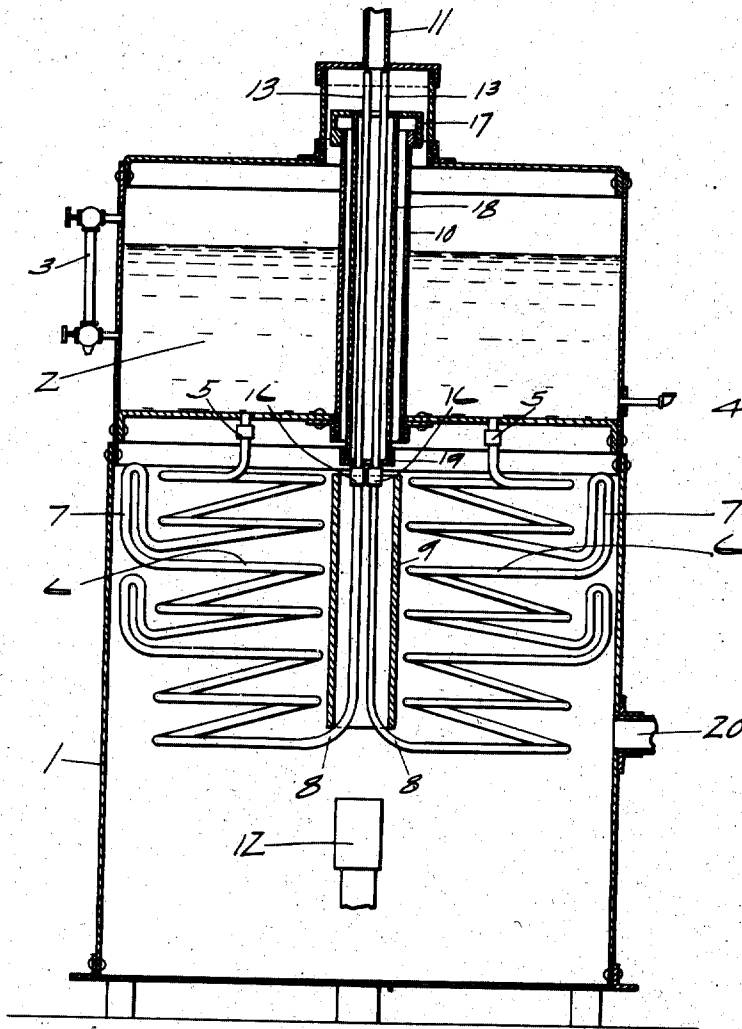


A. L. AUSTIN.
STEAM GENERATOR.
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1,008,515.

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WITNESSES:

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ALBERT L. AUSTIN, OF LAKEWOOD, OHIO.

STEAM-GENERATOR.

1,008,515.

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To all whom it may concern:

Be it known that I, ALBERT L. AUSTIN, a citizen of the United States, and a resident of Lakewood, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Steam-Generators, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relates to steam generators, and its general object is the provision of a generator characterized by economy of space occupied and by maximum efficiency in the generation of steam with a minimum amount of fuel consumption.

To the accomplishment of these and related ends said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying my invention, such disclosed means constituting, however, but one of the various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—the figure is a vertical section of the generator.

The generator comprises a casing 1 formed of suitable material above which is disposed a water chamber 2, and the casing 1 and chamber 2 may be formed separately or may be formed by placing a partition within an integral casing as desired. The water chamber 2 is provided with a sight glass 3 and with an inlet 4 connected with any desired source of supply. Pipes 5, of which there may be any desired number, depend from the bottom of the water chamber 2 into the casing 1 and are preferably formed in helical coils 6. I have also found it advantageous to bend certain portions of the pipe between the ends of the coil vertically as at 7, and then rebend them back into a coil. At the lower ends of the coils, as at 8, the pipes are bent upwardly and extend parallel with each other substantially through the center of the casing 1 and the water chamber 2 to a point at or near the top of the chamber. The pipes 5 preferably terminate near the top of the casing 1, and their continuation is formed by pipes 13, which are joined to the ends of pipes 5 by joints 16. The upwardly extending portions of the pipes within the casing 1, are inclosed by an asbestos tube 9. A

tube 10 is supported in the water chamber, and at its upper end is provided with a perforated cap 17, in which perforation is threaded a second tube 18, spaced from the pipe 10. A cap 19 is secured to the lower end of tube 18, and it is through the tube 18 that the pipes 5 extend, or their continuation 13, if the pipes be jointed ones. Above the upper ends of the pipes is a connection 11 for conducting the generated steam to its place of use. A gas pipe 12, is disposed immediately below the tube 9 and is connected with any suitable source.

