Dec. 16, 1952 P. JOHNEAS 2,622,184

STEAM GENERATOR

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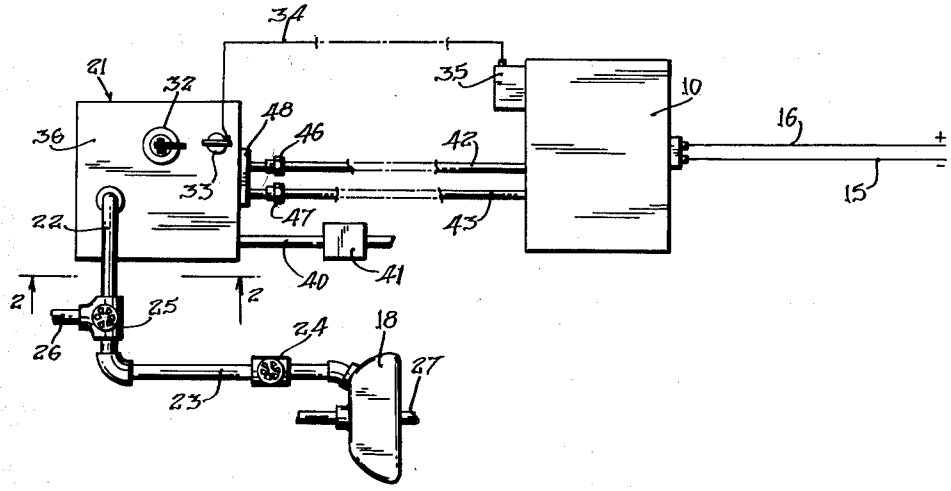


Fig. 1.

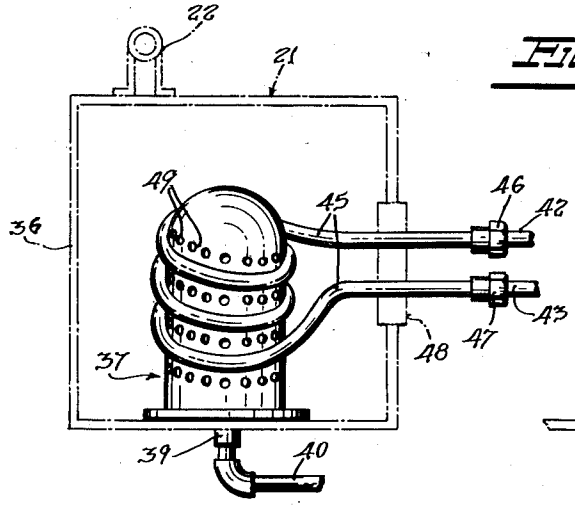


Fig. 2.

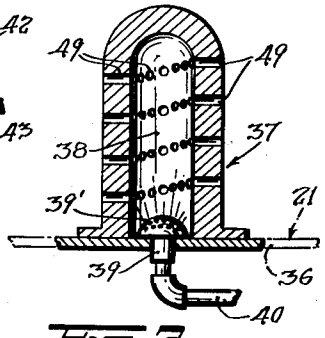


Fig. 3.

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STEAM GENERATOR

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1 Claim. (Cl. 219—38)

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This invention relates to new and useful improvements in systems for steam generation, and a fundamental characteristic of the new system is that, in combination with the attainment of other important objectives, the heat supplied to the boiler where the steam is to be instantaneously generated is derived from an electrical heating apparatus operating according to the induction or so-called short-wave method.

This application is a continuation in part of my previously filed application, Serial Number 782,858, filed on October 29, 1947.

An aim of the invention is to avoid the usual large heat losses through stokers, chimneys and other vents, and also to save the heat ordinarily employed to maintain a comparatively large body of water in the boiler of the ordinary steam generator at a temperature so high as materially to exceed the boiling point of water; and this object is attained in very large part by internal heating rather than by the external heating previously practiced and involving the consumption of various highly expensive combustibles, such as gas, the fuel oils, and solid fuels such as coal and coke.

According to the present invention, no water reservoir is required in the boiler. The water used is introduced by the injection process. This injection may occur simultaneously with the beginning of the operation of the entire system. Said water injection is essentially such that the water is delivered as very fine droplets or as a fine spray. Thus the steam desired is generated instantaneously by the present invention, and merely a fraction of a minute is required to raise the temperature of the steam to very high values. Also, as a result of use of the new system, the preservation of the nation's natural resources is aided, and the steam production is incomparably cheaper than heretofore; while at the same time the tremendous cost and complexity of large power installations is much reduced. Furthermore, the premises where the system is installed are kept clean, and free of dust; and the surrounding air is not contaminated by such dangerous gases as carbon monoxide or by ill-smelling odors. A chief objective is to provide for economical operation, and the saving of labor, time and expensive supervision.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claim in which the various novel features of the invention are more particularly set forth.

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In the accompanying drawings forming a material part of this disclosure:

Fig. 1 illustrates a now favored embodiment of the system of the present invention; and this view may be taken as being, in a schematic sense, a top plan.

