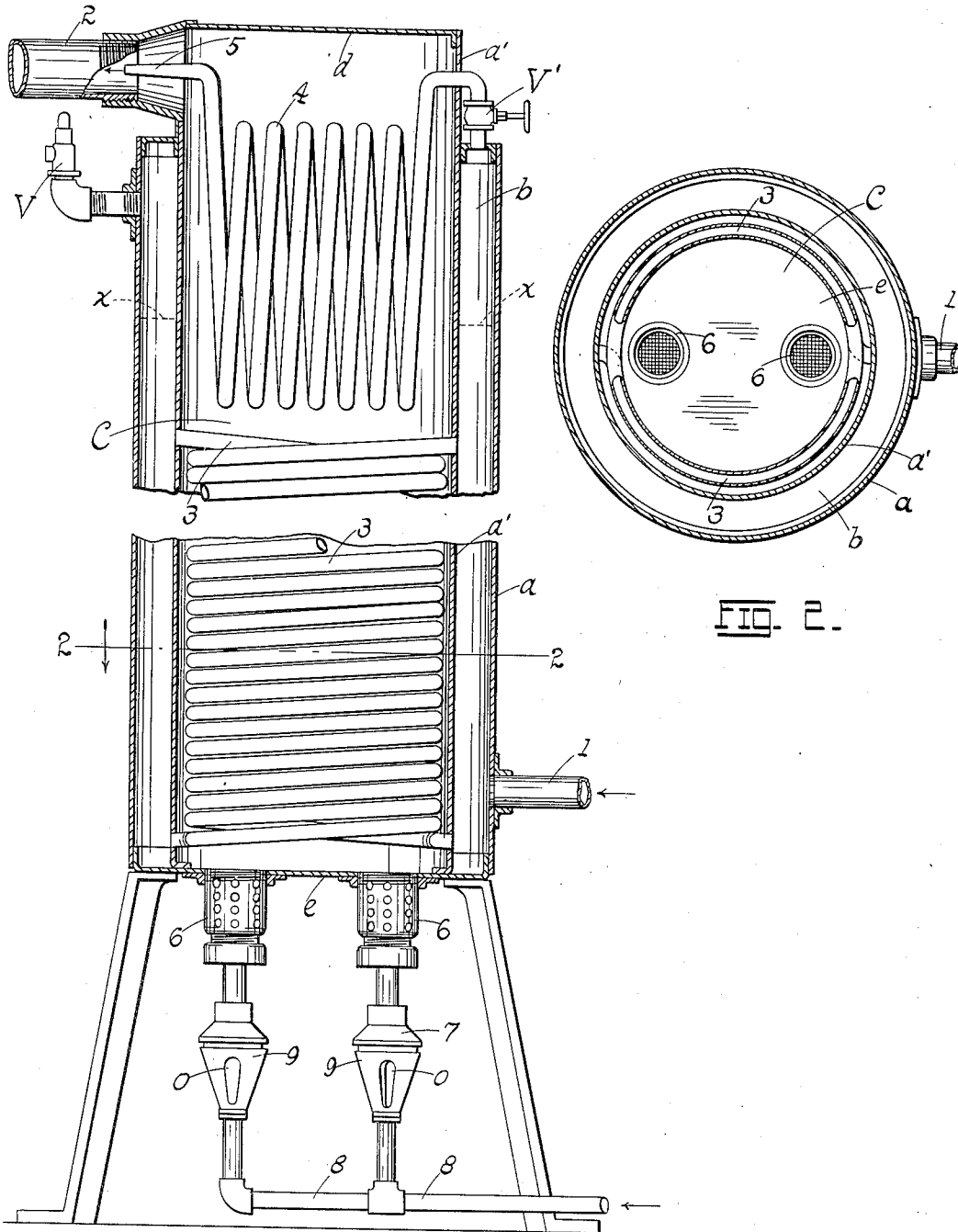


H. V. DEEMAR.
STEAM GENERATOR.
APPLICATION FILED JULY 17, 1912.

1,058,850.

Patented Apr. 15, 1913.

2 SHEETS—SHEET 1.



WITNESSES:

Harry A. Beimer.
Jennie C. Weber

FIG. 1.

INVENTOR.
Henry V. Deemar.

