

(No Model.)

A. YOUNGER.
SMOKE CONSUMING FURNACE.

No. 350,335.

Patented Oct. 5, 1886.

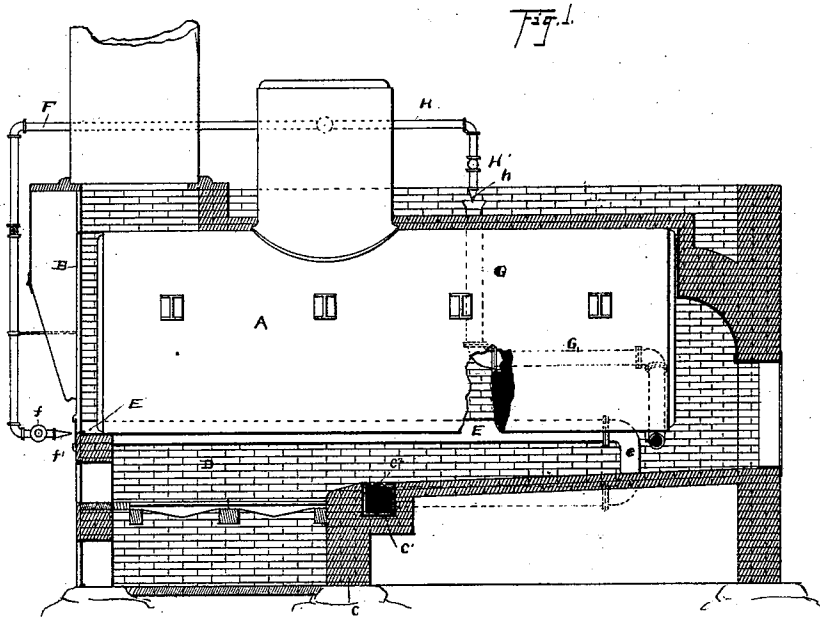


Fig. 2.

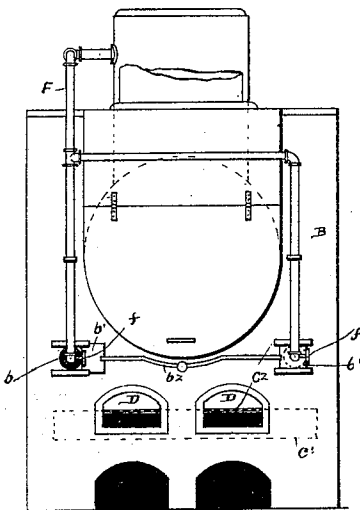
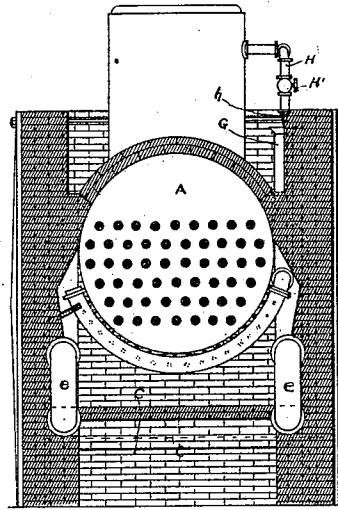


Fig. 3.



WITNESSES

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ALEXANDER YOUNGER, OF CLEVELAND, OHIO.

SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 350,335, dated October 5, 1886.

Application filed April 3, 1886. Serial No. 197,641. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER YOUNGER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Smoke-Consuming Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in smoke-consuming furnaces and attachments in which heated air is distributed through perforations in the top wall of a metal box set in the bridge-wall, the air being supplied through metal ducts leading from the front plate through the fire-box, the current of air being induced by a jet of steam introduced into the outer ends of each duct, to the end that by using the air-ducts alternately the duct that is idle becomes highly heated, by means of which the air, when introduced through the same, becomes highly heated, and is thus discharged at the rear of the fire-box to commingle with the gases and render the admixture inflammable. The dampers for closing the air-ducts are connected, so that the one duct is open and the other duct closed for the same operation. A curved perforated air-tube is located at the rear end and underneath the boiler, the outer end of the air-pipe leading to the same having a steam-jet, by means of which an air-current is discharged through the jet-orifices of the curved pipe to supply air at this point, to the end that all the gases may be consumed.

With these objects in view my invention consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation in section of my improved device. Fig. 2 is a front elevation. Fig. 3 is a rear elevation, partly in section.

