No. 818,024. PATENTED APR. 17, 1906.

B. HAIGH.

SMOKE CONSUMER.

APPLICATION FILED OCT. 21, 1905.

2 SHEETS—SHEET 1.

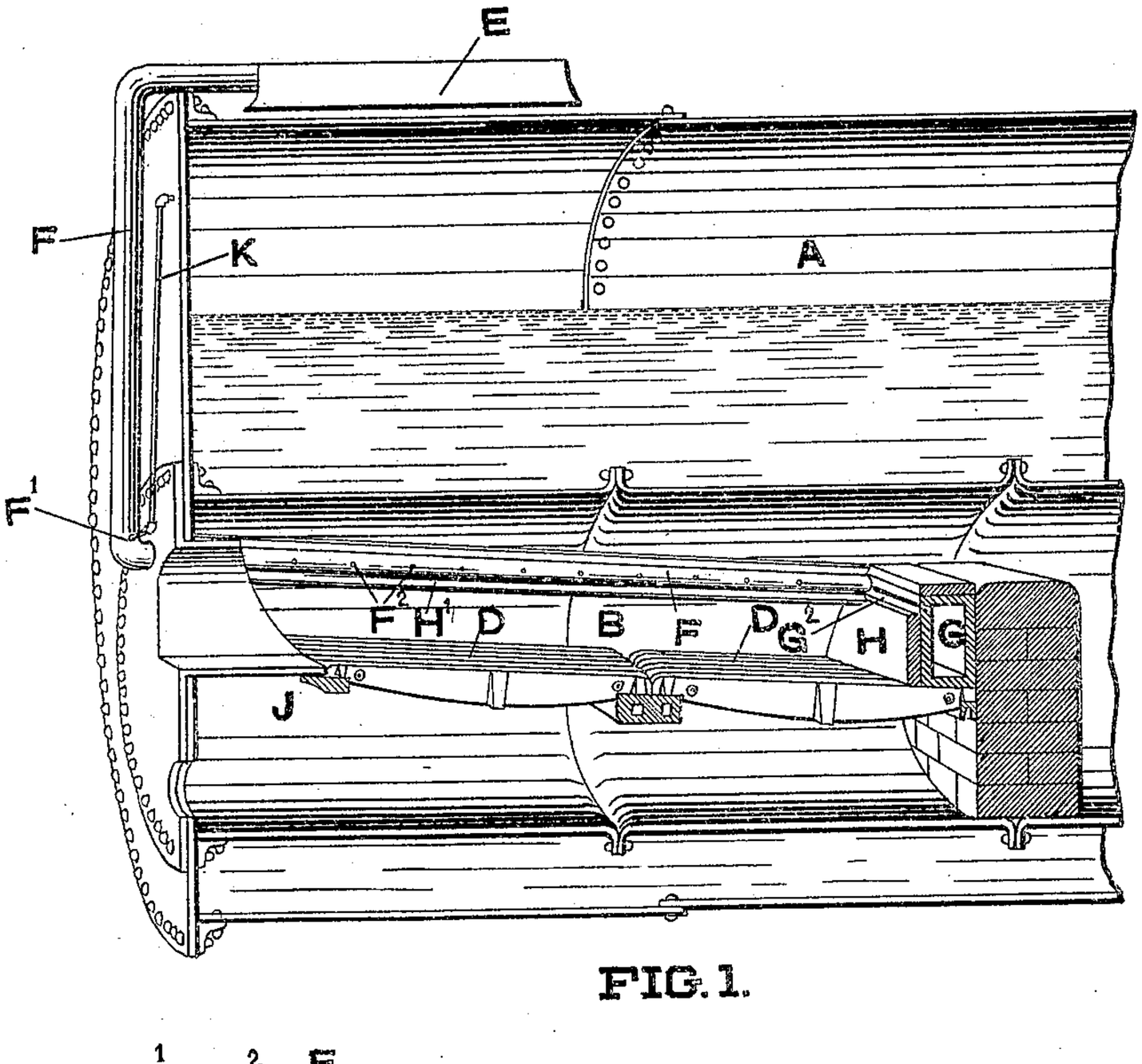

FIG. 1.

