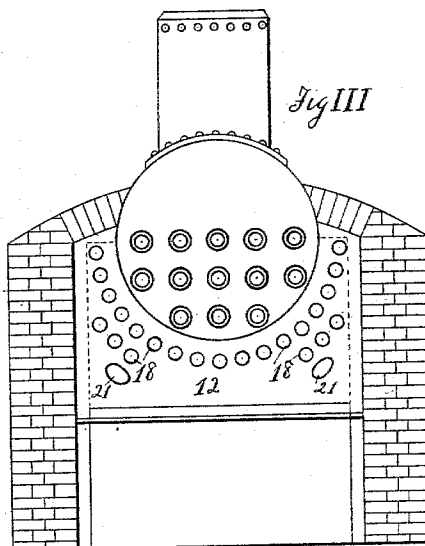
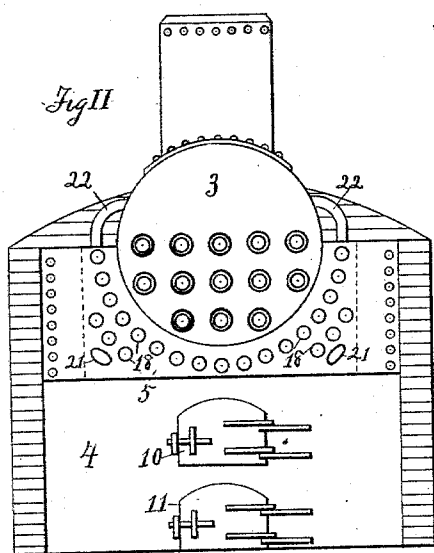
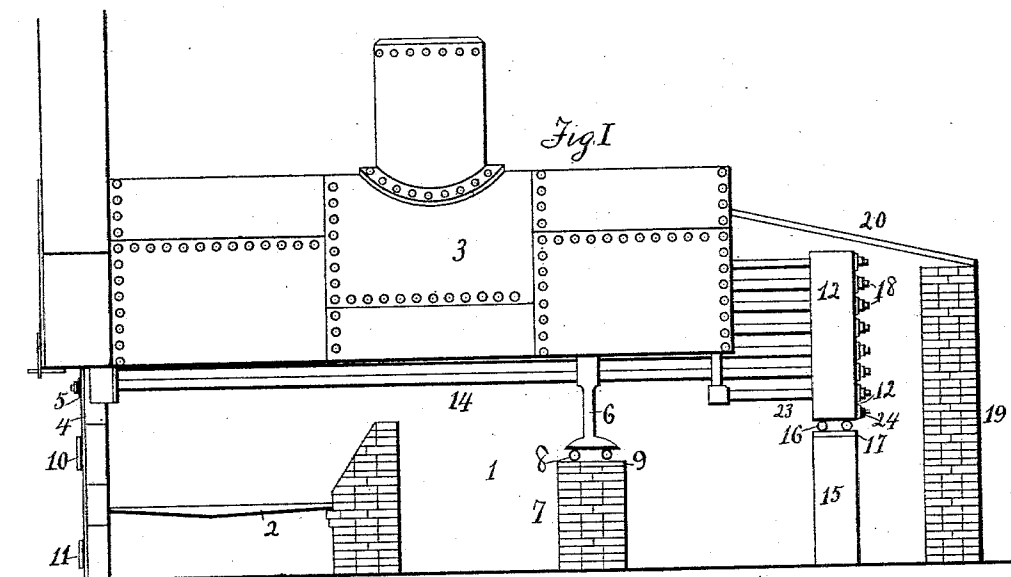


(No Model.)

H. R. SCOTT.
STEAM GENERATOR.

No. 571,848.

Patented Nov. 24, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY R. SCOTT, OF KANSAS CITY, MISSOURI.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 571,848, dated November 24, 1896.

Original application filed February 3, 1893, Serial No. 460,841. Divided and this application filed April 13, 1895. Serial No. 545,656. (No model.)

To all whom it may concern:

Be it known that I, HENRY R. SCOTT, of Kansas City, in the county of Jackson, in the State of Missouri, have invented certain new and useful Improvements in Steam-Generators, of which the following is a clear, full, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to improvements in steam-generators to be attached to steam-boilers; and the object of my invention is to produce and generate steam in the shortest possible time and with the least possible consumption of fuel; and my invention consists in certain features of novelty hereinafter described, and pointed out in the claims, and consists more particularly of improvements upon the steam-generator application for Letters Patent for which were filed February 3, 1893, Serial No. 460,841, and this application is filed as a division of said application.

Figure I represents a vertical longitudinal section of a furnace-wall and showing therein a cylindrical boiler of the ordinary construction, and showing also a generator with water-boxes embodying my improvement attached thereto, the same being a modified form of arrangement of the devices shown in said application, Serial No. 460,841, the furnace and generator being shown in cross-section in the line X X of Figs. II and III. Fig. II represents a front view of the same with the smoke-box and breeching removed. Fig. III represents a rear view of the same with the back wall removed.

Similar numerals refer to similar parts throughout the several views.

1 represents a furnace of the ordinary construction, provided with the grate 2. The boiler 3, of the usual construction, is arranged longitudinally of said furnace in the ordinary manner and may be supported by means of the ordinary side brackets (not shown) or at its front end upon the front wall of the furnace, said wall preferably being shown as composed of the plate 4 and the front water-box 5, the boiler resting upon and being supported by said front water-box, and at its rear end upon the stand 6, supported upon the pier 7, said stand being mounted

upon the rollers 8, riding upon the plate 9 upon said pier, this provision being made to permit the travel of said stand incident upon the longitudinal expansion and contraction of the boiler. The front plate 4 is provided with the usual furnace-doors 10 and 11, above and below the grate.

