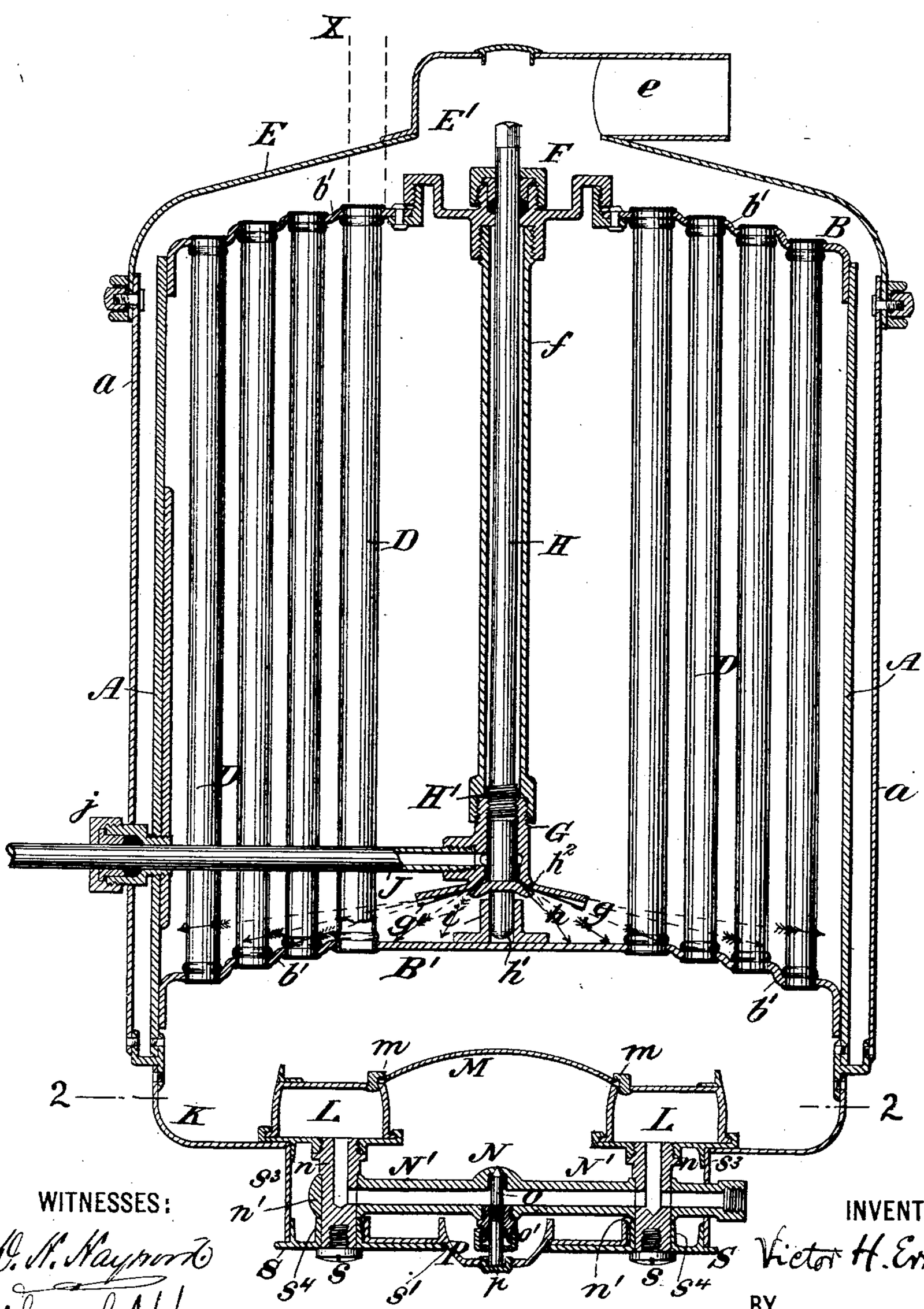
(No Model.) 2 Sheets—Sheet 1.

