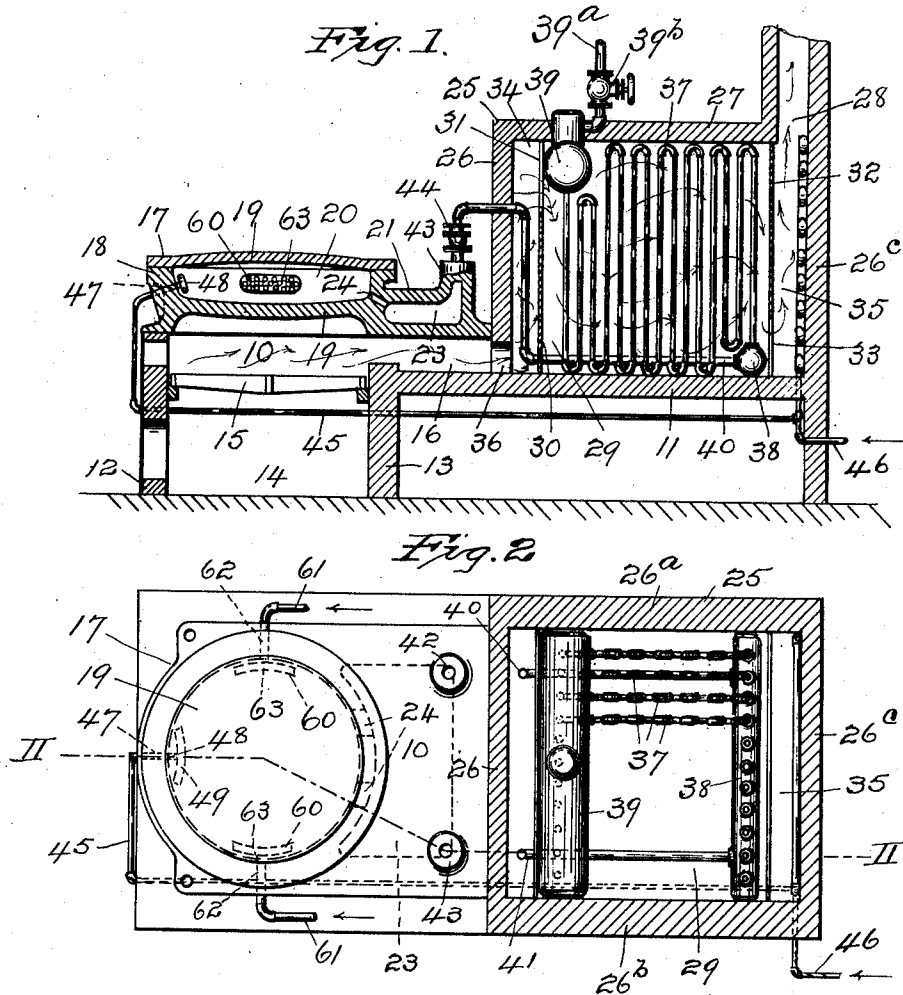


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STEAM GENERATOR.

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Patented Sept. 10, 1912.



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UNITED STATES PATENT OFFICE.

IGNACY WICHROWSKI AND JULIAN PIOTROWSKI, OF NEW YORK, N. Y.

STEAM-GENERATOR.

1,038,250.

Specification of Letters Patent.

Patented Sept. 10, 1912.

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To all whom it may concern:

Be it known that we, IGNACY WICHROWSKI and JULIAN PIOTROWSKI, both subjects of the Czar of Russia, and residents of New York, borough of Brooklyn, county of Kings, and city and county of New York, State of New York, respectively, have invented certain new and useful Improvements in Steam-Generators, of which the following is a full, clear, and exact specification.

This invention relates to a generator adapted to produce a supply of superheated admixture of air and steam for operating mechanism of various classes under pressure.

Our invention has for its primary object to provide a device of this character which is used in conjunction with a furnace for generating a supply of steam charged with air and superheating the motive agent whereby power of an unusually high efficiency is obtainable for operating machinery under pressure or for other desired purposes at a great saving in cost of fuel and labor and a large increase in producing capacity.

