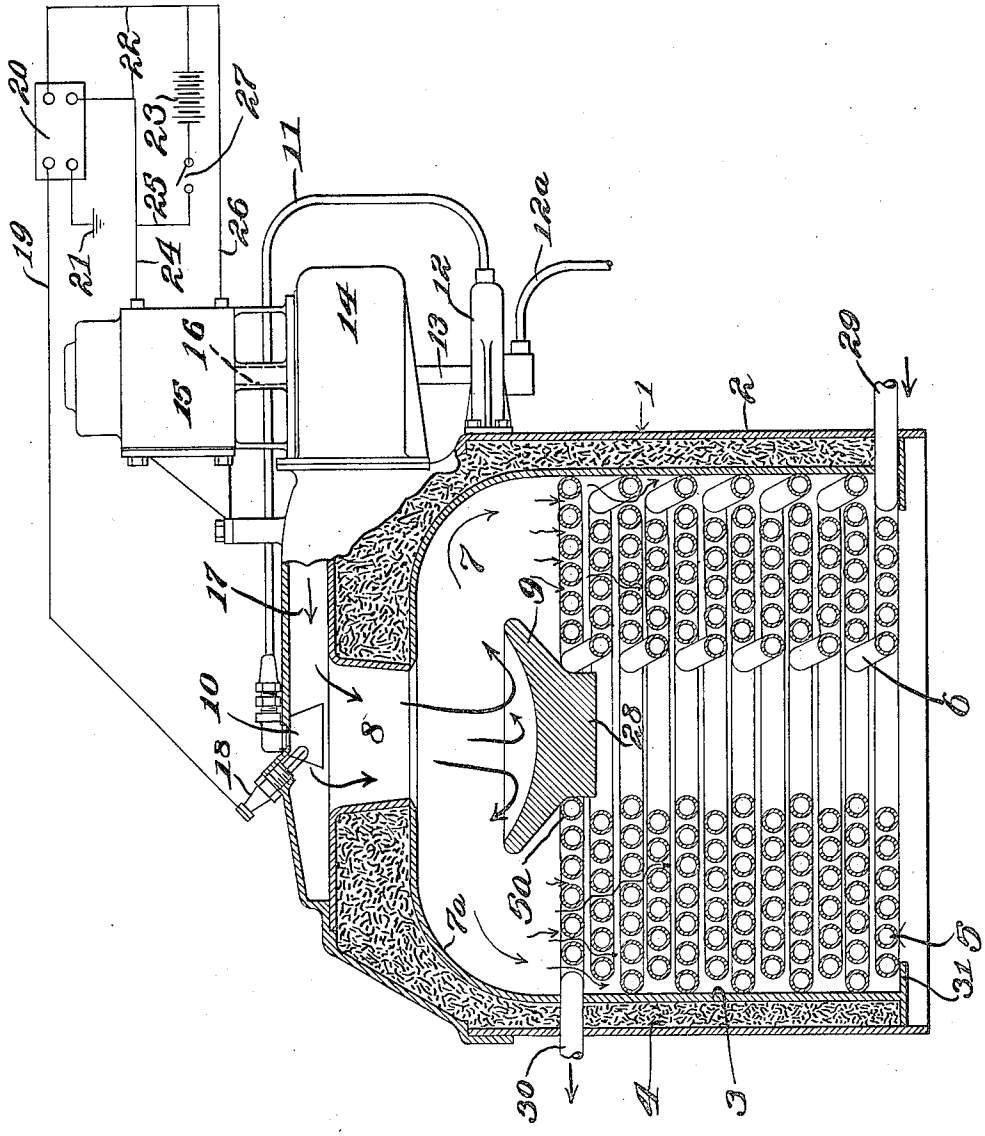
Jan. 8, 1924. 1,480,015

L. L. SCOTT

STEAM GENERATING APPARATUS

Filed March 6, 1920



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LEWIS L. SCOTT, OF ST. LOUIS, MISSOURI.

STEAM-GENERATING APPARATUS.

