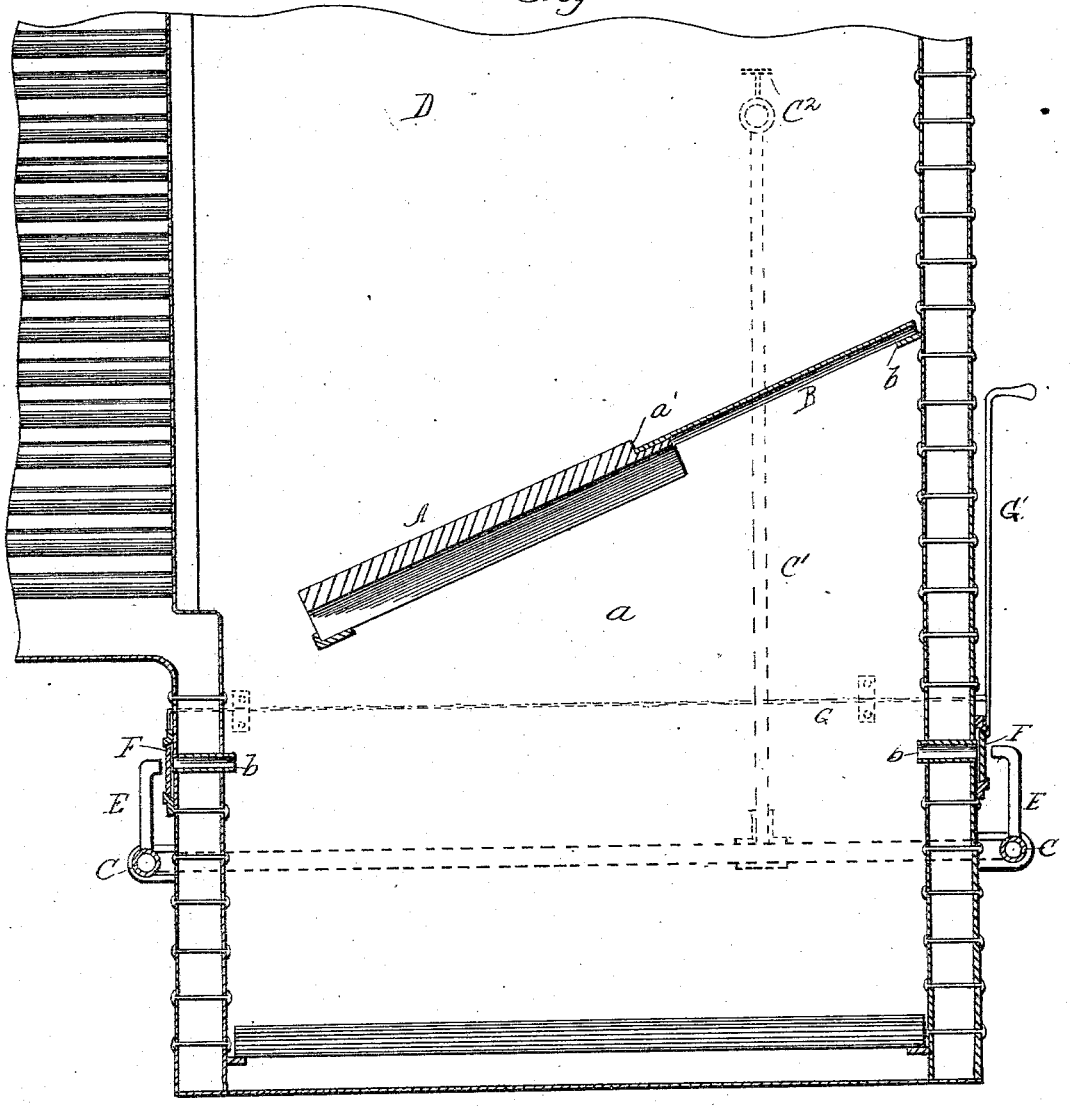
(No Model.) 2 Sheets—Sheet 1.

