

UNITED STATES PATENT OFFICE.

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STEAM-GENERATOR.

978,135.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JAMES J. BUSH, a citizen of the United States, and residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to steam generators, and the object thereof is to provide an attachment for boilers of the usual form and construction, by means of which the generation of steam will be facilitated and expedited; and which will also prevent incrustation of the wall of a boiler, and also provide a positive circulation of the water through the boiler; and with these and other objects in view the invention consists in a device or apparatus of the class specified constructed, applied and operating as hereinafter described and claimed.

The invention described herein is an improvement on that described and claimed in U. S. Letters Patent granted to me Nov. 24, 1903, Number 744,900, and is fully disclosed in the following specification, of which the accompanying drawings form a part, and in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:—

Figure 1 is a side view showing a boiler provided with my improved attachment and mounted in a furnace of the usual form and construction, said furnace being open at one side, or one side wall thereof being removed, and part of the construction being shown in section; Fig. 2 a perspective view showing my improved attachment detached from the boiler; Fig. 3 a partial sectional view on the line 3—3 of Fig. 1; Fig. 4 a front end view of the boiler and the attachment removed from the furnace, and; Fig. 5 a section through the water drum of the attachment.

In the drawing forming part of this specification I have shown at *a* a boiler of the usual fire tube type, and said boiler is mounted in a furnace *b* of the usual general form. The furnace *b* is provided preferably forwardly of the middle thereof with a vertical partition *b*², which extends from the bottom of the furnace chamber forwardly to a predetermined distance from the bottom of the boiler as shown at *b*³ and forwardly of which

is a fire box *b*⁴ provided with the usual grate *b*⁵ below which is the ash pit *b*⁶. The front wall of the furnace is provided with the usual doorway *b*⁷ controlled or closed by a door *b*⁸, and the ash pit is provided with the usual doorway *b*⁹ controlled or closed by a door *b*¹⁰ provided with an air register *b*¹¹. All these parts, however, are or may be of the usual construction and form no part of my invention.

In the practice of my invention I provide a supplemental water heating and circulating attachment, and steam generator, which comprises a front transverse box *c*, an intermediate water drum *d*, and a rear end mud drum *e*, said parts being connected with each other and with the boiler *a* as hereinafter described.

When my improved steam boiler attachment is in position for use the box *c* rests on or is supported by the front end wall of the furnace, the drum *d* on the partition wall *b*², and the mud drum *e* is supported in the rear end portion of the furnace, on the bottom thereof, or in any desired manner.

The water drum *d* is cylindrical in form except the end portions thereof where the top thereof is provided with longitudinal raised members *d*², and the front transverse box member *c* of the attachment and the raised members *d*² of the water drum *d* are connected by separate series of tubes *f*.

In connecting the tubes *f* with the drum *d* the front walls of the raised members *d*² of said drum are bored as shown at *d*³ in Fig. 5, and the opposite or rear walls of said raised members *d*² are also provided with apertures or openings *d*⁴, and the tubes *d* are passed inwardly into said raised members *d*², and a suitable instrument is passed inwardly through the apertures *d*⁴, and the ends of the tube *d* expanded as shown in said figure, after which the apertures *d*⁴ are closed by a suitable plug *d*⁵.

The tubes *f* are connected with the front water box *c* of the attachment as shown at *f*², this connection being made in any desired manner and said water box *c* is provided with tubes *g*, which extend upwardly from the end portions thereof, and the upper end portions of which are provided with inwardly and upwardly directed members *g*² which are connected with the head of the boiler *a* at *g*³, this connection being also made in any desired manner.

Connected with the top of the mud drum

d is a pipe or tube h , which is connected with the bottom of the boiler a , at or near the rear end portion thereon and provided with a three way coupling h^2 , with which is connected a tube or pipe i which is connected with the water drum d centrally thereof, as shown at i^2 or in any desired manner, and the connection of the tube or pipe i with the three way coupling h^2 is a slip joint connection, one branch of said coupling being provided with a gland i^3 which is screwed on to one branch of said coupling, and in which is placed a packing as clearly shown in Fig. 1.

