle between the door and flange I, when, by pressing it forward with a fork, the upper end of the door is depressed, carrying with it the forward end of the grate-bars until an opening is made sufficiently large to admit the straw. It is then pushed into the furnace with the fork, and as the fork is withdrawn the superior weight of the rear end of the grate-bars will raise the forward end and close the door, the striking of the forward end of the bars against the lower edge of the boiler-front producing a jar which will clear the bars from cinders. This construction also enables me to feed the straw to the furnace at any point in its width, whereas the or-

dinary door arrangement only provides a limited opening, so that the straw is all fed in one place and creates a heap of cinders at that point, which prevents the proper burning of the straw by choking off the draft. By placing the door below the grate-bars and feeding on a level with them, the fresh straw which is introduced disturbs the cinders and is fed directly into the hottest part, so that it is readily burned.

The vertical extensions *f f f* serve to prevent the cinders and straw from being drawn into the flues by the draft; and, in order to make them more effective, I shall ordinarily employ stationary water pipes or tubes which connect with the boiler and extend forward between the extensions *f f* so as to alternate with them. These tubes will then serve as clearing-fingers to clear the straw from between the bars every time a fresh charge of straw is introduced.

By this arrangement of the grate-bars I preserve the draft and prevent an accumulation of cinders upon them. This same arrangement can be applied in place of the ordinary furnace-door by connecting the inner end of the inclined door with the front ends of the suspended grate by means of a rod-connection extending down to the grate-bars, in which case it can be used for feeding wood, brush, or other light fuel; or a vertically-sliding door can be connected with the grate so as to be closed by its weighted rear end.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The grate-bars *c c*, weighted at their rear ends and journaled at *d d* as levers, to automatically close the furnace-door, substantially as described.

2. The grate-bars *c c c*, suspended from journals *d d* by means of hangers *e e*, and having their rear ends extended and the extension turned up so as to form a vertical grate in the rear of the horizontal grate, substantially as and for the purpose described.

3. The grate-bars *c c c*, constructed and suspended as described, in combination with the inclined door H, which is pivoted at its lower end, and has its front end connected with the grate bars so as to be closed by the superior gravity of the rear ends of the grate-bars, substantially as above specified.

4. The upwardly-inclined flange I, in combination with a furnace-door, H, which opens entirely across the furnace front, substantially as and for the purpose described.

MICHAEL LAUFENBURG.

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