

No. 669,985.

Patented Mar. 19, 1901.

W. T. GALBRAITH, A. WEAVER & J. W. SCONCE.
STEAM BOILER.

(Application filed June 7, 1900.)

(No Model.)

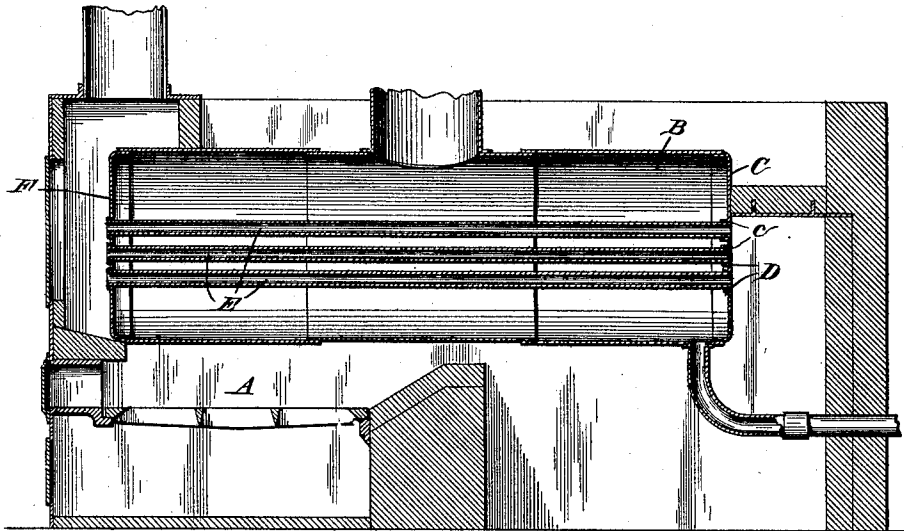


Fig. 1.

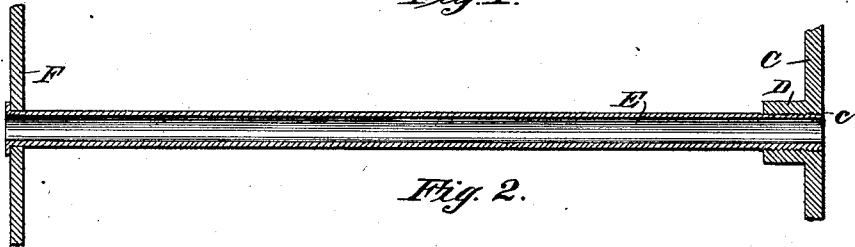


Fig. 2.

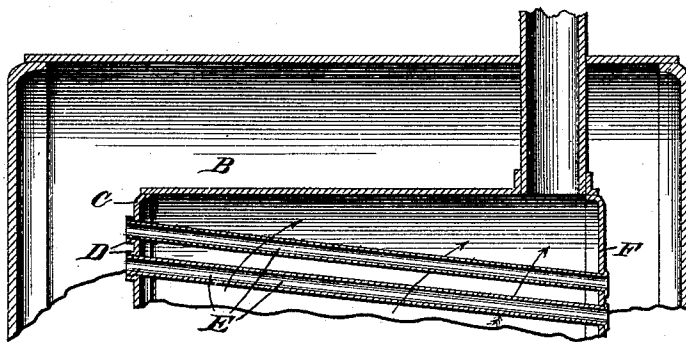


Fig. 3.

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UNITED STATES PATENT OFFICE.

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STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 669,985, dated March 19, 1901.

Application filed June 7, 1900. Serial No. 19,457. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM T. GALBRAITH, ALEXANDER WEAVER, and JAMES W. SCONCE, citizens of the United States, residing at Eminence, in the county of Shannon and State of Missouri, have invented certain new and useful Improvements in Steam-Boilers; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improvement in steam-boilers, and more particularly to that portion of a steam-boiler comprising the flues and sheets used in connection with water or fire tube boilers.

