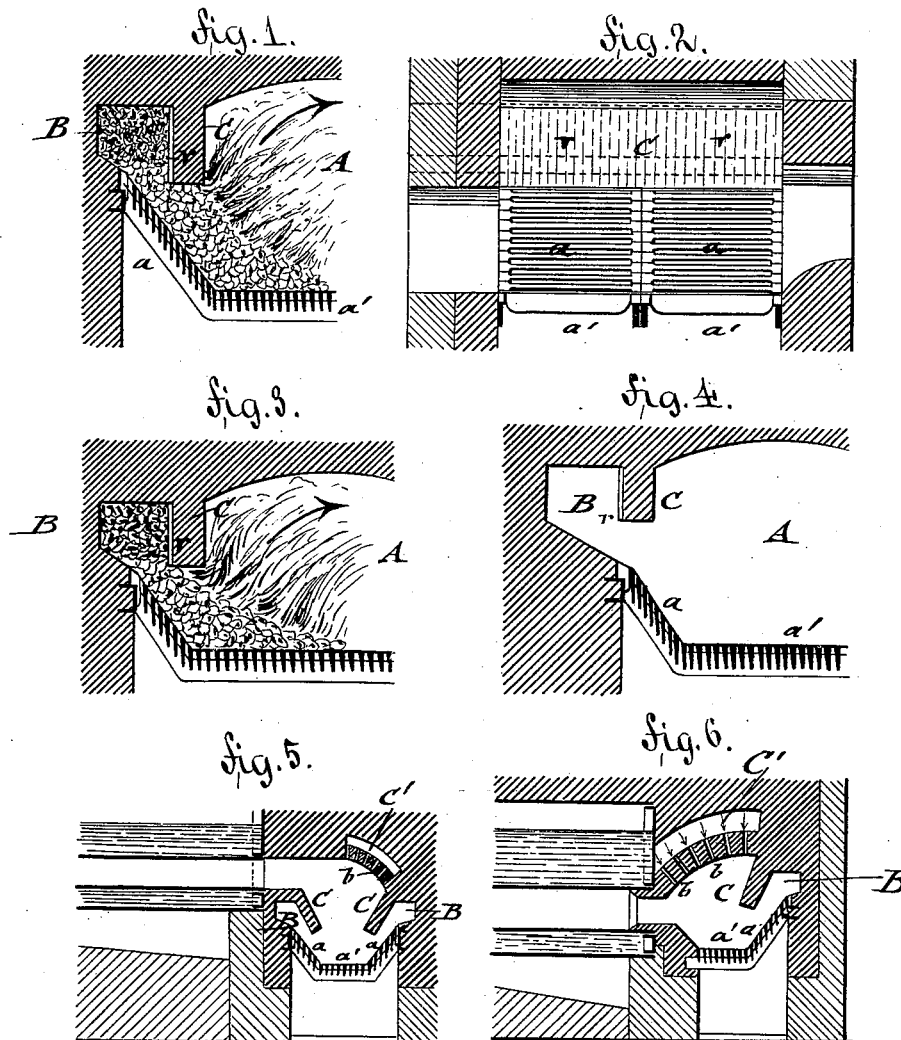


(No Model.)

W. G. A. HEISER.
SMOKE CONSUMING FURNACE.

No. 304,428.

Patented Sept. 2, 1884.



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SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 304,428, dated September 2, 1884.

Application filed July 9, 1883. (No model.) Patented in England November 2, 1882, No. 5,239; in Belgium December 15, 1882, No. 59,638; in Austria-Hungary February 6, 1883, No. 37,324 and No. 3,469; in France February 12, 1883, No. 151,957, and in Germany June 12, 1883, No. 22,505, and July 28, 1883, No. 23,216.

To all whom it may concern:

Be it known that I, WILHELM G. A. HEISER, of the city of Berlin, Kingdom of Prussia, German Empire, have invented certain new and useful Improvements in Smoke-Consuming Furnaces, (for which Letters Patent have heretofore been granted to me by the government of Germany, No. 2,986V, dated February 18, 1883; France, No. 139,726; Great Britain, provisional protection, No. 5,239, and Belgium No. 59,638B,) of which the following is a specification.

This invention has reference to improvements in smoke-consuming furnaces for steam-boilers and other purposes, in which the fuel is utilized in a higher degree by coking it before conducting it into the combustion-chamber proper; and the invention consists, essentially, of one or more coking-chambers arranged transversely to or parallel to the combustion-chambers, from which the fuel is conducted along an inclined grate extending from the coking-chamber to a horizontal grate in the combustion-chamber, the coking-chambers being separated from the combustion-chamber by a separating-wall extending downward from the top. The air necessary for combustion is conducted to the furnace through suitable air-channels above the grate. The separating-wall of the coking-chamber is provided at its inner surface, facing the coking-chamber, with vertical ribs or projections by which the passage of the gases from the coking-chamber to the combustion-chamber is facilitated.

In the accompanying drawings, Figures 1 and 2 represent, respectively, a vertical longitudinal and a vertical section of the simplest form of my improved furnace. Figs. 3 and 4 represent vertical longitudinal sections of the same, showing different relative dispositions of the inclined feeding-grate to the separating-wall of the coking-chamber. Figs. 5 and 6 are vertical longitudinal sections of my improved furnace with transverse coking-chambers and air-supply channels.