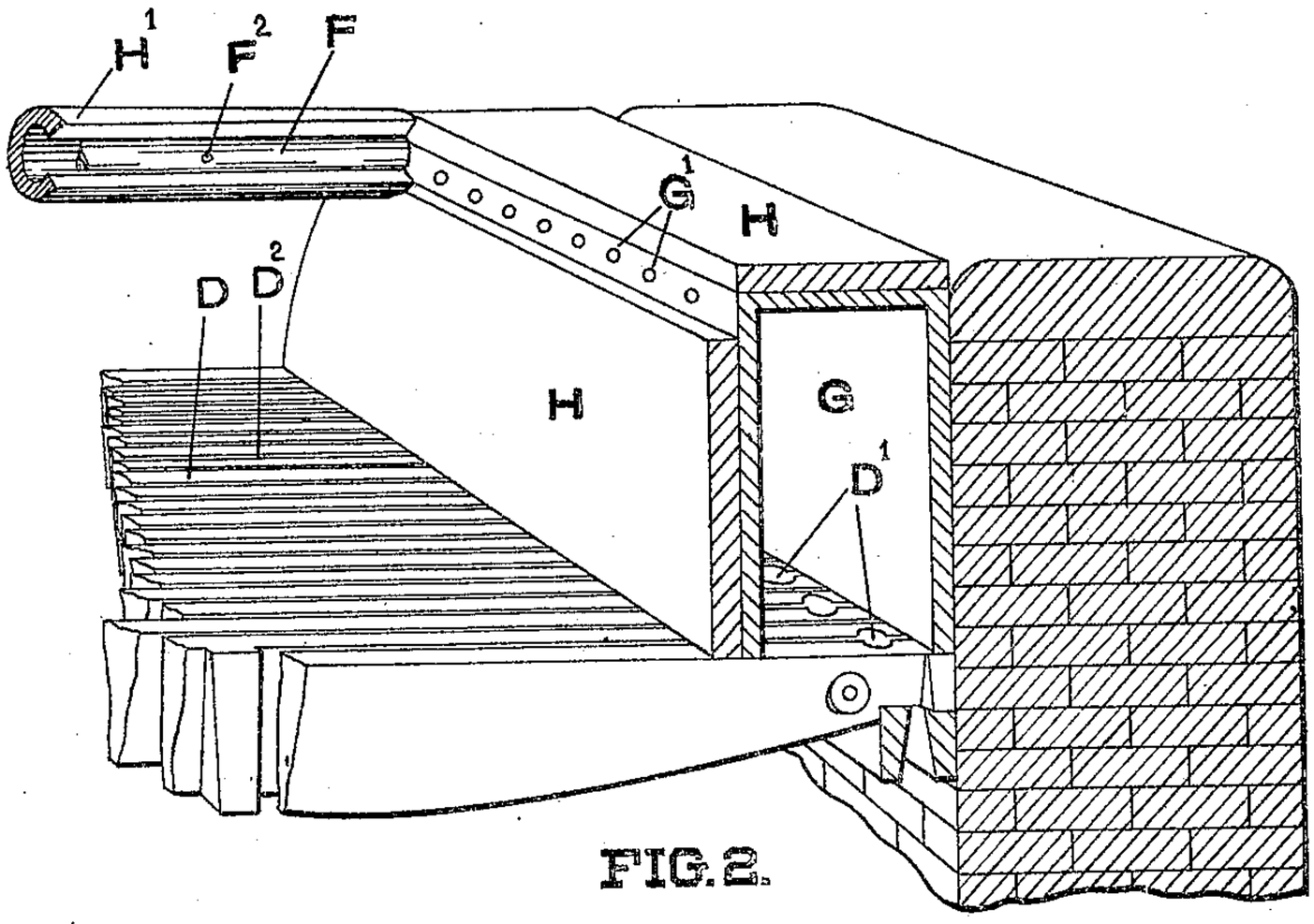

FIG. 2.

WITNESSES

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2 SHEETS—SHEET 2.