The invention is directed more particularly to the particular construction of the flue-sheet, which is so fashioned and formed that the objections heretofore existing are practically overcome.

The objection to the prevailing form of tubular boilers resides in the fact that the tubes are connected with the flue-sheet by expanding the ends of the tubes in a well-known manner. It has been found in practice that it is quite impossible to insure against leakage of the boiler when the expanded method is employed for making the connections. Our invention is designed to overcome this objection by forming a joint at that point where the heat is most intense, and which joint will effectively prevent the burning out of the jointed connection.

The invention also consists in the construction and arrangement of parts hereinafter described, and defined in the claim.

In the drawings we have shown an embodiment of the invention, but desire it understood that the exact positioning of the parts in relation to each other may be changed and that the invention may be otherwise modified without departing from the nature and principle thereof.

Figure 1 is a longitudinal section of the boiler embodying the improvement, the same being shown in broken section with well-

known parts omitted. Fig. 2 is an enlarged view in section of the flue-sheet. Fig. 3 is a detail view of a modified arrangement of the flue-sheet as used in connection with a water-tube boiler.

In the drawings, A designates the usual steam-boiler furnace, and B the boiler, the latter being shown in Figs. 1 and 2 as of the fire-tube type. The flue-sheet C, which is located at an intake end of the flues, is supported in a well-known manner and is constructed with a series of tube-openings *c*.

D designates nipples, which are formed as an integral extension of the sheet surrounding the openings therein and are carried outward a distance of one and a half to two inches or more or less, as the occasion may demand. These nipples are of a thickness substantially that of the flue-sheet; but in practice they may be of any desired thickness. They are each formed with a female thread.

E designates the tubes, of a length to pass through the opposite sheet F and a sufficient portion thereof protruding beyond the sheet to form a wrench-hold. These tubes have a male thread on their opposite ends and are screw-threaded into the nipples and flue-sheet C. After the tubes have been properly positioned, with their threaded ends tightly fitted in the nipples of the flue-sheet, their opposite free ends are expanded in a well-known manner and secured to the flue-sheet F in the usual manner, thereby securely fastening the tubes in their proper positions.

It will be noticed by the above construction that the direct passage of the heat to the flues is from the rear to the front and that the great degree of heat at the rear would have a tendency to burn out the expanded connections between the sheet and flanges; but by the nipple construction this is wholly avoided, and in this connection it may be stated that the ends of the flues may, if desired, be slightly expanded. This, however, we have found to be unnecessary, and owing to the length of the nipples a most efficient and water-tight joint is formed which is not affected by the heat. It will also be observed that the boiler can be easily repaired from one end by the usual implements, the flue being unscrewed from its rear sheet and drawn

through the front sheet and the new tubes replaced. We believe that in this connection we are the first to ever form the nipples on the flue-sheet to accomplish the purposes
 5 above stated, and especially so in combination with the opposite flue-sheet for the usual form of connection with the tubes, whereby the invention may be applied to the boiler and utilized with effect and economy.

10 In Fig. 3 we have shown an application of the invention to a water-tube boiler, in which case the nipples are placed within the water-space. In each case it will be seen that the direct action of the fire or heat on the nip-
 15 ples is prevented and also that the extension-joint formed is such that the liability to burn out is avoided.

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

In combination with a fire-chamber, of a boiler comprising a series of screw-threaded tubes, flue-sheets at the respective ends of said tubes, provided with openings corresponding with the number of tubes, integral
 25 laterally-projecting nipples on the sheet in alinement with the openings therein, and interiorly-arranged screw-threads running entirely through both the nipples and the body
 30 of the sheet adapted to receive the screw-threaded ends of the tubes, substantially as and for the purpose described.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM T. GALBRAITH.
 ALEXANDER WEAVER.
 JAMES W. SCONCE.

Witnesses:

J. B. SEARCY,
 IKE EPSTEIN.