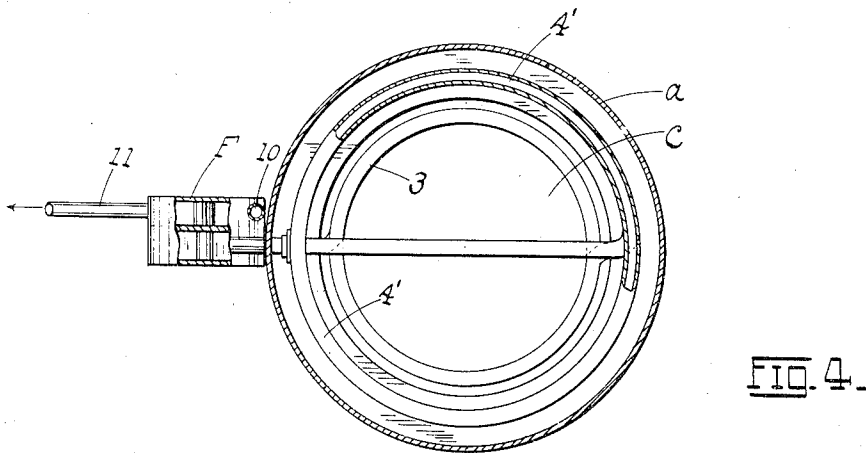
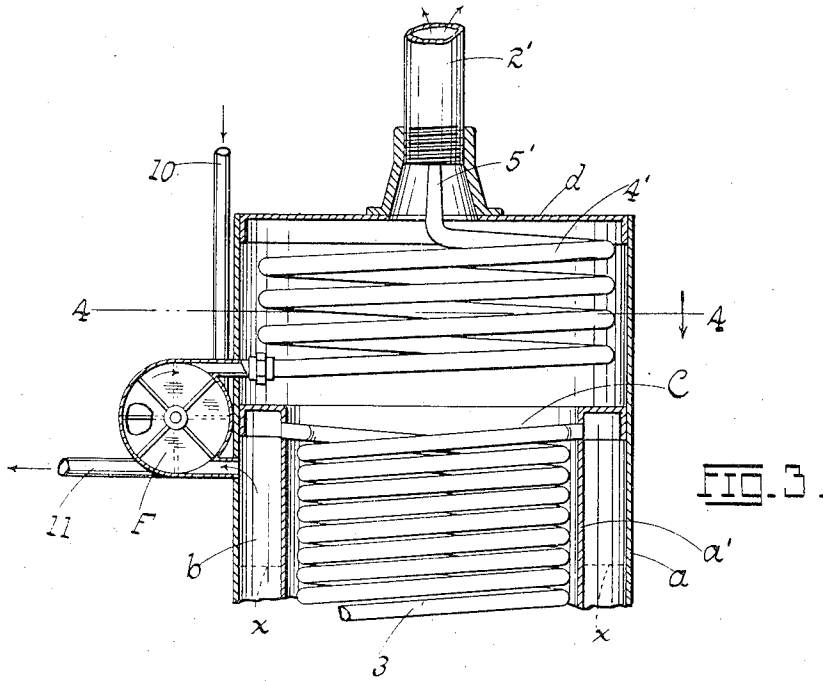
BY *Emil Karem*
ATTORNEY.

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WITNESSES:

Harry A. Beineke.
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UNITED STATES PATENT OFFICE.

HENRY V. DEEMAR, OF ST. LOUIS, MISSOURI.

STEAM-GENERATOR.

1,058,850.

Specification of Letters Patent.

Patented Apr. 15, 1913.

Application filed July 17, 1912. Serial No. 709,974.

To all whom it may concern:

Be it known that I, HENRY V. DEEMAR, citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Steam-Generators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in steam generators; and it consists in the novel details of construction more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a middle vertical section of one form of my improved boiler; Fig. 2 is a horizontal section on the line 2—2 of Fig. 1; Fig. 3 is a vertical middle section of the upper end of a modified form of my invention; and Fig. 4 is a horizontal section on the line 4—4 of Fig. 3.

The object of my invention is to construct a steam generator wherein the steam may be superheated by the heat of the gases and combustion products by which the steam is first generated, thereby utilizing the heat units of the fuel to the best possible advantage.

A further object is to construct a generator in which the necessary air draft may be kept under perfect control by the use of vapor burners through which the air must first flow before reaching the main flue or combustion chamber of the boiler.

A further object is to provide a boiler making possible the distribution of the heat units of the fuel, to the best possible advantage; one presenting a maximum area of heating surface; one from which cold air may be effectively excluded; and one possessing further and other advantages better apparent from a detailed description of the invention which is as follows:—

Referring to the drawings, and for the present to Figs. 1 and 2, *a*, *a'*, represent respectively the outer and inner concentric walls of a hollow cylindrical (or equivalent) boiler, the annular space *b* between the walls serving as the water compartment of the boiler to which feed water is admitted through a bottom feed-pipe 1, the boiler being preferably provided with a safety valve *V* of any approved type. The chamber *C* within the inner shell or wall *a'* constitutes the combustion chamber which is closed on