The transverse front box c of the attachment is provided at the top thereof at j with a hand hole, having a suitable closure device whereby said box may be cleaned whenever desired, and the mud drum e is also provided with a hand hole k having a suitable closure device and whereby said drum may be cleaned when desired, and the water drum d is provided with cleaning holes or apertures at m having suitable means for closing the same, and in the ends of said drums are blow off holes m^2 , which may be closed in any desired manner. It will be understood that, in practice, all the parts of my improved water heating and circulating attachment including the box c , the water drum d , the mud drum e and connecting tubes or pipes are kept full of water at all times being in direct communication with the boiler, and by means of the relative arrangement of all the parts of the device and method of connecting the same with the boiler, the water is forced to circulate freely and rapidly through the boiler and through the various parts of the attachment or supplemental heater, and by means of my improved attachment there is a positive, direct, continuous and unobstructed flow of water in one direction through the boiler and through the attachment, the water being taken from the lower rear end portion of the boiler and passing through the attachment and being returned to the front end portion of the boiler at the top thereof, and this circulation is such as to prevent the deposition of dirt, sediment or similar substances on the inner surface of the boiler, and also on the inner surfaces of the parts of the supplemental heater or attachment, and it will be apparent that by reason of my improved attachment the water in the boiler may be quickly heated and steam quickly generated, and a high pressure of steam secured at a comparatively slight expense of fuel. It will also be understood, on a comparison of the construction herein shown and described with that shown and described in the patent referred to that the invention forming the basis of this application is involved in the method of connecting the tubes or pipes f with the water drum

d , and in the form and construction of said drum and in the method of connecting the tube or pipe i with the coupling h^2 of the pipe h , and in other details of the construction of the front water box c of the attachment and the water drum d .

By providing the raised members d^2 on the opposite end portions of the drum d , the connection of the tubes or pipes f with said drum is facilitated, and the circulation of water through the device is also improved and facilitated, and the formation of the holes or apertures d^4 in the raised members d^2 in the drum d facilitates, as will be understood the connection of the tubes or pipes f with said drum.

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

1. A water heating, circulating and steam generating attachment for steam boilers, comprising a transverse water drum, a front transverse water box and a rear mud drum, the end portions of the water drum being provided longitudinally of the top thereof with raised members, and said front transverse box and the raised members of the water drum being connected by horizontally arranged pipes, the mud drum being provided with a vertically arranged pipe by means of which it may be connected with the bottom rear end portion of a boiler, said pipe being provided with a three way coupling and a tube connected with the water drum, and with said coupling by means of a slip joint, said water box being also provided with tubes whereby it may be connected with the front end of a boiler at the top thereof.

2. A water heating, circulating and steam generating attachment for steam boilers, comprising a transverse water drum, a front transverse water box and a rear mud drum, the end portions of the water drum being provided longitudinally of the top thereof with raised members, and said front transverse box and the raised members of the water drum being connected by horizontally arranged pipes, the mud drum being provided with a vertically arranged pipe, by means of which it may be connected with the bottom rear end portion of a boiler, said pipe being provided with a three way coupling and a tube connected centrally of the water drum and with said coupling, said water box being also provided with tubes whereby it may be connected with the front end of a boiler at the top thereof.

3. The combination with a boiler of a supplemental water heating, circulating and steam generating attachment, comprising a front transverse water box, an intermediate transverse water drum and a rear end mud drum, the end portions of the water drum being provided longitudinally of the top

thereof with raised members, tubes connecting the water box with said members, a vertically arranged tube connecting the mud drum with the rear end portion of the boiler and provided with a three way coupling and a tube connected centrally with the water drum and with said coupling, said water box being also provided with tubes by means of which connection is made with the front end portion of the boiler.

4. In a device of the class described, a water drum, the end portions of which are provided at the top thereof with longitudinally arranged raised members, both opposite side walls of which are provided with apertures or openings, and tubes adapted to be inserted into the apertures or openings in one of the said side walls, and the apertures in the other of said side walls being provided with closure devices.

5. A water heating, circulating and steam generating attachment for boilers, comprising an intermediate water drum, a front transverse water box and a rear mud drum,

the end portions of the water drum being provided longitudinally of the top thereof with raised members and said transverse box and the raised members of the water drum being connected by horizontally arranged pipes, the mud drum being provided with a vertically arranged pipe by means of which it may be connected with the bottom rear end portion of a boiler, said pipe being provided with a three way coupling and a tube connected with the water drum and with said coupling, said water box being also provided with tubes whereby it may be connected with the front end of the boiler at the top thereof.

In testimony that I claim the foregoing as my invention I have signed my name in presence of the subscribing witnesses this 9th day of March 1910.

JAMES J. BUSH.

Witnesses:

C. E. MULREANY,
B. M. RYERSON.