Similar letters of reference indicate corresponding parts.

In all the different applications of my im-

proved furnace the same principle is shown, to wit, the principle of coking the fuel before the same is conducted to the main grate of the furnace.

In the simplest form of my improved furnace, (shown in Figs. 1 to 4,) A represents the combustion chamber; *a*, the inclined feeding-grate, and *a'* the horizontal main grate. The disposition of these grates is adapted to the different applications of the furnace and the kind and quality of the fuel used. The coking-chamber B is separated from the main space of the furnace by means of a partition-wall, C, which extends downward from the crown of the furnace to such a distance that between its lower edge and the upper edge of the inclined grate *a* an opening of sufficient size is formed to admit the free passage of the fuel. This separating-wall C is made of greater or less depth, according to the quality of the fuel employed, as shown in Figs. 1, 3, and 4. In most cases, however, the construction of the proportion shown in Fig. 1 and 2 will be preferred. When the fire on the main grate *a'* is properly started, and the coking-chamber B and the inclined grate *a* are properly charged with fuel, it is obvious that as soon as the fuel on the main grate *a'* is burning briskly, the brightness of the burning fuel gradually decreases on the inclined grate *a*, while at a point near the lower edge of the separating-wall C it has only a dull red color, and develops, consequently, considerably less heat. By the brisk fire in the furnace A, an intense heat is developed, by which the separating-wall C is heated up in its entire length, so that it transmits its heat by radiation to the fuel in the coking-chamber B. The gases which are generated by the fuel in the coking-chamber do not possess the required high temperature to be ignited, and are drawn in downward direction around the lower edge of the separating-wall C into the combustion-chamber, as shown by the arrows in Figs. 1 and 3. The gases thus generated have to pass, consequently, on their way to the combustion-chamber, along the inner surface of the separating-wall C and above the layer of fuel at the upper part of the inclined grate, whereby their temper-

5 ture is increased so that perfect combustion
 can take place when a proper quantity of at-
 mospheric air is supplied, which air is drawn
 through the openings between the main-grate
 10 bars and through the fuel on the inclined grate.
 The surface of the separating-wall C, facing
 the coking-chamber B, is provided with ver-
 tical ribs or projections *r*, against which the
 fuel abuts, so that the gases are compelled to
 15 pass in the channels formed between the ribs
 in downward direction, and below the lower
 edge of the separating-wall C to the combus-
 tion-chamber proper. These ribs or projec-
 tions may be of triangular, rectangular, or
 20 any other suitable cross-section, but have to be
 arranged in all cases at the inner surface of
 the separating-wall, as shown clearly in Figs.
 1, 2, 3, and 4. The atmospheric air is con-
 ducted to the fuel above the main grate by
 25 means of a series of channels, *b b*, which com-
 municate with a larger channel, C', in which
 the air is heated up by the heat radiated by
 the fire and the walls of the combustion-cham-
 ber, as shown in Figs. 5 and 6. The channel
 30 C' is located above in the arched crown of the
 combustion-chamber, and connected at its op-
 posite end with an opening in the front wall of
 the furnace, the channel being provided at this
 point with a slide or register for regulating
 the supply of air.
 One or more coking-chambers B may be ar-
 ranged, which may be either at right angles or
 parallel to the axis of the combustion-cham-
 ber, according to the disposition of the furnace.
 35 Fig. 5 shows a Cornwall boiler in which two
 coking-chambers B, and consequently two in-
 clined grates *a a* are arranged. The coking-
 chambers are in this case arranged transverse-
 ly to the longitudinal axis of the boiler.
 40 In Fig. 6 a Cornwall boiler is shown with

one coking-chamber B only, which is arranged
 transversely to the axis of the same. The sup-
 ply of air by the channel C' and the openings
b takes place in the same manner as in Fig. 5.

My improved system of coking fuel before 45
 the same is supplied to and entirely burned on
 the grate is also applicable to malt-kilns, dry-
 ing-chambers, locomotives, and portable boil-
 ers and other purposes. Besides the more ef-
 fective utilization of the fuel, my improved sys- 50
 tem has the advantage that the clinkers are
 disposed of in an easier manner, inasmuch as
 the grates on which the clinkers are formed are
 readily accessible without interrupting the
 coking process in the chambers B. 55

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

1. As an improvement in smoke-consuming
 furnaces, the combination of the combustion-
 chamber A, one or more coking-chambers, B, 60
 and separating-wall C, provided with vertical
 ribs or projections at the surface facing the
 coking-chamber, whereby the passing off of the
 generated gases to the combustion-chamber is
 facilitated, substantially as described. 65

2. The combination of the combustion-cham-
 ber A, coking-chamber B, separating-wall C,
 having vertical ribs at the surface facing the
 coking chamber, inclined grate *a*, extending
 from the coking-chamber in downward direc- 70
 tion, and main grate *a'* of the combustion-cham-
 ber, substantially as set forth.

In testimony that I claim the foregoing as
 my invention I have signed my name in pres-
 ence of two subscribing witnesses.

WILHELM G. A. HEISER.

Witnesses:

HUGO WILLOSS,
 B. Roi.