Other objects of our invention is to provide a new and novel form of boiler having a steam generating chamber and a communicating superheating compartment; to provide means adapted to supply water in vapor or spray form to the steam generating chamber; and to provide means adapted to charge the vapor within said chamber with air in desired proportions.

Further objects of the invention is to provide a chest or box having a chamber therein which communicates with a flue of the furnace and by which the products of combustion therefrom are utilized for drying the admixture of steam and air which is forced through a plurality of coils of pipes arranged within said chamber and by which the motive agent is converted to a high state of compressive efficiency when used for operating purposes.

With these and other objects in view, the invention will be hereinafter more particularly described with reference to the accompanying drawing which forms a part of this specification and will then be pointed out in the appended claims.

In the drawing Figure 1, is a longitudinal vertical section on line II—II of Fig. 2 of one form of steam generator embodying our invention, and Fig. 2 is a top plan view of the generator, part of which is sectional.

The furnace 10 having a base-plate 11 and the supporting standards 12 and 13 may be of the usual type or any preferred form. Between the standards 12 and 13 is an ash-pit 14 supported in the upper part of which is a grate 15 and communicating with the furnace 10 is one end of a longitudinal flue 16.

A boiler 17 having an annular wall 18 and a bottom-plate 19 form the top inclosure for the furnace 10 and flue 16 so that the flame from a fire therein will play directly upon the underside of said bottom-plate. Upon the annular wall 18 is provided a top-plate 19^a, thus forming a chamber 20 interiorly of the boiler 17 and in which is generated the admixture of steam and air. The boiler 17 has an extension, as 21, which is provided by a top-plate having one end formed upon a part of the annular wall 18 and the opposite end thereof is integral with a flange or wall 22 extending upwardly adjacent to one end of the bottom-plate 19. Interiorly of the extension 21 is provided a compartment 23 which communicates with the generating chamber 20 by a substantially semi-circular opening, as 24, which is formed in the annular wall 18.

To dry the admixture of steam and air whereby the compressive efficiency will be increased for operating purposes upon the bed-plate 11 is provided a chest or box 25 having a front wall 26, side walls 26^a and 26^b, a rear wall 26^c and a top-plate 27 at one end of which is a flue or outlet 28 leading to a chimney for carrying off the products of combustion. The interior of the chest 25 is employed as a drying chamber 29 in which is arranged some distance from the front wall 26 a vertical baffle-plate 30 having an opening in the upper part thereof, as 31, and at a distance from the rear wall 26^c in said chamber is a second vertical baffle-plate 32 having an opening, as 33, in the lower part thereof. By this arrangement a front passage 34 is provided between the front wall 26 and a baffle-plate 30 and a passage 35 communicating with the flue 28 is formed between the rear wall 26^c and baffle-plate 32. In the lower end of the front wall 26 of the chest 25 is an opening 36 by which communication is formed between the flue 16 and passage 34, thus the heat and products of combustion will be drawn from the fire in the furnace 10 through the flue 16, through the opening 31 of the baffle-plate 30 into the

drying chamber 29, through the opening 33 of the baffle-plate 32, through passage 35 and out through the flue 28.

Between the baffle plates 30 and 32 is arranged a plurality of coils of pipes 37. The lower end of each coil of the pipes 37 is connected to a steam head 38 provided in the lower part at the rear of the drying chamber 29. The opposite end of each coil of said pipes is connected to a steam drum 39 arranged in the upper front part of the drying chamber 29, and to said drum is connected one end of an outlet pipe 39^a in which is interposed a throttle or globe valve 39^b adapted to control the passage of the motive agent for operating purposes. The admixture of steam and air is supplied to the steam head 38 through two pipes 40 and 41 which are disposed in parallel relation crosswise of the lower part of the drying chamber 29 through the baffle-plate 30 to and through the front wall 26 of the chest 25 where the opposite ends thereof are screwed in threaded bosses 42 and 43 formed upon the top-plate of the boiler extension 21, and interposed in each of the pipes 40 and 41 is a check valve, as 44. Water is supplied under pressure to the boiler 17 from any suitable source of supply through pipe 45 by a pump of any desired form connected to the pipe 46.