V. H. ERNST.

STEAM GENERATOR.

No. 587,683. Patented Aug. 3, 1897.

Fig. 1,



WITNESSES:

E. F. Hayward

Geo. C. Abbe.

INVENTOR

Victor H. Ernst

BY

Hoffman & Hoffman

ATTORNEYS

(No Model.) 2 Sheets—Sheet 2.

V. H. ERNST.

STEAM GENERATOR.

No. 587,683. Patented Aug. 3, 1897.

Fig. 2,

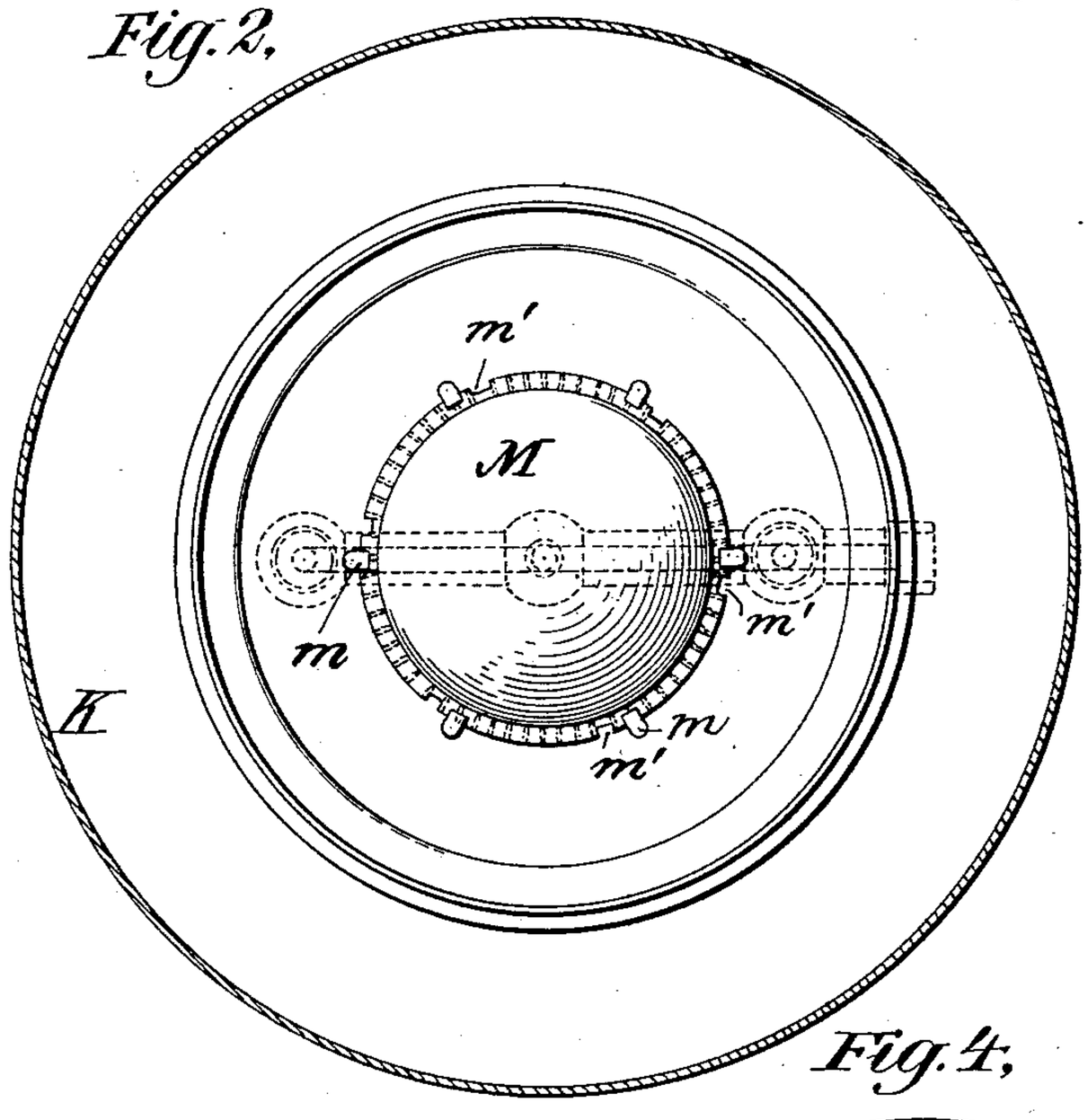
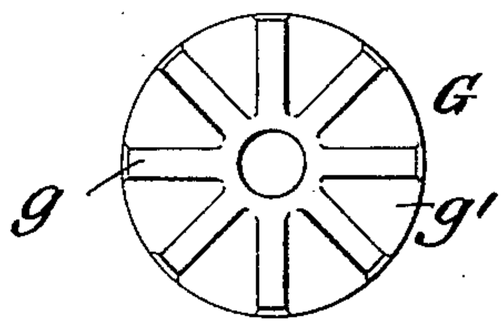