top by a wall *d*, a discharge pipe 2 leading from the upper end of said combustion chamber. The chamber *C* is closed at the bottom by a wall *e* and above said wall is provided with water-circulating coils 3 (disposed along the wall *a'*) whose ends tap the compartment *b* at points substantially diametrically opposite one another, there being two coils, the upper discharge ends of the respective coils being diagonally opposite their bottom intake ends to bring about a perfect circulation. Of course, any number of coils may be improvised, the two here shown serving as an example. Tapping the steam space of the boiler (the water level being indicated by the line *x*) and controlled by an ordinary globe valve *V'*, is a superheating coil 4 spanning the chamber *C* and disposed in the path of the combustion products on their way to the discharge pipe 2, said coil terminating in a nozzle 5 serving as an aspirator, the superheated steam escaping from the nozzle aspirating the combustion products and thus assisting them through the pipe 2 to wherever may be their destination. The bottom *e* of the combustion chamber *C* is tapped by the burner heads 6 of suitable hydrocarbon vapor burners to the mixing chambers 7 of which the gas or vapor is conducted through the gas pipes 8, and the air through the damper-controlled openings 9. The burners here shown are on the order of those forming the subject-matter of my pending application, Serial Number 681,352, and as obvious from the drawings, the only air which can enter the combustion chamber *C* must come through the burners, the bottom *e* being closed or imperforate. By thus regulating the dampers 9 of the mixing chambers 7, the quantity of air admitted into the chamber *C* may be controlled, thereby not only controlling the draft through the chamber (the draft being directly affected by the jet from the nozzle 5) but compelling all the air (which supports the combustion of the gas or vapor) to flow through the burners, and whatever excess of air passes through the burners over and above the quantity necessary to effect combustion of the gas, becomes heated, so that no cold air ever strikes the inner walls of the boiler.

The operation is readily understood from the foregoing. The hot combustion products from the burners 6, 6, enter the chamber

C where they heat not only the walls a' , but the coils 3, 3, thus producing an effective boiler circulation. The same products heat the coil or superheater 4 so that the steam generated in the boiler becomes superheated, and is finally discharged through the nozzle 5, whence the steam and aspirated combustion products traverse the pipe 2 and may be used for any domestic, commercial, industrial, or other purpose, that contemplated here being to utilize the conjoint gases as a circulating medium for heating systems, the radiators whereof are however, not here shown as they are well understood in the art.

Where the steam and aspirated gases are used for circulating purposes in a heating system composed of coils and radiators (not shown), I may utilize the steam generated in the boiler to drive a double fan or blower F, as shown in the modification in Figs. 3 and 4. The steam as it leaves the driven section of the fan traverses the superheater coil 4' whence it discharges through the nozzle 5' into the circulating pipe 2' leading to a heating system. After the mingled steam and gases have traversed such system the waters of condensation from the radiators may be allowed to drain to a point whence they may be again fed to the boiler through the pipe 1, the gases freed from the condensed steam being led back from the radiators through a pipe 10 to the driving exhaust section of the fan F whence they are discharged into the atmosphere through the pipe 11 leading from the casing of the fan. In other respects the boiler in Figs. 3 and 4 is identical with that already described. The walls a, a' , though here shown cylindrical, may be prismatic, that is to say, polygonal in cross-section instead of circular as shown. In lieu of coils (3, 4, 4') any equivalent thereof may be employed. One section of the fan F or that driven by the steam from the boiler operates the adjacent section or that to the casing of which the pipe 10 leads, such second section constituting the driving section for the gases in the pipe 10, or more properly serving as an exhaustor for drafting the gases out of any vacuum circulating or heating system to which the invention is applied, such vacuum

systems being well understood in the art and not necessary to detail here.

Having described my invention, what I claim is:—

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1. A steam generator comprising a hollow member having a central combustion chamber closed at top and bottom and provided with a gas outlet at the top, means for directing burner gases into said chamber through the closed bottom thereof, an outer enveloping water compartment, circulating means tapping the walls of said compartment below the water-level and disposed in the path of the burner gases, a superheater member tapping the steam space above the water in the water compartment, and disposed in the path of the burner gases in the combustion chamber, and means for discharging the superheated steam into the gas outlet.

2. A steam generator comprising a cylindrical member having a central combustion chamber closed at top and bottom and provided with a gas outlet at the top, means for directing burner gases into said chamber through the closed bottom thereof, an outer annular water compartment, circulating coils tapping the walls of said compartment below the water level and disposed in the path of the burner gases, a superheater coil tapping the steam space above the water in the water compartment, and disposed in the path of the burner gases in the combustion chamber, and means for discharging the superheated steam into the gas outlet, as set forth.

3. In a steam generator, a boiler, a combustion chamber, a superheater for the steam, a fan operated by the steam from the boiler, means for directing the superheated steam and combustion products through a common circulating outlet pipe leading from the combustion chamber, and an exhaustor coupled to the fan for separating the gases from the waters of condensation.

In testimony whereof I affix my signature, in presence of two witnesses.

HENRY V. DEEMAR.

Witnesses:

EMIL STAREK,

FANNIE E. WEBER.

ch, by addressing the "Commissioner of Patents, D. C."