As a means adapted to convert the supply of water into a form of vapor or spray for delivery into the steam generating chamber 20 upon the end of the water pipe 45 is connected the end of the tube 47 of a nozzle 48 arranged within said generating chamber.

To supply the generating chamber 20 with a desired proportion of air for charging the vapor simultaneous with its conversion to steam we provide a form of nozzle, as 60. There may be one, or a plurality of the nozzles 60 arranged within said generating chamber and to each of which is forced air through the pipe, as 61, by any suitable form of air-pumping means. It is clear that in supplying air to the generating chamber 20 it will be forced from the pipes 61, and out through the apertures 65 into the generating chamber 20. When the generating chamber 20 is filled with the admixture of steam and air it will be forced through the semi-circular opening 24 into the superheating compartment 23 from where the motive agent is conveyed by the pipes 40 and 41 to the steam head 38 for distribution to and passage through the coils of pipes 37 to the steam drum 39, and through the outlet pipe 39^a and valve 39^b.

In the foregoing description we have embodied the preferred form of our invention, but we do not wish to be understood as limiting ourselves thereto, as we are aware that modifications may be made therein without departing from the principle or

sacrificing any of the advantages of this invention, therefore we reserve to ourselves the right to make such changes as fairly fall within the scope thereof.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. In a steam generator, the combination with a furnace having a frame, of a boiler and superheating means associated with the boiler, said boiler comprising a chamber arranged over the furnace, said superheating means comprising a compartment situated in proximity to the boiler chamber and communicating therewith, a chest supported on the frame of said furnace, and communicating with the furnace, two baffle plates subdividing the interior of the chest and providing a chamber therebetween, and means arranged in the chamber in said chest adapted to contain the motive agent, said means being in communication with the superheating compartment.

2. In a steam generator the combination with a furnace having a frame, of a boiler and superheating means associated with said boiler, said boiler comprising a chamber arranged over the furnace, said superheating means comprising a compartment situated in proximity to the boiler chamber and communicating therewith, a chest supported on the frame of said furnace and communicating with the furnace, a steam head arranged at one end of the lower ends of said chest, a steam drum arranged at the opposite end of the chest, means adapted to convey steam from the superheating compartment to the steam head, and means adapted to convey the motive agent from said steam head to the steam drum.

3. In a steam generator, the combination with a furnace having a frame, of a boiler and superheating means associated with the boiler, said boiler comprising a chamber arranged over the furnace, said superheating means comprising a compartment situated in proximity to the boiler chamber and communicating therewith, a chest supported on the frame of said furnace and communicating with the furnace, two baffle plates subdividing the interior of the chest and providing a chamber therebetween, a steam head arranged at one end of the chamber formed by the baffle plates, a steam drum arranged at the opposite end of the chamber, means adapted to convey steam from the superheating compartment to the steam head, and means adapted to convey the motive agent from said steam head to the steam drum.

4. In a steam generator the combination with a furnace having a frame, of a boiler having a chamber therein arranged over the furnace, an extension provided upon one part of the boiler and having an interior

compartment, a communicating means leading from the chamber of the boiler to the compartment of the extension, a chest provided upon the frame of the furnace and having a flue at one end thereof, two baffle plates subdividing the interior of the chest and providing a chamber therebetween, a communicating means leading from the furnace to the chamber of the chest and communicating means leading from said chamber to the flue of the chest.