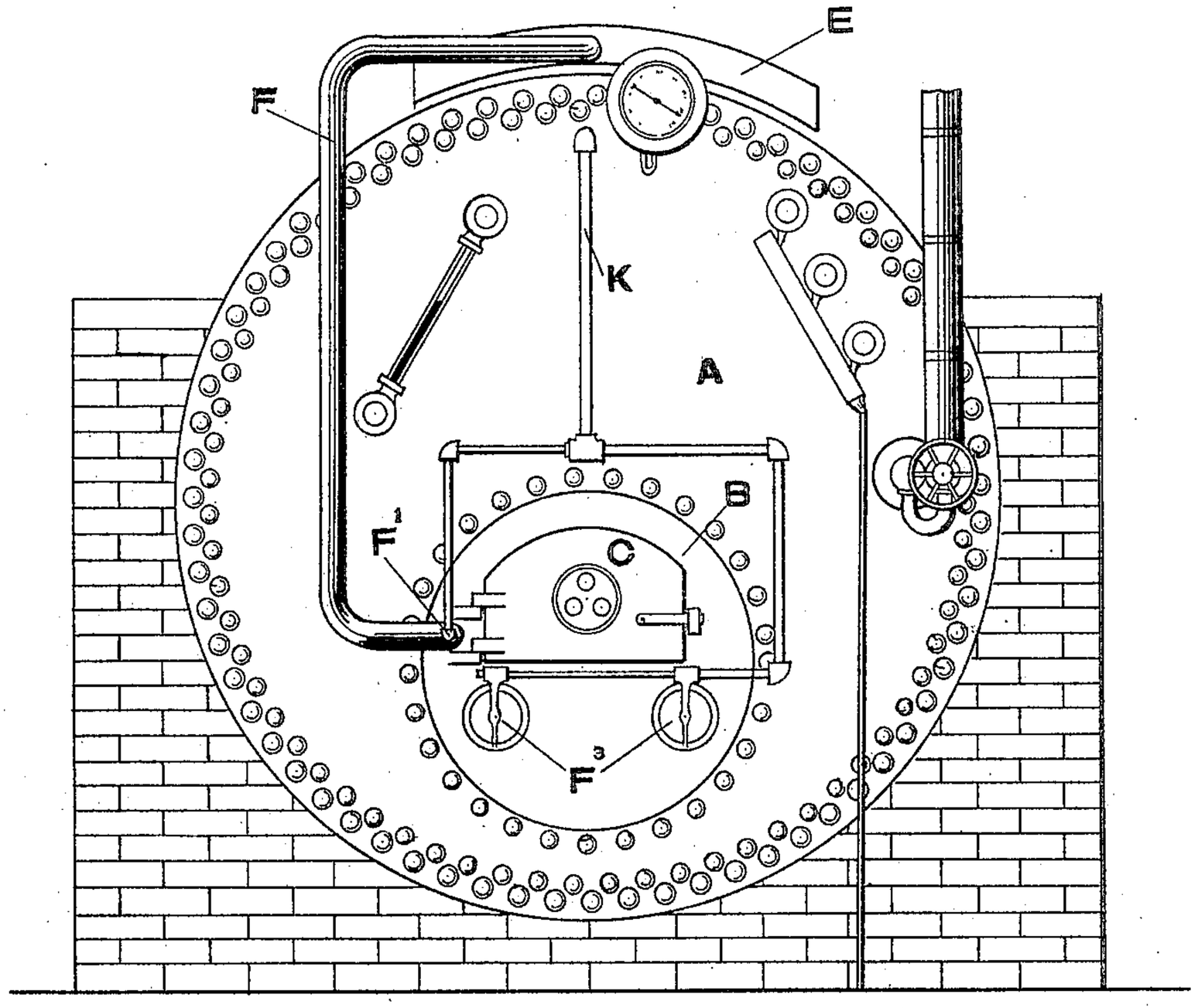

FIG. 3.