In the use of my improved generator, the water chamber is partly filled with water, and the water descends through the pipes 5 by gravity. A blast from the gas pipe is directed into the tube 9, and this blast also draws in air through the opening below the side of the casing 1. As the cold water reaches the lowermost point 8 of the coils, it is struck by the intense forced blast from the gas pipe, and is instantly flashed into steam. Practically all of the hot gas is driven through the tube 9 so that in the upwardly extending portions of the pipes, the steam is dried and expanded. It will be noted that there is an air space between the two concentric tubes which inclose the pipes within the water chamber, and some of the hot gases rise into this air space and serve to effectually insulate the steam pipes from the cold water. The majority of the hot gases after rising through the tube 9, strike the bottom of the water chamber and are reflected downwardly, and fumes pass off through a pipe 20. It will therefore be understood that the present invention provides a generator of the "flash" type, which is fed by gravity, and by means of which, cold water may be flashed into steam in an incredibly short time, and with an extremely small fuel consumption. The important point of construction in attaining this end is that the pipes are subjected to heat only at the point at which they start upwardly that is within the space inclosed by the lower tube. The portions of the pipes outside of this lower tube 9 are subjected to practically none of the heat and as all of the heat is directed against the pipes at the one point at which they are bent upwardly "flashing" is bound to occur.

Although I have described my invention as especially adapted for the generation of steam, it is equally adaptable to the provi-

sion of hot water. When it is desired to use it as a water heater, the pipes will not extend higher than the level of the water in the chamber but will preferably stop short of the water level. By regulation of the heat directed at the lower ends of the pipes the cold water can be instantly heated as it starts into the uprisers.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein described provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In a device of the character described, the combination of a water chamber, pipes depending from said chamber and bent upwardly at their lower ends, a tube inclosing the upwardly extending portions of said pipes, and a hot blast directed into the bottom of said tube and arranged so that the descending portions of said pipes are subjected to substantially no heat and so that substantially the full force of said blast is applied to said pipes at the points where they are bent upwardly.

2. In a device of the character described, the combination of a water chamber, pipes depending from said chamber and bent upwardly at their lower ends, the upwardly extending portions of said pipes extending through said chamber to a level above the water and being insulated from said water, a tube inclosing the upwardly extending portions of said pipes below said chamber, and a hot blast directed into the lower end of said tube and being so arranged that the depending portions of said pipes are subjected to substantially no heat and substantially the full force of said blast is applied to said pipes at the points where they are bent upwardly.

3. In a device of the character described, the combination of a casing; a water chamber above said casing; a pipe depending from said chamber into said casing, said pipe being bent at its lower end and extending thence upwardly substantially through the center of said casing and chamber; a tube inclosing the portion of said pipe within said chamber; a second tube inclosing the upwardly extending portion of said pipe within said casing; and a heater below said second tube.

4. In a device of the character described,

the combination of a casing; a water chamber above said casing; a plurality of pipes depending from said chamber into said casing, said pipes being bent at their lower ends and extending thence upwardly substantially through the center of said casing and chamber; a tube inclosing the portions of said pipes within said chamber; a second tube inclosing the upwardly extending portions of said pipes within said casing and a heater below said second tube.

5. In a device of the character described, the combination of a casing; a water chamber above said casing; a plurality of pipes depending in helical coils from said chamber into said casing, said pipes being bent at the lower ends of said coils and extending thence upwardly substantially through the center of said casing and chamber; a tube inclosing the portions of said pipes within said chamber; a second tube inclosing the upwardly extending portions of said pipes within said casing; and a heater below said second tube.

6. In a device of the character described, the combination of a casing; a water chamber above said casing; a plurality of pipes depending in helical coils from said chamber into said casing and being formed between the ends of said coils with vertically extending rebent portions, said pipes being bent at the lower ends of said coils and extending thence upwardly substantially through the center of said casing and chamber; a tube inclosing the portions of said pipes within said chamber; a second tube inclosing the upwardly extending portions of said pipes within said casing; and a heater below said second tube.

7. In a device of the character described, the combination of a water chamber, a casing below the chamber, two spaced concentric tubes extending through the chamber, pipes depending from said chamber into said casing, said pipes being bent upwardly at their lower ends and extending through the inner of said concentric tubes, a third tube inclosing the upwardly extending portions of said pipes within said casing, and a hot blast directed into the lower end of said third tube.

Signed by me, this 28th day of December, 1910.

ALBERT L. AUSTIN.

Attested by—

ROBERT M. SEE,
D. S. DAVIES.