2 Sheets—Sheet 1.

H. YOUNG, Jr.

SMOKE CONSUMING FURNACE.

No. 188,719. Patented March 20, 1877.

Fig. 1.

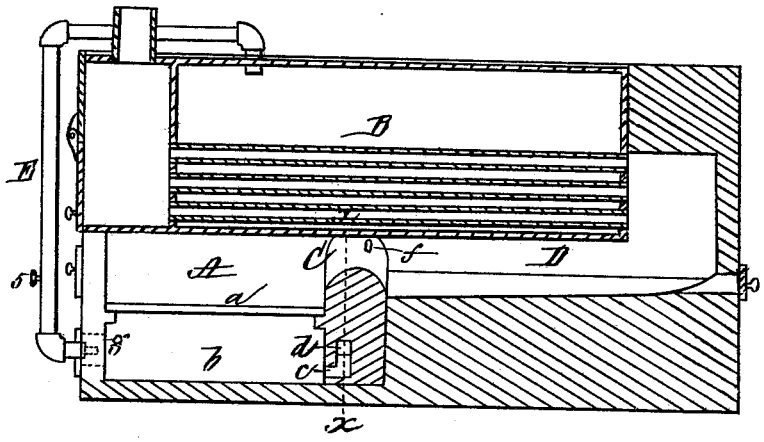


Fig. 3.

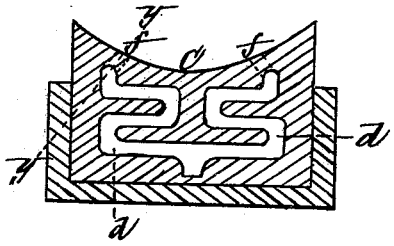
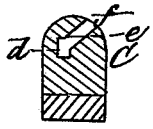


Fig. 4.



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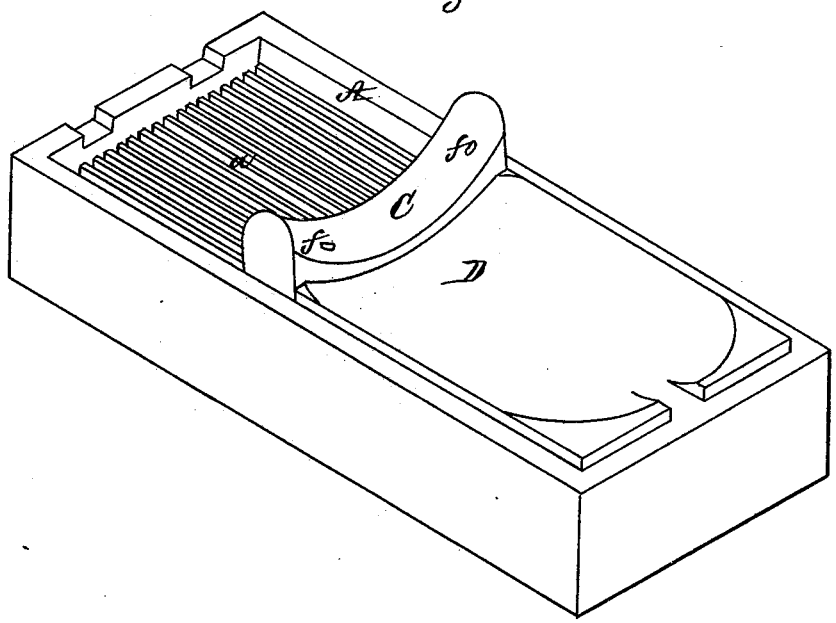
2 Sheets—Sheet 2.

H. YOUNG, Jr.

SMOKE CONSUMING FURNACE.

No. 188,719. Patented March 20, 1877.

Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY YOUNG, JR., OF WOBURN, ASSIGNOR TO HIMSELF, CHARLES B. BRYANT, OF STONEHAM, AND THEOPHILUS KING, JR., OF QUINCY, MASSACHUSETTS.

