P. W. BRITTS.
BOILER AND ECONOMIZER.
APPLICATION FILED JUNE 11, 1908.

1,061,444.

Patented May 13, 1913.
3 SHEETS—SHEET 1.

Fig. 1.

Peter W. Britts.

Witnesses

E. C. Hume

M. H. L. J.

By C. A. Snow, Los Angeles.

Attorneys
To all whom it may concern:

Be it known that I, Peter W. Britts, a citizen of the United States, residing at Arleta, in the county of Multnomah and State of Oregon, have invented a new and useful Boiler and Economizer, of which the following is a specification.

This invention relates to a combination of a boiler with a feed economizer, the latter being in the form of a feed water heater attached to the boiler.

The invention has for its object to improve the efficiency of boilers and fuel economizers, to simplify the construction of such devices, to decrease the amount of useful space occupied by the economizer, and such other objects as will hereinafter be more apparent.

The invention consists, in general, of a boiler arranged in a substantially horizontal position, in combination with a feed water heater arranged in a vertical position and lying below the plane of the boiler.

The invention further consists in certain novel arrangement of furnace or boiler settings to accomplish these results.

The invention further consists in certain novel details of arrangement, and combinations of parts, hereinafter fully described, illustrated in the accompanying drawings, and specifically set forth in the claims.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and; Figure 1 is a median section of the preferred form of the device. Fig. 2 is a similar section of this invention showing the device as applied with a brick setting and a water tube feed water heater. Fig. 3 is a similar section to Fig. 2 but with a fire tube water heater.

Referring now to the form illustrated in Fig. 1, there will be seen a fire-box 10 formed in a boiler of the locomotive type as illustrated at 11. In this boiler there is the usual grate 12 and flues or tubes 13. In the place usually occupied by the smoke box there is what is preferably termed a combustion chamber 14, which is extended downward as at 15 to form a feed water heater chamber. At the lower end of this feed water heater chamber is an opening 16 communicating with a stack 17. In the feed water heater chamber 15 is held a feed water heater 18, in the present instance of a water tube type. This feed water heater is connected at the upper end to the boiler 11 by a pipe 19 and the lower end thereof is provided with a water supply pipe 20.

In the form shown in Fig. 2 the device is similar in character with the exception that the boiler 11 is in the form of a cylindrical boiler and is preferably without the tubes 13. Furthermore, the front wall of the fire-box 10, forms one side of the chamber 15 of Fig. 1, and the combustion chamber, and other parts of the boiler are housed in bricks or the like.

In the form shown in Fig. 3 the parts are precisely similar to those shown in Fig. 2 with the exception that the feed water heater itself is of the fire tube type, the fire tube being indicated by the numeral 21.

In all of the forms shown there is provided a by-pass 22 at the upper end of the economizer wherein is located a damper 23. By this means I am able to direct the hot gases through the stack carrying them through the economizer and it is found frequent that this is necessary when the fire is first started to heat the stack and there is preferably a damper held therein so as to direct the smoke in either manner. It is to be noted that if desired a fan may be used in connection with this device for draft. It is to be noted that in all of the forms described the relatively cold water is admitted at the bottom of the water heater, that is to say, at the point at which the gases of combustion are cooled, and from there rises upward through the gases of combustion which are hotter as the feed water approaches the top and is fed into the boiler through the pipe 19 in substantially a boiling condition. It is thus seen that the fuel economizer provided in this peculiar feed water heater is exceptionally efficient and is so arranged as to absorb the greatest number of heat units from the outflowing gases of combustion. It is to be further observed that by the present arrangement of the boiler and feed water heater or economizer, the latter forms substantially a portion of the boiler and that by the peculiar disposition of this economizer no floor or air space is taken up thereby, as the same is so arranged as to be readily sunk in the ground or held in the cellar of the building in which the boiler is located.

There is thus provided a simple and efficient device of the character described, and in which the products of combustion are very fully utilized by the heating of the feed.
water as well as one in which great economy of space is obtained.

Having thus described the invention what is claimed as new, and is desired to be secured by Letters Patent, is:

1. A boiler and economizer, comprising a fire box including grate bars, a horizontally extending smoke chamber, a boiler, a feed water heater in the smoke chamber having its upper end disposed above the plane of the grate bars and below the plane of the boiler crown sheet, a horizontal smoke stack adjacent said smoke chamber, a connection between said smoke chamber and said smoke stack below the lower end of said feed water heater, a by-pass leading from said smoke chamber to said smoke stack adjacent the upper end of said feed water heater, means for controlling passage through the said by-pass, a feed water pipe communicating with the lowest point of the feed water heater, and a pipe connecting the top of said feed water heater to the said boiler.

2. The combination with a horizontal boiler, a horizontal fire box, vertical smoke chamber and vertical smoke stack, of a feed water heater located in said smoke chamber, the upper end of which lies above the fire grate of the fire box and below the plane of the crown sheet of the boiler, communication between the lower end of said smoke chamber and said smoke stack, said communication lying below the lower end of said feed water heater, a by-pass leading from a point adjacent to the upper end of the feed water chamber to the stack, means for controlling passage through said by-pass, said feed water pipe communicating with the lowest point of the feed water heater, and an upwardly extending pipe connecting the top of said feed water heater to the said boiler.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

PETER WILLIAM BRITTS.

Witnesses:
C. R. HOTCHKISS,
N. A. LOVGREN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D.C."