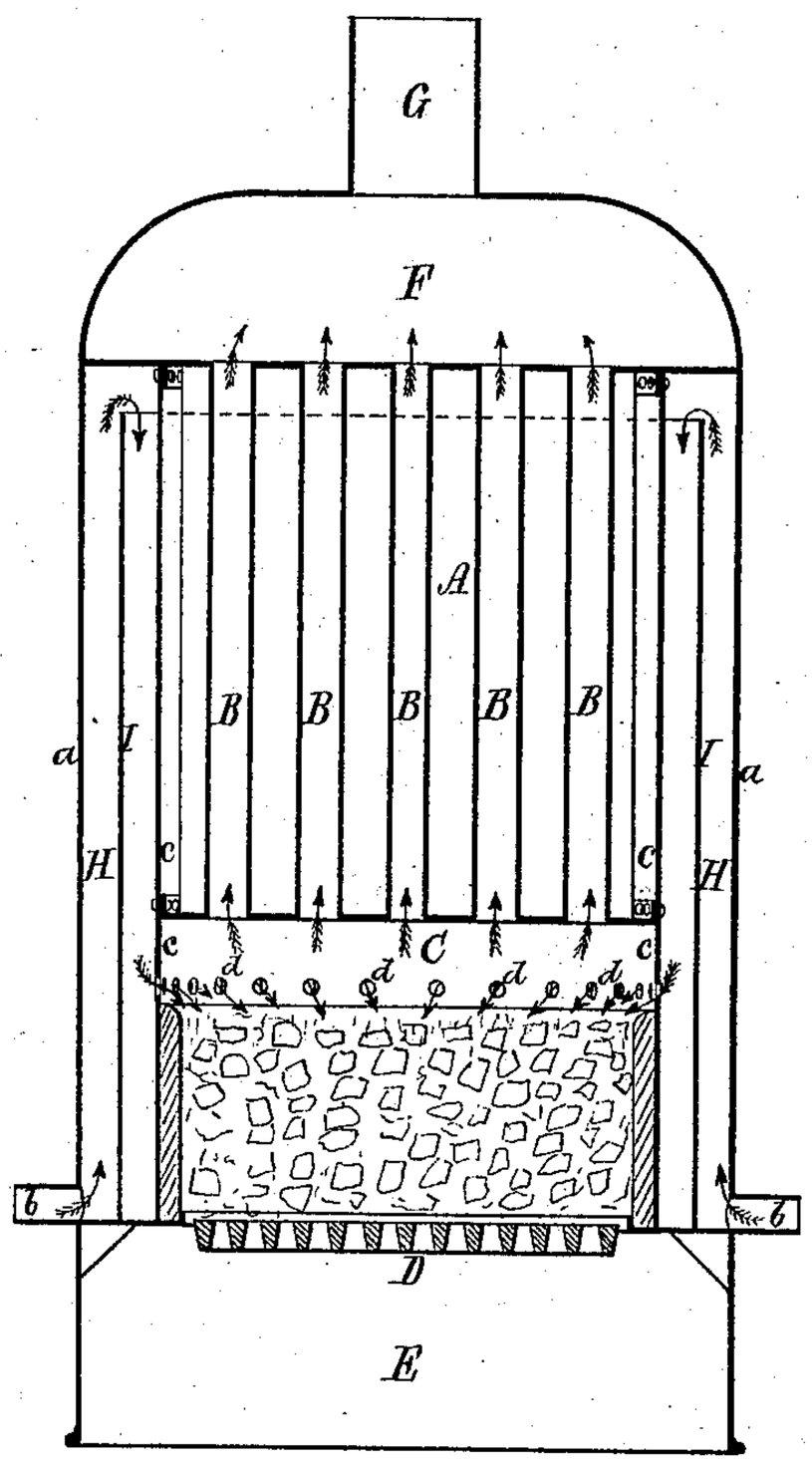
(No Model.)

D. McBRIDE GRAHAM.

STEAM GENERATOR.

No. 287,824. Patented Nov. 6, 1883.



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UNITED STATES PATENT OFFICE.