C. H. GREWCOX & F. YEITER.

SMOKE CONSUMING FURNACE.

No. 305,918. Patented Sept. 30, 1884.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

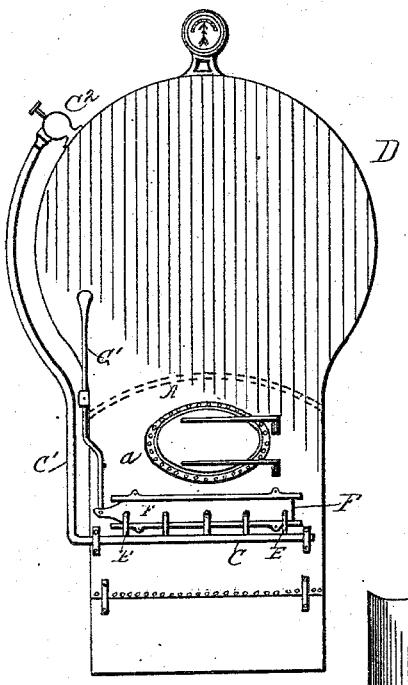
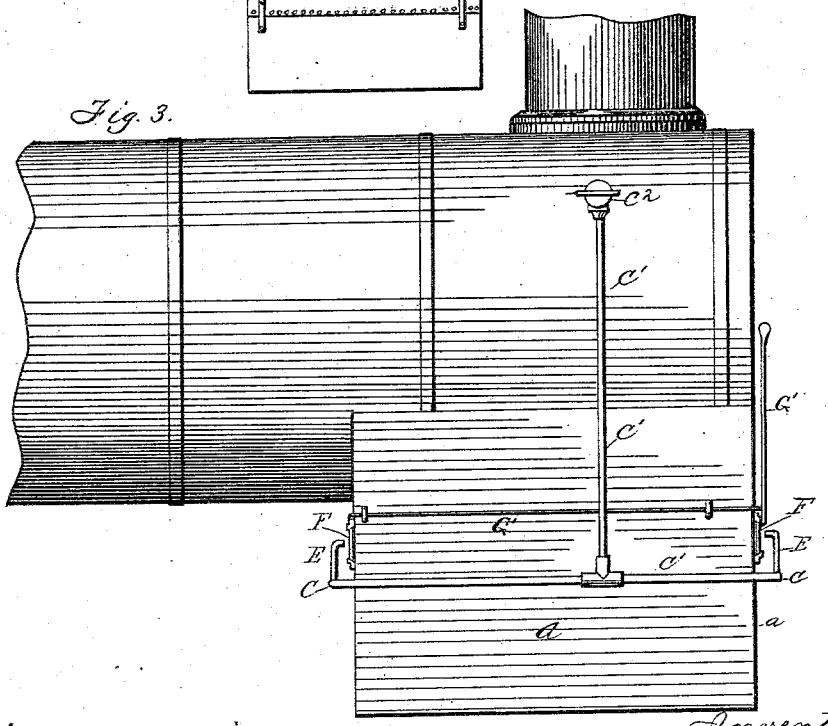


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES H. GREWCOX AND FRED YEITER, OF BRAINERD, MINNESOTA.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 305,918, dated September 30, 1884.

Application filed June 6, 1884. (No model.)

To all whom it may concern:

Be it known that we, CHARLES H. GREWCOX and FRED YEITER, citizens of the United States, residing at Brainerd, in the county of Crow Wing and State of Minnesota, have invented certain new and useful Improvements in Smoke-Consuming Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention pertains to improvements in smoke-consuming appliances for furnaces, more especially locomotive-boiler furnaces, although it is applicable to all classes of steam-boiler furnaces, and has for its object to effect a blast or powerful draft either when the engine or locomotive is out of or in action, to permit its being readily put into and out of operation, and to allow the ready conversion of the furnace from a smoke-consuming into a non-smoke-consuming furnace, and vice versa.

The invention therefore consists of the sundry combinations of parts and their construction, substantially as hereinafter fully set forth, and pointed out in the claim.