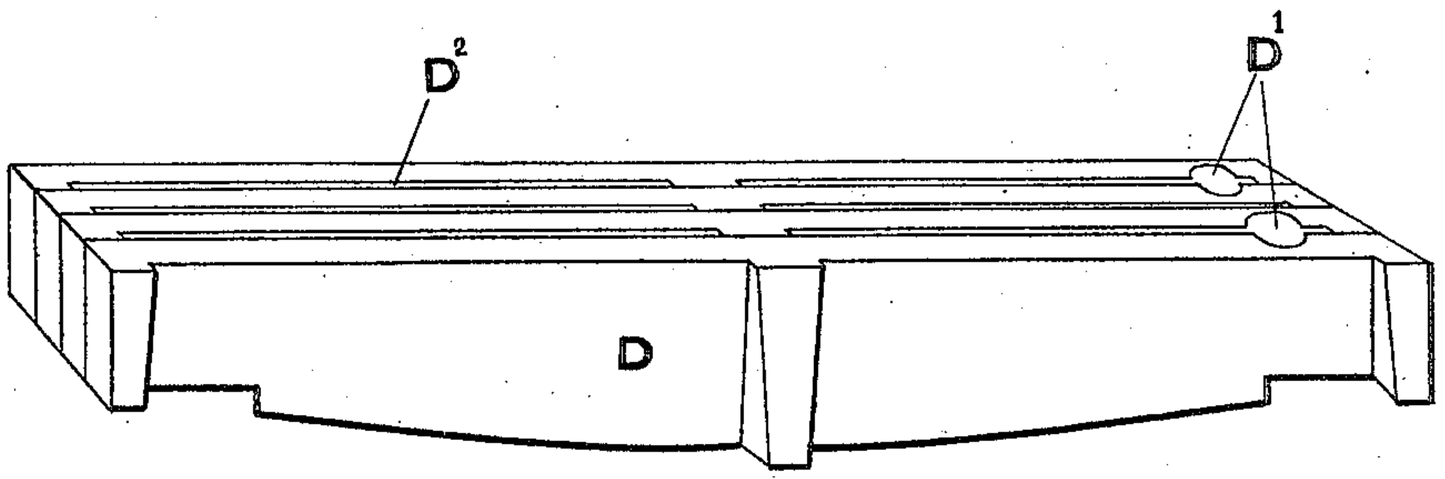

FIG. 4.

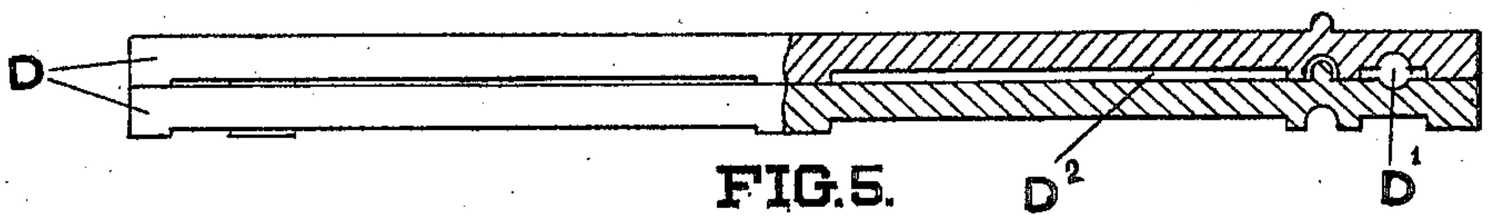

FIG. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

BEN HAIGH, OF MONTREAL, CANADA.

SMOKE-CONSUMER.

No. 818,024. Specification of Letters Patent. Patented April 17, 1906.

Application filed October 21, 1905. Serial No. 283,716.

To all whom it may concern:

Be it known that I, BEN HAIGH, a resident of the city of Montreal, Province of Quebec, and Dominion of Canada, have invented certain new and useful Improvements in Smoke-Consumers, of which the following is a full, clear, and exact description.

My invention relates to smoke-consumers; and the object is to provide a device that will supply a sufficient quantity of superheated air and steam to the combustion-chamber to completely convert the particles of carbon into carbon dioxid. In accomplishing this complete combustion of carbon I not only reduce the smoke to a minimum, but also obtain a greater economy in the combustion of fuel.