DANIEL McBRIDE GRAHAM, OF CHICAGO, ILLINOIS.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 287,824, dated November 6, 1883.

Application filed March 12, 1883. (No model.)

To all whom it may concern:

Be it known that I, DANIEL McBRIDE GRAHAM, of Chicago, of the county of Cook, of the State of Illinois, have invented a new and useful Improvement in Steam-Generators; and I do hereby declare the same to be described in the following specification and represented in the accompanying drawing.

The said drawing is a transverse and vertical section of an upright steam generator or boiler provided with my invention, the nature of which is defined in the claim hereinafter presented.

My said invention may be used for heating air for warming the apartments of a building or dwelling, as in such case it will only be necessary to let, instead of water, into the boiler the air to be heated, and to cause such air, after being heated, to flow or pass from the boiler through one or more educts or pipes to the room or rooms to be warmed.

My invention is especially applicable to upright steam-generators.

In the drawing, A denotes a multitubular boiler, consisting of a cylindrical drum and a series of pipes, B, extending through it from head to head and opening through the heads. The boiler is arranged over a fire-place or chamber of combustion, C, whose grate is shown at D, and ash-pit or chamber E. Over the upper end of the boiler is the smoke arch or dome F, provided with an educt, G, to lead the waste smoke and spent volatile products of combustion to a chimney or into the open air. Surrounding the fire-place and the boiler is a duplex air-jacket, consisting of an annular chamber, H, having within it, and arranged concentrically therein, an annular partition, I, which extends from the bottom nearly to the top of the chamber H. In the lower part of the outer shell, *a*, of the chamber H there is one or a series of air-inlets, *b*, and there is in the inner shell, *c*, comprising or encompassing the combustion or fuel chamber C, a series of air-inlets, *d*, they being arranged so as to discharge air directly upon the upper surface of the fuel or into the upper part of the combustion-chamber. The boiler is to be provided with an inlet for water and an outlet for steam, as is the case with other steam-boilers, the water and steam spaces being within the drum and about the tubes thereof, through which the smoke and volative products of combustion pass from the fire-place into the dome F, and thence through and out of its outlet G.

While the boiler may be in operation air will be drawn into the duplex-jacket and will ascend in the space thereof situated between the partition I and the outer shell, *a*, and will flow over the top of such partition and rush downward in the space between the partition and the boiler and fire-place, and be discharged into the latter through the inducts *d*. In so doing, the air, before going through such inducts, will intercept the heat radiated from the boiler and shell *c*, the combustion of the smoke and gases in the fire-place being greatly promoted thereby. The fuel in burning will receive air through the grate.

The duplex jacket is serviceable in two ways—viz., in supplying heated air to the smoke and gaseous products of the fire-chamber, and in intercepting and utilizing heat that would be otherwise radiated and lost.

With a boiler constructed as above described, very little smoke is wasted, the combustible gases and smoke escaping from the fuel being mostly, if not entirely, utilized and burned, and in consequence thereof a material saving in fuel results. In the said boiler it will be perceived that the duplex air-jacket is arranged wholly above the grate and ash-chamber, and in no respect operates to discharge air into the latter, the air heated in passing through the jacket being discharged into the fire-place above the fire-pot or fuel-receiving space. The air to pass into and up through the fuel is to come from and to enter the ash-chamber through its doorway, or by a suitable duct. With my improvement fresh air for supplying the flame and gases emitted from the fuel can be discharged into them over the fuel without it first being caused to pass up through the fuel, the air for combustion of the fuel being received only from the ash-pit. This is not the case in the boiler shown in the United States Patent No. 159,069, wherein all the air that goes through the duplex air-jacket is discharged into the ash-

chamber, and thence into and caused to pass up through the grate and the fuel thereon. Therefore,

I claim—

The combination of the duplex air-jacket with the smoke-chamber or arch F, extended over the top of such jacket, the ash-chamber E, extended beneath the bottom of such jacket, and the grate, fire-place, and tube-stack arranged within such jacket, all being substantially as represented, and the said air-jacket being provided with air inducts and educts, as explained.

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Witnesses:
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