Application filed March 6, 1920. Serial No. 363,691.

To all whom it may concern:

Be it known that I, LEWIS L. SCOTT, a citizen of the United States, residing in the city of St. Louis and State of Missouri, have invented new and useful Improvements in Steam-Generating Apparatus, of which the following is a specification.

This invention relates to steam generating apparatus. While features of the invention may be applied to steam generators for any purpose, in the present specification I have described the invention as applied to a flash boiler or steam generator, burning liquid fuel. The general object of my invention is to provide means for generating intense heat within the generator at the same time protecting the heating elements or steam pipes from direct contact with the flame; one of my objects is to produce a simple and compact steam generator which will operate with efficiency, but in such a way that the steam coils are protected from injury, the result of which will be to increase the life of the generator.

Further objects of the invention will appear hereinafter.

The invention consists in the novel features, and in the general combination of parts to be particularly described hereinafter, all of which contribute to produce a simple and efficient steam generating apparatus. A preferred embodiment of my invention will be particularly described in the following specification, while the broad scope of my invention will be pointed out in the appended claims.

The drawing is a diagrammatic view showing a steam generator embodying my invention substantially in vertical section, the accessory apparatus being shown diagramatically and in elevation.

The generator may consist of a wall or shell 1, comprising an outer shell 2 and an inner shell 3 forming an insulating chamber to carry an insulating material 4 such as asbestos or any other suitable material.

Within this generator I provide heating elements for the water, which may consist of a plurality of steam pipes preferably in the form of a series of coils 5 connected together successively by means of risers 6. Within this shell I provide a combustion chamber 7 which is preferably located in the upper portion of the shell and may be provided with an orifice 8. With this arrangement the steam coils 5 will be disposed below and adjacent to the combustion chamber.

I provide means for generating or projecting a flame in the combustion chamber in the general direction of the pipes or coils.

Within the combustion chamber I provide a baffle member or deflector 9 which is placed in such a way as to protect the pipes or coils from direct contact with the flame, and this deflector should be constructed in such a way that it will operate to diffuse the flame within the combustion chamber.

This flame may be generated, if desired, directly within the combustion chamber, but I prefer to generate the flame by means of a burner or spray nozzle 10 located in the upper portion of the shell 1 and directly over the orifice 8 so that the flame will be projected through the orifice 8 and onto the deflector. This nozzle may be of any suitable construction adapted for burning liquid fuel whch may be supplied to it by a pipe 11 leading from a small fuel pump 12, said pump receiving fuel through a pipe 12^a and being driven by a shaft 13 extending from a blower 14 driven by a motor 15 through a shaft 16. The blower delivers air into a duct or chamber 17 in which the nozzle or burner 10 is located. The fuel may be ignited at the nozzle or burner by any suitable means such as a spark plug 18 in a grounded circuit including a conductor 19 and a suitable spark coil 20, the secondary coil of which is grounded at 21, the primary coil being energized by means of a branch circuit 22 including a source of electromotive force such as a generator or battery 23. This generator is also in a circuit formed by conductors 24, 25 and 26 which form a circuit including a switch 27 which may be closed at will to operate the motor and spark plug.

The coils 5 are preferably spiral coils disposed centrally in the shell 1, which is of cylindrcal form, the innermost and uppermost coil 5^a operating as a seat and support for the deflector 9. This deflector should be of refractory material, such as alundum and may be of shallow dish form with a cylindrical base 28 which is received in the central opening of the coil 5^a.

The feed water enters the coils at the connection 29 which leads into the bottom coil

and proceeds in a general upward direction through the series of coils, and the steam passes out of the generator or boiler at the connection 30.

The coils may be supported by an annular ledge or shelf 31 at the bottom of the shell 1 which leaves the shell substantially without any bottom, as illustrated in the drawing. Hence the gases of combustion after passing down through the coils pass out into the atmosphere, or the same may be led away through a suitable duct.