In the accompanying drawings, which form a part of this specification, Figure 1 is a longitudinal section of a locomotive-boiler furnace having our invention. Fig. 2 is an end elevation, and Fig. 3 is a side view thereof.

Similar letters of reference in the several drawings denote like parts.

In the embodiment of our invention we dispose in an inclined position in the fire-box *a* an arched imperforate partition, A, of suitable material, extending from side to side of the furnace, with its lower end juxtaposited to the rear end of the latter, being sufficiently removed therefrom to permit the required amount of upward draft and the ascent of any unconsumed products of combustion. The opposite or upper end of the arch is considerably removed or isolated from the front or door end of the furnace, the intermediate space as regards the size of the door-opening and the same amount of surface at that end of the arch being spanned by an inclined plate, B, having coincident curvature with the arch, one end of said plate (the lower end) resting upon a rabbet, *a*, of the upper end of the arch, while the upper end of said plate bears or abuts against an inclined ledge, *b'*, secured to or made a part of the inner surface of the front wall of the furnace. The plate B, thus resting upon the ledge *b* and in the rabbet *a'* of the arch, has freedom to contract and expand, and the ledge is of proper material and construction as to withstand the heat. We deem it important that the plate B be thus unconfined, and that its supports be made to stand the temperature. This plate, together with the arch, forms a rearwardly-inclined and downwardly-sloping deflector conducting the flame and smoke in the plane of and exposing them, as will more fully appear further on, to the blast or a powerful draft for their consumption, to utilize the same as fuel, and to abate the great nuisance of escaping or flying clouds of smoke and sparks. It is obvious that by removing the plate B, being readily removable, the draft, and consequently the course of the smoke and flame, will be caused to take a directly upward course, thereby rendering the furnace available for use either with or without our invention as thus far described. We next arrange along both the front and back ends of the fire-box casing, upon its outside, a short pipe, C, which is supported upon brackets attached to the fire-box casing, said pipes having one end connected by additional pipes C' to a globe-valve, C^2, of the boiler D, by means of which latter pipes and valve the steam is admitted to the short pipes C. A series of branch pipes, E, extend from each of the pipes C to a contiguous point to the ends of the fire-box casing, in front of which ends of said branch pipes, and between cleats upon said fire-box casing, are disposed, so as to slide, serially-apertured plates or valves F, which are connected together by jointed rod connections G, and these latter are so actuated by a common lever, G', as to effect the operation or movement of said slides or valves F, the purpose of which will be seen presently.

Coincidently with the open ends of the series of branch pipes E, and made in the ends of the fire-box casing, are apertures *b*, through which, by causing the apertures of the side or valve F to register therewith, jets of steam are injected into the fire-box, whereby blasts or powerful drafts are generated to promote or quicken and intensify combustion, and thoroughly consume the smoke and other previously non-consumed products of combustion.

By means of this appliance, while the blast or draft produced by the engine in action is aided by the aforesaid steam-blast, if thought necessary to be used, then the blast is continued when the engine is not in action, thus keeping up a continuous consumption of the smoke, &c.

It is apparent that the steam-blast can be readily cut off or turned on, whenever required, by accordingly moving the slide-valve lever.

We deem it important that the steam enter upon opposite sides of the fire-box, and that all the steam-entrances may be controlled simultaneously by a single lever.

We are aware that it is not new to introduce steam into the fire-box of a furnace through apertures in the walls thereof, and no claim is herein broadly made for such a device.

We are aware that plates corresponding to our plate B have been supported on hooks; but such hooks are liable to be destroyed by the heat, and are subject to different strains, arising from expansion and contraction of the plate.

What we claim as new is—

In combination with a furnace having steam-inlets arranged upon opposite sides thereof, and steam-pipe connections with each of said inlets, controlled by a single cock, as C^2, the sliding gates having apertures registering with the steam-inlets, and a single lever and connections with said gates, for controlling all the inlets simultaneously, as set forth.

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

CHARLES H. GREWCOX.
FRED YEITER.

Witnesses:
W. E. ENTRIKIN,
WILLIAM MAHEAD.