Fig. 4,

Fig. 3,



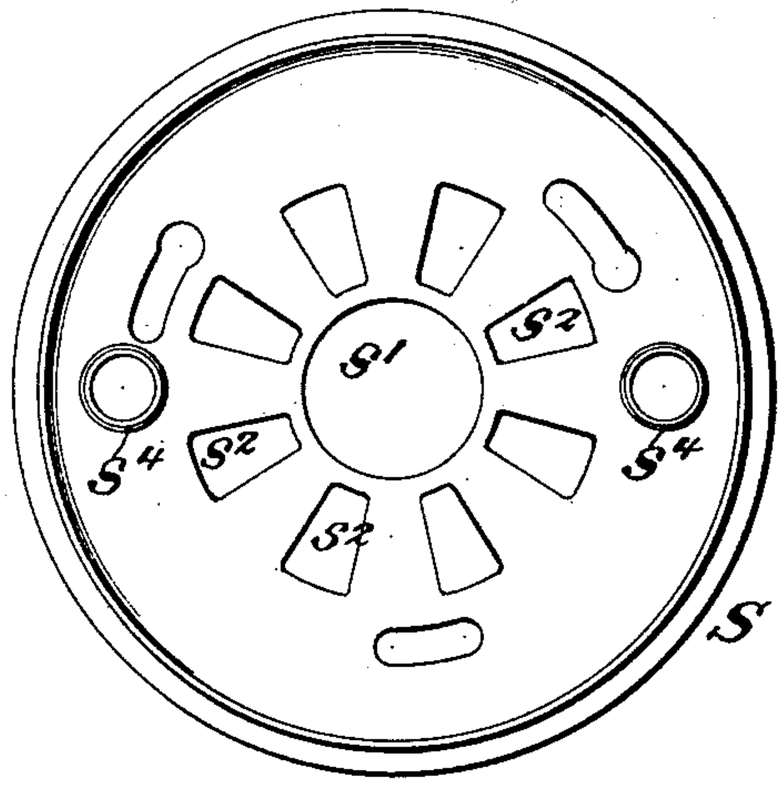
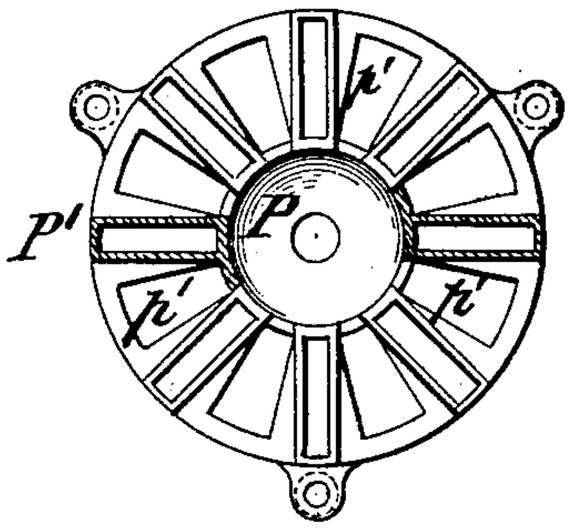


Fig. 5,



WITNESSES:

D. H. Haywood

Geo. C. Abbe.

