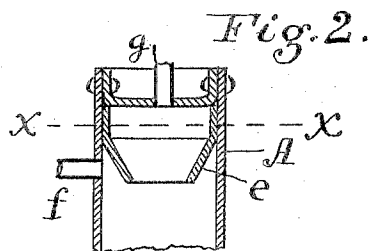
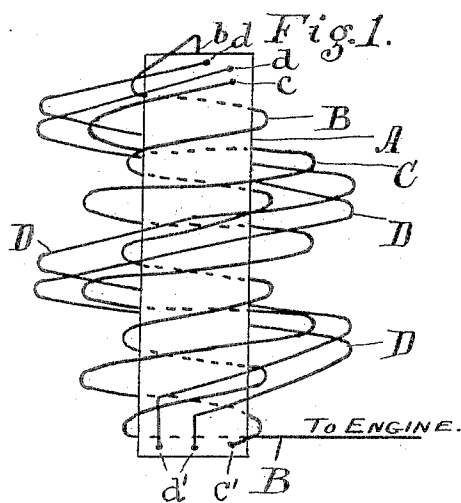


No. 797,333.

PATENTED AUG. 15, 1905.

H. R. STICKNEY.
STEAM GENERATOR.
APPLICATION FILED OCT. 24, 1904.

2 SHEETS—SHEET 1.



Witnesses:
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Charles W. Godfrey.

Inventor:
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by S. M. Bates
Atty.

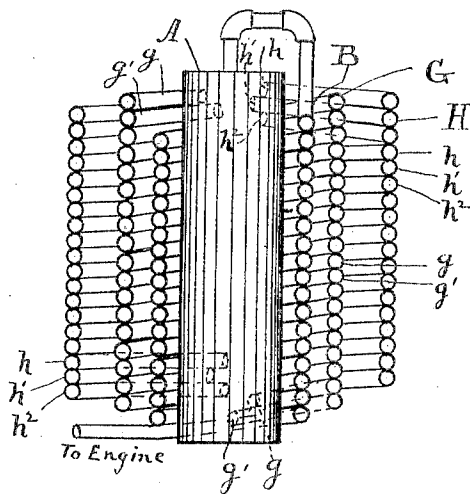
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2 SHEETS—SHEET 2.

Fig. 4



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UNITED STATES PATENT OFFICE.

HENRY R. STICKNEY, OF PORTLAND, MAINE.

STEAM-GENERATOR.

No. 797,333.

Specification of Letters Patent.

Patented Aug. 15, 1905.

Application filed October 24, 1904. Serial No. 229,681.

To all whom it may concern:

Be it known that I, HENRY R. STICKNEY, a citizen of the United States of America, and a resident of Portland, Cumberland county, State of Maine, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

My invention relates to a steam-generator of that class using a vertical drum with water-tubes connecting with the drum at the upper and lower ends; and the object of my invention is to construct such a generator as will utilize as much space as possible, while at the same time producing a generator of great steaming power and efficiency.

The invention is particularly applicable to automobiles, launches, and other cases where small boilers are to be used; but it may be used for boilers of any size or for any purpose.

The invention consists generally of a vertical steam-drum surrounded by a series of coils arranged concentrically with annular flue-spaces between them, the coils being formed of one or more pipes, increasing in number from the drum outward, the individual pipes of each coil connecting with the drum at the top and bottom. By this construction it is possible to make the length of the individual pipes in all the coils to approximate the same length. Steam is delivered through a superheating-coil which surrounds the drum, connecting at its upper end to the top of the drum and at its lower end with the engine or steam-supply pipe.

I illustrate my invention by means of the accompanying drawings, in which—

Figure 1 is a diagrammatic view showing the arrangement of the drum and the several coils. Fig. 2 is a vertical section through the upper end of the drum. Fig. 3 is a section on the line *xx* of Fig. 2, and Fig. 4 is a vertical section showing modified form.

The construction of these water-tube boilers and the means of making the connections are well known and unnecessary to be described, the diagram shown in Fig. 1 being sufficient to enable a mechanic to construct the boiler and being at the same time more intelligible than an accurate drawing of the real boiler.