My device consists, essentially, of a chamber located at the back of the fire-box, which is supplied with a mixture of air and steam under pressure and which admits this air and steam to the combustion-chamber at an angle of approximately one hundred and eighty degrees to the line of draft.

In the drawings, which illustrate my invention and in which similar letters of reference refer to similar parts throughout, Figure 1 is a vertical longitudinal section of the boiler, showing the relative positions of the parts of my device. Fig. 2 is a perspective view of the superheating-chamber, showing the supply-pipe leading thereto. Fig. 3 is an elevation of the front of a boiler, showing the attachments for conveying hot air and steam to the superheating-chamber. Fig. 4 is a perspective view of the grate-bars of a boiler, showing the openings into the superheating-chamber. Fig. 5 is a plan view of a pair of grate-bars, partly in section, showing the opening into the superheating-chamber.

Referring to the drawings, A designates a boiler having a fire-box B, provided with a fire-door C and ash-pit J. A hood E, which admits hot air at the top of the boiler, leads into the pipe F, which enters at the front of the fire-box and passes along the side wall of the combustion-chamber and enters the superheating-chamber G, as shown in Fig. 1. A steam-pipe K admits a jet of steam to the pipe F at the bend F′, as shown in Fig. 1. In its passage along the side wall of the combustion-chamber the pipe F is partially protected by fire-brick H′. The superheating-chamber G is also protected by means of fire-brick H. A number of apertures F^2 in the pipe F admit air and steam over the combustion-chamber at right angles, while the apertures G′ in the chamber G admit the superheated mixture of air and steam to the combustion-chamber at an angle of one hundred and eighty degrees to the line of draft. In passing along the wall of the combustion-chamber the pipe F and its contents become heated, while a certain part of the mixture of air and steam is delivered to the combustion-chamber through the apertures F^2. The greater part of the mixture, however, is passed on to the chamber G, and becoming thoroughly superheated is delivered to the combustion-chamber through the apertures G′ in a direction opposite to the draft of the fire. Instead of the apertures G′, I may use a narrow slit G^2, as shown in Fig. 1. It will thus be seen that a quantity of superheated air and steam becomes thoroughly mixed with the gases in the combustion-chamber.

Where forced draft is used, as shown in Fig. 3, in which steam enters the ash-pit through the blowers F^3, a number of apertures D′ are formed in the ends of the grate-bars D to supply a further quantity of air and steam to the superheating-chamber G. It is found that the mixture of air and steam which enters the combustion-chamber through the slits D^2 between the grate-bars is not sufficient to complete the combustion of the fuel. By the use of my device, however, this supplementary mixture of air and steam is forced into the combustion-chamber and is thoroughly mixed with the unburned gases and particles of carbon, and complete combustion is thus insured. Furthermore, the hot gases are arrested in their passage and emit a greater quantity of heat to the boiler before passing into the smoke-stack.

While I have shown the preferred form of my device, I do not wish to limit myself to the precise construction herein disclosed. Instead of using a mixture of air and steam I may with equal facility use compressed air. Moreover the superheating-chamber G may be placed at the side of the fire-box, though I prefer to place it at the back on account of the increased angle at which the superheating mixture meets the line of draft.

Having thus described my invention so that the same may be readily understood by those skilled in the art to which it appertains, what I claim, and desire to secure by Letters Patent, is—

1. In combination with a boiler-furnace or the like, a hood located at the top of said

boiler, a pipe leading from the hood into the fire-box and passing along the side wall of the same, said pipe provided with apertures opening into the fire-box, and a superheating-chamber connected with said pipe, said chamber communicating with the ash-pit and provided with an aperture leading into the fire-box.

2. A smoke-consumer for furnaces and the like, comprising a hood located at the top of the furnace, a protected superheating-chamber located at the back of the fire-box, a pipe leading from the hood to the superheating-chamber and passing along the side wall of the fire-box, said pipe provided with apertures opening into said fire-box, means for admitting steam or compressed air into said pipe, means of communication between the ash-pit and the superheating-chamber, and means for admitting the contents of the superheating-chamber to the flame of combustion.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

BEN HAIGH.

Witnesses:

C. W. TAYLOR,

E. R. MCKENZIE.