5. In a steam generator, the combination with a furnace having a bed-plate and a communicating flue, of a base plate arranged directly over the furnace and flue, an annular wall provided upon one part of the base-plate and having a top-plate whereby a steam generating chamber is provided, a vertical wall provided upon another part of the base-plate, a top-plate arranged upon the vertical wall and having one end formed upon part of the annular wall whereby a superheating compartment is provided, a communicating means leading from the generating chamber to the superheating compartment, a box arranged upon the bed-plate of the furnace in which a drying chamber is provided and having a flue in the top at one end thereof, a steam head arranged at one of the lower ends of the drying chamber, a steam drum arranged at the opposite end of the drying chamber, means adapted to convey steam from the superheating compartment to the steam head, means adapted to convey the motive agent from said steam head to the steam drum, and a communicating means leading from the drying chamber to the communicating flue of the furnace.

6. In a steam generator, the combination with a furnace having a bed-plate and a communicating flue, of a boiler in which is provided a steam generating chamber directly over the furnace, an extension to said boiler in which is provided a superheating compartment and having a passage leading to the steam generating chamber, a chest provided upon the bed-plate of the furnace and in which is provided a drying chamber, a flue provided in the top of the chest, an outlet pipe arranged also on the top of the chest, means adapted to convey the admixture of steam and air from the superheating compartment to and through the drying chamber of the chest to the outlet pipe, and means adapted to direct the passage of the heat and products of combustion from the communicating flue of the furnace circuitously through the chest for exit through the flue of said chest.

7. In a steam generator, the combination with a furnace, a flue communicating with the furnace, of a steam generating chamber with a bottom plate, an annular wall and a top plate disposed directly over the furnace,

a superheating compartment with a bottom plate, a vertical wall and a top plate arranged over the communicating flue of the furnace, communicating means leading from the steam generating chamber to the superheating compartment, a chest having a flue in the top of one end thereof, a baffle plate having an opening in its upper part and arranged to provide a passage at the rear part within the chest, communicating means leading from the passage in the forward part of the chest to the communicating flue of the furnace, a steam head arranged in the lower part of the chest between the baffle plates, a steam drum provided in the upper part of the chest between said baffle plates, a plurality of coils of pipes each having one end connected to the steam head and the other end thereof connected to the steam drum, a plurality of pipes each having a valve interposed therein and adapted to convey the motive agent from the superheating compartment to the steam head, and an outlet pipe having one end connected to the drum and having a valve interposed therein.

8. In a steam generator, in combination, a furnace having a bed-plate, a flue communicating with the furnace, a boiler having an extension wall dividing the interior thereof into a generating chamber disposed directly over the furnace and a superheating compartment disposed directly over the communicating flue of the furnace, a chest arranged over the bed-plate of the furnace in proximity to the communicating flue of said furnace, communicating means leading from said flue to the interior of the chest, a flue provided in the upper part of said chest, a baffle-plate having an opening in the upper part thereof and arranged in the forward part on the chest whereby a passage is provided between said baffle-plate and the wall of said chest, a baffle plate having an opening in the lower part thereof and arranged in the opposite part of the chest whereby a passage is provided between said baffle plate and the opposed wall of the chest, said passage being in communication with the flue of the chest, a valve controlled outlet means arranged in the upper part of the chest, and valve controlled means adapted to convey the motive agent from the superheating compartment in the extension of the boiler to said valve controlled outlet of the chest.

9. In a steam generator, a boiler having a bottom plate, an annular wall formed upon one end of the bottom plate, a top plate arranged upon the annular wall, a vertical wall provided adjacent to the opposite end of the bottom plate, a top plate having one end arranged upon the vertical wall and having the other end thereof formed upon the annular wall, said annular wall also dividing the boiler into a generating chamber

and a superheating chamber, said superheating chamber being disposed below the generating chamber, and communicating means provided in the annular wall leading
5 from the generating chamber to the superheating compartment.

10 10. In a steam generator, the combination with a furnace having a frame, a generator chamber arranged above the furnace, and means for introducing water and air into said chamber, of a superheating apparatus comprising a compartment communicating with the chamber, a chest mounted upon the

frame of the furnace and communicating with the furnace, and means arranged in the chest and communicating with the superheating compartment for obtaining a circulation of admixed steam and air through said chest. 15

This specification signed and witnessed this third day of September A. D. 1910. 20

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