The generator consists of the front and rear water-boxes 5 and 12 and the longitudinally-extending tubes 13 and 14, the front water-box being formed with its upper side concave to receive the boiler and adapted to form the upper part of the front furnace-wall, the rear water-box being of like form and occupying a corresponding space in the furnace to the rear of the boiler. The rear water-box is supported upon the pier 15, and is provided with the roller 16, riding upon the plate 17 upon said pier, such provision being made to permit the travel of the generator incident to expansion and contraction. This provision for travel of the stand 6 and water-box is made to protect and prevent strain of the front furnace-wall, and is a new and peculiar construction which I propose to make the subject-matter of a future application for Letters Patent. Said rear water-box may, however, be supported by and form a part of the rear wall of the furnace, the pier 15 being omitted, thus exposing its exterior face and outside the furnace-wall.

The tubes 13 are arranged in a semicircular form conforming to and at a slight distance from the bottom of the boiler, and the tubes 14 are arranged in the angles upon the opposite sides of the center of the furnace in such manner as to receive the greatest or maximum amount of heat from the fire. Said tubes communicate at their opposite ends with said water-boxes, said water-boxes being provided with openings in their adjacent sides for the admission of said tubes. Said water-boxes are further provided on their exterior sides with openings opposite the ends of the tubes through which tools may be introduced to secure permanently the ends of the tubes therein and also implements or tools where-with scale or incrustation or other matter may be removed from the inner surface of the tubes. Said exterior openings are closed by plugs or hand-plates 18, making a perfectly

water-tight joint. Access to the tubes through the front water-box is thus gained from the outside of the furnace.

19 represents the rear wall of the furnace, 5 and 20 the usual back-wall plate or other suitable means bridging the rear ends of the furnace from the back wall to the boiler. Between said back wall and the rear water-box is provided sufficient space to obtain access 10 to the plugs or hand-plates 18 and to the tubes through the rear water-box. When, however, said rear water-box forms a part of the rear wall of the furnace, said plugs or hand-plates are accessible from the outside of the furnace 15 the same as in the front water-box. Access to the interior of the water-boxes is also obtained through the hand-holes 21 for the purpose of securing in place the plugs or hand-plates 18. The water-boxes are connected 20 with the boiler through the tubes 22 and 23, whereby circulation is maintained from the boiler through the water-boxes and tubes. As shown, the front water-box is connected at a high point with a high point of the boiler 25 and the rear water-box at a low point with the lower point of the boiler, causing the circulation from the boiler through the rear water-box, through the tubes and front water-box back to the boiler. This circulation, however, may be reversed by connecting the rear 30 water-box at a high point with the higher point and the front water-box at a lower point with the lower point of the boiler without affecting the principle or operation of the device. Said water-boxes are also provided with a suitable blow-off pipe 24 for removal 35 of sediment and other matter collecting therein, said rear water-box extending below the entrance of said tubes 13 and 23, forming and performing the function of a mud-drum for 40 the collection of such sediment.

The operation of the generator is as follows: The fire being started, the heated products of combustion first impinge upon and envelop 45 the generating-tubes and heat the water, the tubes 14, located in the angle between the boiler and the furnace-wall, presenting a heating-surface, where in the usual construction the heat is wasted. The water is thus 50 heated and steam generated in the pipes, which heated water and steam will tend to rise in the water-box, connected at its high point with the higher point of the boiler, and pass through the connecting tubes or pipes 55 into the boiler, and simultaneously the colder water will pass downward through the connecting-pipe to the water-box, connected at its low point with the lower point of the boiler, to replace the water displaced from the generator-tubes, thus causing a constant circulation 60 through the generator and the boiler and by such circulation preventing the deposition of sediment or other foreign elements upon

the inner surface of the boiler. The water is fed in the usual manner either direct to the 65 boiler or to the front or rear water-box, preferably to the water-box connected to the lower point of the boiler.

Having thus fully described my improvements, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination with a boiler of a steam-generator attachment, comprising a pair of water-boxes concave as to their upper sides 75 and conforming to the configuration of the furnace said front water-box being adapted to form part of the front wall of the furnace and to receive and support the boiler; and each having one continuous and uninterrupted passage or compartment, a number of tubes 80 or pipes communicating at their opposite ends with said water-boxes, openings in the outer sides of said water-boxes, removable plugs or hand-plates for closing said openings, an inlet-pipe for the boiler, pipes connecting the 85 rear end of the boiler with the continuous passage or compartment of the rear water-box, and pipes communicating at their opposite ends with the front water-box and with the boiler. 90

2. The combination with a boiler and furnace of a rear water-box within the furnace independent of the boiler and rear furnace-wall, and having one continuous and uninterrupted passage or compartment, a front 95 water-box concave as to its upper side adapted to receive and support the front end of the boiler and to form part of the front wall of the furnace and having one continuous and uninterrupted passage or compartment, tubes 100 communicating at their opposite ends with said water-boxes, and tubes connecting said water-boxes with the boiler, substantially as set forth.

3. The combination with a boiler and furnace of tubes extending longitudinally with the boiler, a front water-box concave as to its upper side adapted to receive and support the front end of the boiler and to form part 110 of the front wall of the furnace and having one continuous and uninterrupted passage or compartment with which said tubes communicate at one end, a rear water-box within the furnace independent of the boiler and rear furnace-wall having one continuous and un- 115 interrupted passage or compartment with which said tubes communicate at the other end and extending below said tubes forming a mud-drum, a blow-off pipe connected with said rear water-box and tubes connecting said 120 water-boxes with the boiler, substantially as set forth.

HENRY R. SCOTT.

Witnesses:

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