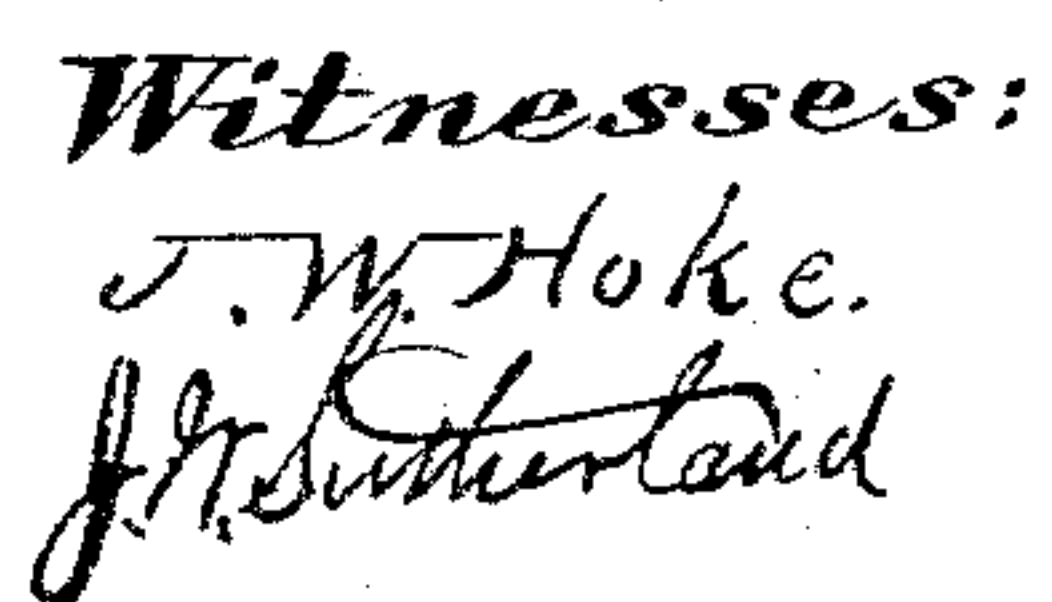


C. J. M. HAYNA.
FURNACE.

Patented Aug. 30, 1887.



Inventor:
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by C. Moody, atty

UNITED STATES PATENT OFFICE.

CLEMENTINA J. M. HAÿNA, OF ST. LOUIS, MISSOURI.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 369,285, dated August 30, 1887.

Application filed August 30, 1886. Serial No. 212,155. (No model.)

To all whom it may concern:

Be it known that I, CLEMENTINA J. M. HAÿNA, residing in St. Louis, in the State of Missouri, have invented a new and useful Improvement in Furnaces, of which the following is a specification.

My improvement is applicable to most, if not all, kinds of fire-places, stoves, and heating-furnaces, as well as furnaces for stationary and locomotive engines; but for purposes of description its different features are shown in the drawings accompanying and forming part of this specification in connection with the boiler of a stationary steam-engine.

The objects of my improvement are, first, to cause an unusually complete and economical combustion of the fuel used; second, to avoid the generation of smoke as far as practicable; and, third, to consume all smoke generated. These objects are attained most completely when all the features of my hereinafter-described improvement are employed in combination in the manner explained below; but I do not desire to be limited to the combination of all the features thereof, for there are various sub-combinations in which they may be used to advantage, and some of them may be applied advantageously to ordinary furnaces, stoves, and fire-places without being combined with either of the other features, as will be obvious to the practical constructionist.

The following is a full, clear, and exact description of my improvement, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a vertical longitudinal section on the line 1 1 of Fig. 2 of a furnace and boiler having my improvements. Fig. 2 is a vertical cross-section on line 2 2 of Fig. 1.

Similar letters refer to similar parts.

A is the main combustion-chamber; B, the bridge; C, an auxiliary combustion-chamber; D, the grate; E, the ash-pit; F, the bridge-support; G, the space beneath the flue.

a a is an air-inlet in the walls of the furnace and ash-pit near the bridge.

g is an inlet in the walls of the chamber G. Only one inlet on each side of the chamber is shown in the drawings. I prefer that number; but more may be used.

The inlets *a a* and *g* should be provided with suitable dampers, and those of *a a* should be

so arranged as to permit of the air being shut off above the level of the grate without closing the lower part of the inlet, and vice versa.

I prefer to place the bearing-bars H some distance from the ends of the grate-bars, so as to afford the latter the most effectual possible support and have their ends free and the air-inlets *a' a'* unobstructed. The object in having the bearing-bars rounded on top, as shown in the drawings, *h h*, Fig. 1, is to prevent ashes or clinkers from collecting upon them.

The different features of my improvement operate when used in combination as follows: The combustion-chamber A being charged with the burning fuel and the air-inlets opened, the air enters the space G behind the bridge-support through *g* and passes forward beneath the bridge through the openings *f f f* into the ash-pit E and rises up and passes through the air-inlets *a'* and *a'* and the grate into the combustion-chamber A. Air also enters the ash-pit through that portion of the air-inlets *a a* extending below the grate, and passes up through the passages *a'* and *a'* and the grate into the chamber A. The upward draft is so great that the air in rushing through the grate into the combustion-chamber causes the grate-bars to rock upon their bearings, and this motion of the bars tends to sift out the ashes as they form and keep the air-passages open. The lighter and more inflammable gases which are generated between the front end and middle of the furnace in the process of combustion rise to the top of the chamber A and pass in flames over the bridge at *b* into the auxiliary combustion-chamber C. The smoke generated between the front end and middle of the furnace also rises and passes toward the top of the bridge, but at a lower level than the gases, in consequence of its greater specific gravity. Before reaching the bridge, however, this smoke is met by a blast of air entering at the inlets *a a*, and is driven back and down toward the burning fuel near the middle of the chamber, at the same time being mixed with fresh air and spread out over the fire. It then passes back near the level of the incandescent fuel in the back of the chamber toward the openings *c c c* until it meets the blast of air entering at the inlet *a'*, and is somewhat detained thereby near the bridge, where the fire is hottest, at the same time receiving a fresh admixture of

air. Any smoke unconsumed then passes along with an admixture of air through the perforations in the bridge at *c c c* into the chamber C and rises and mixes with the blazing gas entering through the passage *b* and is
5 entirely consumed.

I do not confine myself to the particular forms of the different parts of my improvement, for various equivalents thereof will at once suggest themselves to a skilled mechanic.
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I claim—

The combination of the combustion-chamber A, having the air-inlets *a a*, as described,

with the bridge B, perforated at *c*, a grate composed of the bars D D, the bearings H H, the auxiliary combustion-chamber C, the air-inlets *g f*, and the ash-pit, substantially as described. 15

Witness my hand.

CLEMENTINA J. M. HAYNA.

Witnesses:

C. D. MOODY,

H. SILVESTER.