INVENTOR

Victor H. Ernst

BY

Howson and Howson

ATTORNEYS

UNITED STATES PATENT OFFICE.

VICTOR H. ERNST, OF JERSEY CITY, NEW JERSEY.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 587,683, dated August 3, 1897.

Application filed March 27, 1896. Serial No. 585,111. (No model.)

To all whom it may concern:

Be it known that I, VICTOR H. ERNST, a citizen of the United States of America, and a resident of Jersey City, Hudson county, State of New Jersey, have invented a Steam-Generator, of which the following is a specification.

The object of my invention is to construct a steam-generator which shall be simple, light, and strong and which will generate steam rapidly without danger of explosion and which generally has qualities adapting it for use upon steam-motor vehicles, launches, &c.

In the accompanying drawings, Figure 1 is a vertical section of my improved steam-generator. Fig. 2 is a sectional plan view on the line 2 2, Fig. 1. Fig. 3 is a face view of the water-spreader. Fig. 4 is a plan view of the bottom plate of the burner detached; and Fig. 5 is a plan view of the ignition-cup and lighting-spider, which also serves, in connection with the bottom plate, as an air-supply regulator.

My steam-generator is in this instance constructed with vertical fire-tubes, and as a fuel I prefer to use oil, the oil-burner being arranged at the bottom of the generator.

A is the outer shell of the generator, having riveted or otherwise secured to its upper and lower ends the flanged top and bottom tube-sheets B and B′. Both tube-sheets are formed with corresponding annular steps *b* *b′*, as illustrated in Fig. 1. The tubes D are expanded or otherwise secured into the horizontal portions of the steps of the two sheets. This annular stepped construction of the sheets is strong and, while enabling me to use tubes of uniform length, gives me a construction of combustion-chamber C well adapted for the best distribution of the heat.

Outside the cylindrical casing A of the generator is a second casing *a* to form a jacket to prevent radiation. To the top is fitted the inclosing dome E to form the draft-box E′. A chimney *e*, of any suitable shape, carries off the products of combustion.

The center of the upper tube-sheet B is provided with a stuffing-box piece F. Into the under side of this is screwed or otherwise secured a holding member *f*, in the form of a tube, which extends downward into the generator, where it has screwed into it a tubular piece G, which I term the "water-distributer." Through the stuffing-box of the piece F, the tube *f*, and spreader G there extends a stem H, having below the under side of the spreader G an annular flange *h*. The lower end *h′* of the stem H is guided in a foot-piece *i*, secured to the upper side of the lower tube-sheet B′. The stem H is threaded at H′, where it passes through the upper part of the tubular piece G, being fitted there into corresponding threads in the distributer G, so that by turning the stem H in one direction or the other the flange *h* can be caused to approach toward or be moved away from the lower face of the piece G. The upper end of the stem H may be squared, as shown in Fig. 1, for the reception of a tool to turn it.

Between the lower part of the tubular piece G and the stem H, immediately above the flange *h*, there is left an annular passage or clearance, into which opens a lateral water-supply pipe J. This pipe enters through a stuffing-box *j*, fitted into the shell A and jacket-casing *a*.

The lower face of the tubular piece G has immediately over the flange *h* of the stem a spreading flange *g*, preferably greater in diameter than the diameter of the flange *h*. On turning the stem H to move the flange *h* away from or toward its seat the quantity of water supplied to the generator may be thoroughly regulated. By bringing the flange *h* up to the flange *g* any scale formation there may be crushed or ground off and blown out by the water-pressure.