IMPROVEMENT IN SMOKE-CONSUMING FURNACES.

Specification forming part of Letters Patent No. **188,719**, dated March 20, 1877; application filed January 27, 1877.

To all whom it may concern:

Be it known that I, HENRY YOUNG, Jr., of Woburn, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Smoke-Consuming Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a longitudinal vertical section through a steam-boiler and its furnace, constructed in accordance with my invention. Fig. 2 is a perspective view of the interior of the same, the boiler and upper portion of the brick-work being removed. Fig. 3 is a transverse vertical section through the bridge-wall on the line *x x* of Fig. 1. Fig. 4 is a section on the line *y y* of Fig. 3.

My present invention consists in a furnace in which a bridge-wall, provided with one or more flues or interior passages, communicating with the external air and with a series of discharge-orifices at or near its top, is combined with a pipe or other means by which steam is conducted from the boiler, in such a manner as to enter the ash-pit where the air is also admitted, and a portion of each commingled passes into the flue or flues of the bridge-wall, the air and steam thus becoming mixed and being emitted together from the discharge-orifices of the bridge-wall so as to impinge upon and become thoroughly commingled with the smoke and volatile gases as they pass over into the combustion-chamber, by which means their ignition and consumption is accomplished in a perfect and effectual manner.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A represents the furnace, B the boiler, *a* the grate-bars, *b* the ash-pit, C the bridge-wall, and D the combustion-chamber.

In the front of the bridge-wall, near its bottom, is an aperture, *c*, which opens into the ash-pit *b*, and communicates with two flues or passages, *d d*, formed within the bridge-wall C, as seen in Fig. 3, and from the top of each of these flues *d* extends a small passage, *e*, (Fig. 4, and dotted in Fig. 3,) which terminates in a discharge-orifice, *f*, in the top of the bridge-wall, the passages *e* being preferably inclined upward at an angle of about 45°, and also slightly inward toward the center of the combustion-chamber D.

E is a steam-pipe, leading from the boiler B to the ash-pit *b*, within which the steam is thus introduced, and becomes mixed with the air therein, the air and steam together entering the aperture *c* and passing into and up through the flues *d d* and passages *e*, issuing from the discharge-orifices *f f* in streams or jets which impinge upon and become thoroughly commingled with the smoke and gaseous products of combustion as they pass over the top of the bridge-wall C into the chamber D, the air moistened or saturated with steam by mixing them together as described, acting upon the smoke and gases in such manner as to promote their combustion to a much greater extent than where dry hot air alone, or steam alone, is discharged upon them in jets, as heretofore, and consequently more perfect results are attained, and a great saving in fuel effected.

The external air is admitted to the ash-pit through an aperture, *g*, (seen dotted,) surrounding the lower end of the steam-pipe E, but it may be admitted in any other suitable manner, and the quantity of steam allowed to enter the ash-pit may be regulated by a valve, 5, in the pipe E. It will be seen that the passage of the moistened air through the bridge-wall will tend to cool it, and prevent its rapid destruction by the intense heat to which it is exposed.

The number of flues or passages within the bridge-wall may be varied, a single one only, or more than two, being employed, as preferred, and any desired number of discharge-orifices *f* may be provided in or near the top of the bridge-wall.

My improvement may be applied at a very moderate cost to boiler-furnaces already con-

structed, and my invention may be used in connection with furnaces of various descriptions.

What I claim as my invention, and desire to secure by Letters Patent, is—

The bridge-wall C, provided with the flues *d*, opening into the ash-pit *b*, in combination with the steam-pipe E, aperture *g*, and ash-pit *b*, substantially as described, and for the purpose set forth.

Witness my hand this 24th day of January, A. D. 1877.

HENRY YOUNG, JR.

In presence of—

P. E. TESCHEMACHER,

N. W. STEARNS.