Fig. 2 is an enlarged vertical section, taken on the line 2—2 of Fig. 1, for clearly showing the salient features of the new steam generating unit; with the latter, and certain parts associated therewith, indicated in dot and dash lines.

Fig. 3 illustrates, in central vertical section, an upstanding, preferably cylindrical, post-like flash-type steam generator shown in side elevation in Fig. 2; and with here omitted certain heating coils seen in Fig. 2 as encircling the upper portion of said generator.

The system of the invention employs, in combination with the new generator, various units of well-known types. Induction heater or oscillator 10 provides ultra-high-frequency energy in the conventional manner which may be conducted by suitable leads to the load which is to be heated. Thus a detailed illustration of the last-named units is not necessary. Consequently, to keep the drawing as clear as possible, Fig. 1 is, as to said known units, merely schematic, for showing, among other things, the relative arrangement of said units, to make entirely clear their manner of coaction during operation of the system.

Referring now to Fig. 1 more in detail, a commonly known commercial unit comprising a short-wave induction heater 10 is arranged to be supplied with the electric current required to operate the same from a suitable external source of electric current as by way of the wires 15 and 16.

The steam generated in the generating unit 21 is delivered to a steam distribution pipe 22 and through a pipe 23, on opening a valve 24, for imparting a power drive to a turbine 18 to which the pipe 23 is connected. Excess steam, or steam not needed for the purpose just noted, may be usefully applied by opening a standard three-way valve 25, to send such steam to a pipe 26 leading to the place or places where the said steam may do useful work.

The rotor of the turbine 18 is fixed on a shaft 27, which in turn can be connected to a suitable load which is to be driven.

As shown also in Fig. 1, the steam generating unit 21 is provided with a safety valve 32, and a pressure gauge 33. The latter, in accordance with practice known in the art of induction heating, is electrically connected, as by a circuit in-

cluding a wire **34**, to the familiar timer **35** of the short-wave induction heater **10**; these parts operating in the known way to modify the consumption of electric current in the heater **10** in accordance with the relative pressure of the steam generated and confined in the casing of the steam generating unit **21**.

Referring now more particularly to the steam generating unit **21**, and to certain of its appurtenances, and to their details of construction, attention should especially be directed to Figs. 2 and 3. It may preliminarily be said that the generating unit **21** is illustrated, but only by way of example, as having a casing **36** of the conventional cube shape. As will be understood, such casing may be of any shape desired, or of any size required.

Upstanding in the casing **36** there is a post-like structure **37** of high melting point stainless steel, hollow along its length from its bottom to a point somewhat below its top, which top may be convexly rounded exteriorly. The hollow in said post **37** provides a chamber **38** presenting a flash-type steam-generating surface. The post **37** is suitably rigidly secured to the floor wall of the casing **36**, and below the bottom location of said chamber **38** the floor wall has an opening through which is extended a hollow fitment **39** having a finely perforated spray-head **39'**.

The spray-water to be thus injected into the chamber **38** in the post **37** is conducted to the fitment **39** by way of a suitable pipe connection **40**, from a pump **41** driven in any desired way and by any power desired, as by steam power from the pipe **26**.

The water thus injected into the post **37** is instantaneously flashed into steam, since the post is maintained at a very high temperature; and most economically thus heated, it may be added, by heat transmitted from the heater unit **10**. The transmission of this heat is by way of a conduit means including heavy cylindrical copper conductors **42** and **43** and a heavy copper tubing **45**, which conduct the ultra-high frequency energy created by induction heater or oscillator **10** in the conventional manner. The two ends of the tubing **45** are connected, respectively, to the conductors **42** and **43** by couplings **46** and **47**. Beyond the central portion of the tubing **45**, where it is wound to provide a plurality of coils as shown in Fig. 2 for encircling the upper portion of the post **37**, said ends of said tubing pass through a heat and electrical insulating block **48** carried at a side of the casing **36** of the boiler unit. Said coils tend to concentrate the electromagnetic energy created by induction heater or oscillator **10**. Since post **37** is made of steel, the electrical losses resulting from the concentration of the magnetic field therein cause the temperature of post **37** to rise well above the boiling point of water.

At its upper portion the post **37** is provided with a multiplicity of steam emitting apertures or passageways **49**, for discharging all the steam flash-generated in the chamber **38** from said chamber and into the space in the casing **36** around the post **37** and so for delivery of this steam to the steam distribution pipe **22**.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claim.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

A steam generating unit comprising a hollow casing having a top wall and a floor having a hole, a distribution pipe leading from the top wall of said casing, a hollow metallic post within said casing and mounted on said floor wall over said hole and having its top end closed, a pair of conductors passing through said casing, an oscillator mounted external said casing and electrically connected to said conductor, a coil member insulatedly supported and surrounding said post and electrically connected to said conductors, and a water spraying fitment extended into said casing and into said post for spraying water against the walls of said post, said post having a plurality of passageways between the convolutions of said coil member whereby steam generated in said post can pass into said casing.

PAUL JOHNEAS.

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