Referring to Fig. 1, A represents the central vertical drum, and B is the superheating-coil, which I place, preferably, next to the drum. This coil is connected with the top of the boiler at *b*, and its lower end connects with the steam-supply pipe or the engine,

and it constitutes the outlet through which the steam passes after it is generated in the boiler. The steam-generating coils surround the drum and connect with it at its upper and lower ends. As here illustrated, a coil C, connecting at the top of the boiler at *c* and at the bottom of the boiler at *c'*, is coiled about the drum next outside the coil B. The coils C and the other coils which form the boiler are coiled as closely as possible to form substantially cylinders from top to bottom, leaving annular spaces between the coils for the passage of the heated products of combustion, the pipes forming the coil being slightly separated.

Next outside the coil C is the coil D, which is made double—that is, the pipes are coiled in pairs, so that each pipe is only one-half the length that a single coil will be of the same diameter. The two pipes of this double coil connect at the top of the boiler at *d* and at the bottom at *d'*. While I have shown but three coils or sets of coils, it is to be understood that any desired number of coils may be used and that they are coiled as closely as possible, leaving only a space enough for the fire to work up through; but it is to be understood that the spaces between the coils are distinct and continuous spaces or annular flues, through which the products of combustion readily pass without being checked or baffled.

As the boiler increases in diameter, the outer coils are made of more than two pipes coiled in the same manner as the double coil D, and in this way the entire length of each of the several coils is approximately equal—at least they are as nearly equal as is necessary to obtain a perfect circulation of steam and water in the generator.

For the purpose of producing dry steam I make use of a simple separating device. (Shown in Figs. 2 and 3.) This consists of a ring *e*, which substantially fills the upper end of the drum and has a downward-extending conical surface. The upper ends of the water-tubes, one of which is represented at *f*, enter the side of the drum opposite this inclined surface, and the column of steam striking is deflected downward.

g represents the steam-outlet in the top of the drum.

Referring to Fig. 4, the superheating-coil C is wound close to the drum A, as shown; but the steam-generating coil G is composed of two pipes *g* and *g'*, wound as closely together

as possible and each connecting at the top and bottom of the drum. The next outer coil H is composed of three individual pipes h , h' , and h^2 , each of which connects with the top and bottom of the drum.

The operation of my generator is as follows: Steam is rapidly formed in the various coils by contact with the heat of the fire, and these coils being substantially of the same length draw the water about equally from the lower end of the drum, discharging steam in at the upper end. The steam as it enters the upper end of the boiler is deflected downward by the action of the ring e , and thus tends to throw any water which may be in the steam downward. The steam passes from the top of the drum through the superheating-coil B, and during its passage downward it passes through the hottest portion of the fire and becomes very highly superheated.

The boiler or generator contains enough water for an ample reserve for automobile work. It has a great amount of surface in proportion to the size of the generator. It does not "prime," but produces a highly-heated dry steam, and it is easily and cheaply constructed and kept in repair.

I claim—

1. The herein-described steam-generator consisting of a central vertical drum surrounded by a series of coils arranged concentrically with annular flue-spaces between them the coils being formed of one or more

pipes increasing in number from the drum outward and the individual pipes of each coil connecting with the drum at the top and bottom.

2. The herein-described steam-generator consisting of a central vertical drum surrounded by a series of coils arranged concentrically with annular flue-spaces between them, the coils being formed of one or more pipes increasing in number from the drum outward and the individual pipes of each coil connecting with the drum at the top and bottom and a superheating-coil wound next to the drum and extending substantially throughout its whole length, said superheating-coil connecting with the drum at the top and with the steam-supply pipe at its lower end.

3. In a steam-generator, the combination of a central, vertical drum having in its upper end a ring with a downwardly-inclined conical surface, water-tubes connecting with the lower portion of said drum and entering the upper end of said drum opposite said conical surface and a steam-outlet from said drum above said ring.

Signed at Portland, Maine, this 19th day of October, 1904.

HENRY R. STICKNEY.

Witnesses:

S. W. BATES,

CHARLOTTE W. GODFREY.