A represents the boiler, that is of the return-flue variety, with brick setting, substantially as heretofore in common use.

B represents the front plate, C the bridge-wall, and D the fire-box, the latter being provided with doors, grates, ash-pit, &c., in the usual manner.

C' is a metal box, usually of cast-iron, set

in the bridge-wall, the upper perforated wall, C', of the box being usually about flush with the top surface of the bridge-wall. The hot-air chamber inside this box is connected at either end respectively with air-ducts E. These latter are preferably of cast-iron, the peculiar form thereof in cross-section not being essential. These ducts are connected with corresponding holes, b, in the front plate, and lead rearward through the fire-box on either side of the same to near the rear end of the boiler. Thence by means of a return-bend, e, the ducts lead forward and are connected with the air-box C', as aforesaid. The openings b are closed by sliding dampers b', that are connected by a rod or other mechanism, b², so that the one damper is closed and the other damper opened at the same operation. A steam-pipe, F, leads from the dome of the boiler, and by means of branches, as shown, leads in front of each air-duct, where valves f are provided and discharging-nozzles f' are arranged to discharge a jet of steam into the respective air-ducts. But one air-duct and the accompanying steam-jet are used at a time, and the idle air-duct, being exposed to the intense heat of the fire-box, becomes intensely heated. A regenerative system is thus had, by means of which a hot blast is discharged in jet at the rear of the furnace to commingle with the gases, the intense heat of the blast being such that the admixture is not only rendered highly combustible, but is ignited by the heated air, and burns fiercely at the rear of the bridge-wall and under the rear portion and at the ends of the boiler, thus consuming the gases before smoke is formed, and adding greatly to the steam-generating capacity of the plant. Heretofore various devices for heating air for such purposes have been used that only heated the air moderately warm, and consequently fell short of what they were intended to accomplish. With my improved device the idle air-duct becomes red-hot in a few minutes, and the air when introduced through the same is heated to a corresponding high degree with the result aforesaid.

A pipe, G, open at the top end, leads down from the top of the arch and curves under the rear end of the boiler, as shown in Fig. 3. The curved portion has jet-orifices presenting toward the fire-box. A pipe, H, leads from the

dome, and is provided with a valve, H', and a nozzle, h, for introducing a steam-jet into the mouth of the pipe G, to induce an air-current through the same. The air is discharged 5 to meet the rearwardly-passing flames from the fire-box, the object being to retard and spread the flames, so as to envelop this portion of the boiler, and also to supply fresh air to aid in burning any of the gases that up to 10 this point may not have been consumed.

The valves and dampers mentioned are the only parts that require manipulation, and hence it will be seen that the device is easily regulated and operated.

15 The air-ducts E will in time burn out; but as these are usually of cast-iron they are easily and cheaply renewed. The other portions of the device are likely to be as lasting as the other parts of the plant.

20 The device will be found effective and comparatively cheap in initial cost, and may be easily added to plants already built.

What I claim is—

1. The combination, with a furnace for steam- 25 boilers and a distributing-chamber located in the bridge-wall, the casing thereof having a suitable perforated surface, of metal air-ducts leading through the fire-box and discharging into the distributing-chamber, and 30 dampers for closing the air-ducts, the latter being arranged and operated on the so-called "generator system," substantially as set forth.

2. The combination, with a furnace for steam-generators and metal air-ducts leading

through the fire-box and discharging into a 35 distributing-chamber located in the bridge-wall, of dampers for the air-ducts, said dampers being connected for closing one air-duct with the same operation that opens the other 40 air duct, the parts being arranged substantially as set forth.

3. The combination, with a furnace for steam-generators, a distributing-chamber located in the bridge-wall, air-ducts leading 45 through the fire-box to the distributing-chamber, and connected dampers for simultaneously opening one air-duct and closing the other air-duct, of steam-pipes and suitable valves for discharging steam-jets into the respective 50 air ducts, the parts being arranged substantially as set forth.

4. The combination, with a furnace for steam-generators, with air-ducts, distributing-chamber, and valves arranged on the so-called "regenerative system," substantially as 55 shown, of an air-tube leading under the rear end of the boiler, said air-tube being perforated adjacent to the boiler, and having a steam-pipe for discharging a steam-jet into the outer end 60 of said air-tube, the parts being arranged substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 26th day of March, 1886.

ALEXANDER YOUNGER.

Witnesses:

CHARLES W. BOTTEN,
JOHN I. FISHER.