The innermost turns of the coils may be of substantially the same diameter, as illustrated. If my deflector 9 were absent the flame would pass down through the central openings formed by the innermost coils or turns of the pipe. However, in the operation of the steam generator the flame is prevented by the deflector from passing down through the center of the coils, and as the deflector produces a thorough mixture of the air with the combustible gas in the flame, a very complete combustion takes place in the combustion chamber 7 leaving no flame to pass down into contact with the coils. The fact that the deflector 9 closes the opening through the center of the coils, insures that the gases of combustion will pass down through the spaces or interstices between the coils. In this way, the gases of combustion are caused to come into very intimate contact with the coils, thereby giving very efficient effects in steam generation.

The upper wall of the combustion chamber should be formed into inclined faces or curves 7^a adjacent the side of the shell which tend to bend the flame down toward the outermost coils. This is a most advantageous effect.

It is understood that the embodiment of the invention described herein is only one of the many embodiments my invention may take, and I do not wish to be limited in the practice of my invention nor in my claims, to the particular embodiment set forth.

What I claim and desire to secure by Letters Patent is:

1. In a steam generating apparatus, a shell having a combustion chamber therein, a plurality of coils within said shell adjacent to the combustion chamber, said shell having an orifice leading into the combustion chamber and disposed substantially centrally with respect to said coils, means for projecting a flame through the orifice and into the combustion chamber in the direction of the coils, and a deflector of refractory material located opposite the orifice and directly in the path of the flame entering at the orifice, operating to deflect the flame and thereby prevent the same from passing along the central axis of the coils and operating to diffuse and deflect the flame in an outward direction in the combustion chamber, said shell operating to guide the deflected gases of combustion along the outer portions of the coils.

2. In a steam generating apparatus, the combination of a shell having a combustion chamber in the upper portion thereof, and having an orifice through its upper wall leading down into the combustion chamber, a plurality of coils disposed within the shell below the combustion chamber, means for projecting a flame down through the orifice and into the combustion chamber, and a deflector within said combustion chamber directly in the path of the flame, operating to deflect the flame and thereby prevent the same from passing directly through the coils, and for diffusing the flame in the combustion chamber.

3. In a steam generating apparatus, the combination of a shell having a combustion chamber in the upper portion thereof, a deflector within the combustion chamber above the coils, a series of coils disposed in the shell around the deflector, and means for projecting a flame toward the center of the coils and against the deflector, said deflector operating to deflect the flame and thereby prevent the flame finding outlet through the center of the coils, and operating to diffuse the flame in the combustion chamber and cause the gases of combustion to pass downwardly through the spaces between the coils.

4. In steam generating apparatus, the combination of a shell having a combustion chamber in the upper portion thereof, the upper wall of the combustion chamber having inclined faces adjacent the side of the shell, a plurality of steam coils disposed within the shell below the combustion chamber, a deflector in the combustion chamber above the coils, and means for projecting a flame in the direction of the coils and against the deflector, said deflector constructed to diffuse the flame in the combustion chamber and bend the same toward the inclined faces, said inclined faces in the wall of the combustion chamber operating to deflect the flame and gases of combustion downwardly and toward the outermost coils.

5. In a steam generating apparatus, the combination of a shell having a combustion chamber, a series of circumferential coils disposed in the shell adjacent the combustion chamber, means for projecting a flame in the direction of the coils, and a dished deflector in the path of the flame and disposed substantially centrally with respect to said coils, said deflector operating to deflect the flame outwardly and thereby prevent the same from passing down through the center of the coils.

6. In a steam generating apparatus, the combination of a shell having a cumbustion chamber located in the upper portion thereof, a series of steam generating coils

disposed within the shell below the combustion chamber, a fuel and air supply device operating to project a flame down into the combustion chamber, a deflector within the combustion chamber located directly in the path of the flame operating to deflect the same upwardly and outwardly toward the outer wall of the shell and thereby preventing the flame from passing through the central portion of the coils and preventing the same from coming in direct contact with the coils.

In testimony whereof, I have hereunto set my hand.

LEWIS L. SCOTT.