(No Model.)

C. STAUSS.

SMOKE CONSUMING FURNACE.

No. 458,642. Patented Sept. 1, 1891.

Fig. 1.

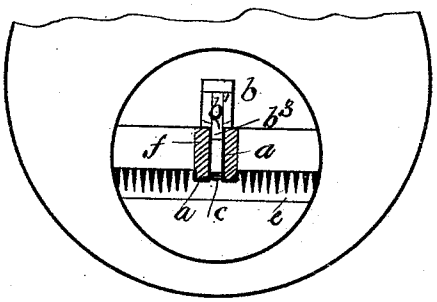


Fig. 2.

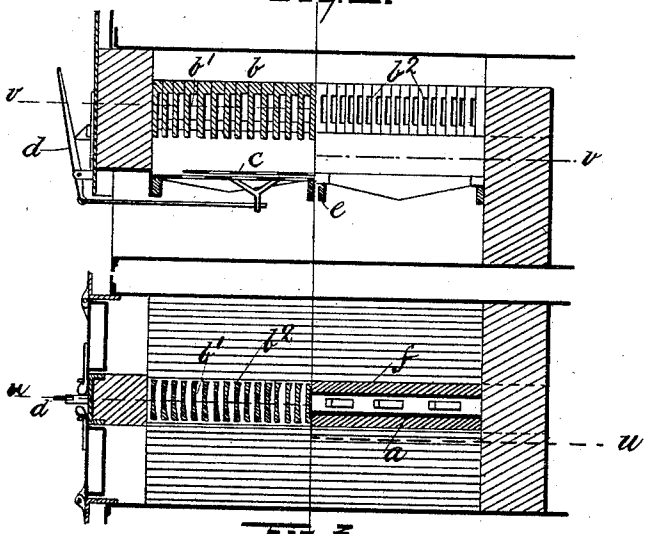


Fig. 3.

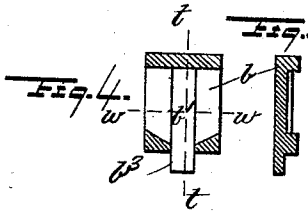


Fig. 5

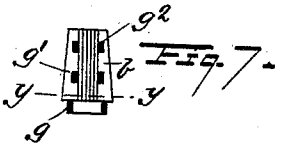
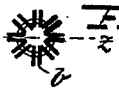


Fig. 7.

Fig. 6.

Fig. 8.



Witnesses

A. D. Melhuish

E. L. Clemens

Inventor

Carl Stauss

by his Attorney R. H. Addams

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CARL STAUSS, OF BERLIN, GERMANY.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 458,642, dated September 1, 1891.

Application filed September 22, 1890. Serial No. 365,744. (No model.) Patented in Germany February 26, 1889, No. 52,022, and in France July 23, 1889, No. 199,752.

To all whom it may concern:

Be it known that I, CARL STAUSS, a subject of the Emperor of Germany, residing at No. 30 Heidestrasse, Berlin, Germany, have invented a certain new and useful Improvement in Smoke-Consumers, (for which I have obtained Letters Patent in Germany, dated February 26, 1889, No. 52,022, and in France, dated July 23, 1889, No. 199,752,) of which the following is a specification.

The object of this invention is to provide for an increased supply of highly-heated air in such a way as to consume the smoke.

This invention relates to that class of air-heaters in which air is taken from below the grate and delivered above the fuel through or from chambers or flues heated by the fuel, and it differs from former inventions in not being provided with any chambers of large extent in which the air is heated, to be afterward distributed to or over the fuel, but in the construction whereby the air is divided up into a number of thin streams before and during its passage through that part of the structure which is heated by the fuel, whereby also the latter remains substantially in effect a solid body capable of becoming very hot throughout by conduction, and consequently imparting very much greater heat to the divided air than chambers of large extent do to air heated in a large body.

To this end the invention consists in an apparatus the essential features of which are hereinafter described, and specifically pointed out in the claim.

Reference being made to the accompanying drawings, Figure 1 illustrates the apparatus as applied to the furnace of a boiler of the "Cornish" type, being a cross-section thereof. Fig. 2 is a longitudinal vertical section thereof on line *u u*, Fig. 3; and Fig. 3 is a longitudinal horizontal section on line *v v* of Fig. 2. Fig. 4 illustrates one of the component parts of the apparatus, being a section on line *x x*, Fig. 5. Fig. 5 is a section on line *t t*, Fig. 4. Fig. 6 is a section on line *w w*, Fig. 4. Fig. 7 is a section on line *z z*, showing a modified design suitable for small grates. Fig. 8 is a section on line *y y*, Fig. 4.

It will be understood that the apparatus can be applied to any furnace or grate for burning fuel. For a furnace of considerable size the apparatus is constructed as follows: An oblong hollow iron frame *a* of suitable length is constructed, preferably flanged outward below to receive and uphold an outer protecting-covering of fire-brick *f* and of a height sufficient that when it is placed upon the cross-bars supporting the fire-bars (certain of which are removed or omitted to provide space for the frame) the upper edge is on a level, or nearly so, with the fuel in the furnace. Upon this frame *a* are supported along its whole length as many plates *b* as may be conveniently placed thereon, said plates being shaped, as in Fig. 4, so that when placed vertically across the frame *a* spaces are left between them wider at the center and narrower at the sides for passage of air rising through the frame *a* and outlet of said air laterally to mingle with the flames of the furnaces. Each plate *b* is for this purpose hollowed out toward the center at *b'*, and for retaining the plate on the frame *a* it is provided with the tongue b^3, fitting into the frame, as shown in Fig. 1. The bottom opening of the frame *a* is closed by a register or shutter device *c*, of any convenient construction, by which the inlet of air into the frame *a* may be brought under control. In Fig. 2 a sliding perforated plate is moved, in connection with a fixed perforated plate, by means of hand-lever and gear *d* for this purpose. In the furnace shown one of these apparatus is located along the center of the grate, there being two doors to the furnace. Where one door only is used, the apparatus may be arranged along one side, or similar apparatus may be placed on each side, so that the same does not or do not constitute an obstacle to the firing.

For convenience of cleaning and repairs the plates *b* are made separate and distinct from the frame *a;* but it is obvious that, if desired, each may be all made in one casting.

In small grates and furnaces it is not necessary to make this smoke-consuming furnace of such size, and for such grates the modification illustrated in Fig. 5 will suffice, the effect of which is the same—namely, to carry up a certain volume of air and substantially to di-

rect it after heating radially or horizontally over the fuel.

This device consists of a number of V-shaped plates *b*, assembled together, as shown, so that narrow openings b^2 are left therein, communicating with a central space or air-uptake. The plates are held together by rings g' and g^2 and rest upon a cylindrical piece *g*, performing the part of the frame *a*. This apparatus may be made and preferably is made in one piece.

I claim as my invention—

In a furnace, the combination, with the fire-grate, of an air-feed-heating structure consisting of a series of plates having their opposed faces set parallel each to each at slight intervals apart, these intervals constituting plane passages extended severally between said plates, being severally open below the grate for admission of air to be heated and severally open above the grate for emission of the heated air, substantially as set forth.

In witness whereof I have signed this specification in presence of two witnesses.

CARL STAUSS.

Witnesses:

ALFRED KÜHN,

OTTO MEYER.