As it is my intention so to operate the generator as to convert the water into steam as fast as it is admitted, I so construct the flanges *h* and *g* as to spray the water all over the bottom tube-sheet and the lower ends of the tubes, as indicated by arrows in the drawings. For this purpose I prefer to form on the lower face of the flange *g* radiating grooves *g′*, as illustrated in Figs. 1 and 3, and on the upper face of the flange *h* similar but shorter grooves h^2, Fig. 1, so as to get a thorough spraying effect, as the arrows will indicate.

The steam may be taken off from the generator at any suitable point—as, for instance, as indicated by the dotted lines at X, Fig. 1.

I will now describe the construction of the burner, which is fitted to the lower end of

the generator through the medium of the flanged ring K. This burner comprises an annular vaporizing-chamber L, with a central distributing-plate M, below which is the burner-jet N, controlled by the screwed needle-valve O. This burner-jet N is part of a transverse pipe N′, into and through which oil passes from the inlet *n*. This transverse pipe N′ communicates by the upright branches *n* with the under side of the annular vaporizing-chamber L. To the under side of the burner is secured in any suitable manner, as by means of headed screws *s*, entering downward extensions of the branches *n*, a bottom plate S, Figs. 1 and 4, with the central opening *s′* and radial openings s^2. I prefer to form the branches *n* separate from the cross-pipe N′ and to provide the latter with enlargements *n′* to fit over the branches, the passages being made in the parts accordingly. Flanges s^4 on the bottom plate S fit over the lower ends of the branches *n* and hold the parts together. A ring or flange s^3 closes at the side the space between the bottom plate S and the annular vaporizing-chamber L. The central opening *s′* in the bottom plate S is closed by the ignition-cup P, secured to or forming part of a spider P′, provided with openings *p′*, corresponding with the openings s^2 in the bottom plate. By turning this ignition-cup and spider the openings *p′* and s^2 may be made to register more or less to admit more or less air to the burner or may be turned wholly out of register, so as to cut off all the supply of air, as will be readily understood.

The stem of the valve O passes down through a stuffing-box *o′* and has a squared head outside the stuffing-box, and the bottom of the ignition-cup P is provided with a screw-plug *p*, upon removing which the valve-stem O may be adjusted to any desired position to regulate the flame.

Lugs *m*, Figs. 1 and 2, retain the spreading-plate M in position, notches *m′* being provided in the edge of the plate M to pass the lugs, but on turning the plate to bring the notches out of register with the lugs, as shown in Fig. 2, the lugs will hold the plate in position. The edge of the spreading-plate resting upon the inner edge of the annular vaporizing-chamber has radial slits cut in it, as shown in Fig. 1 and indicated by dotted lines in Fig. 2, for the thorough distribution of the gas-flame into the combustion-chamber C of the generator.

I claim as my invention—

1. A steam-generator provided with fire-tubes, a bottom tube-sheet with annular steps highest at the center and forming the top of the combustion-chamber, in combination with a water-feed spreader adapted to spray the water over the said tube-sheet and the ends of the tubes, all substantially as described.

2. A steam-generator provided with fire-tubes, a bottom tube-sheet with annular steps, highest at the center and forming the top of the combustion-chamber, substantially as described.

3. A steam-generator provided with fire-tubes, and tube-sheets at opposite ends with annular steps, the lower tube-sheet thus formed constituting the top of the combustion-chamber substantially as described.

4. A steam-generator having a holding member extending from the upper tube-sheet with a flanged spreader at its lower end, an adjustable stem provided with a coöperating flange, and means for supplying water to the spreader, substantially as described.

5. A steam-generator, having a holding member extending from the upper tube-sheet with a threaded and flanged spreader at its lower end, a threaded stem passing through the spreader and provided with a coöperating flange, means for supplying water to the spreader and a guide-step for the stem on the lower tube-sheet, substantially as described.

6. A steam-generator having a water-supply pipe and a spreader with a flange having radial grooves, and an adjustable stem provided with a coöperating flange, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

VICTOR H. ERNST.

Witnesses:
EDITH J. GRISWOLD,
HUBERT HOWSON.