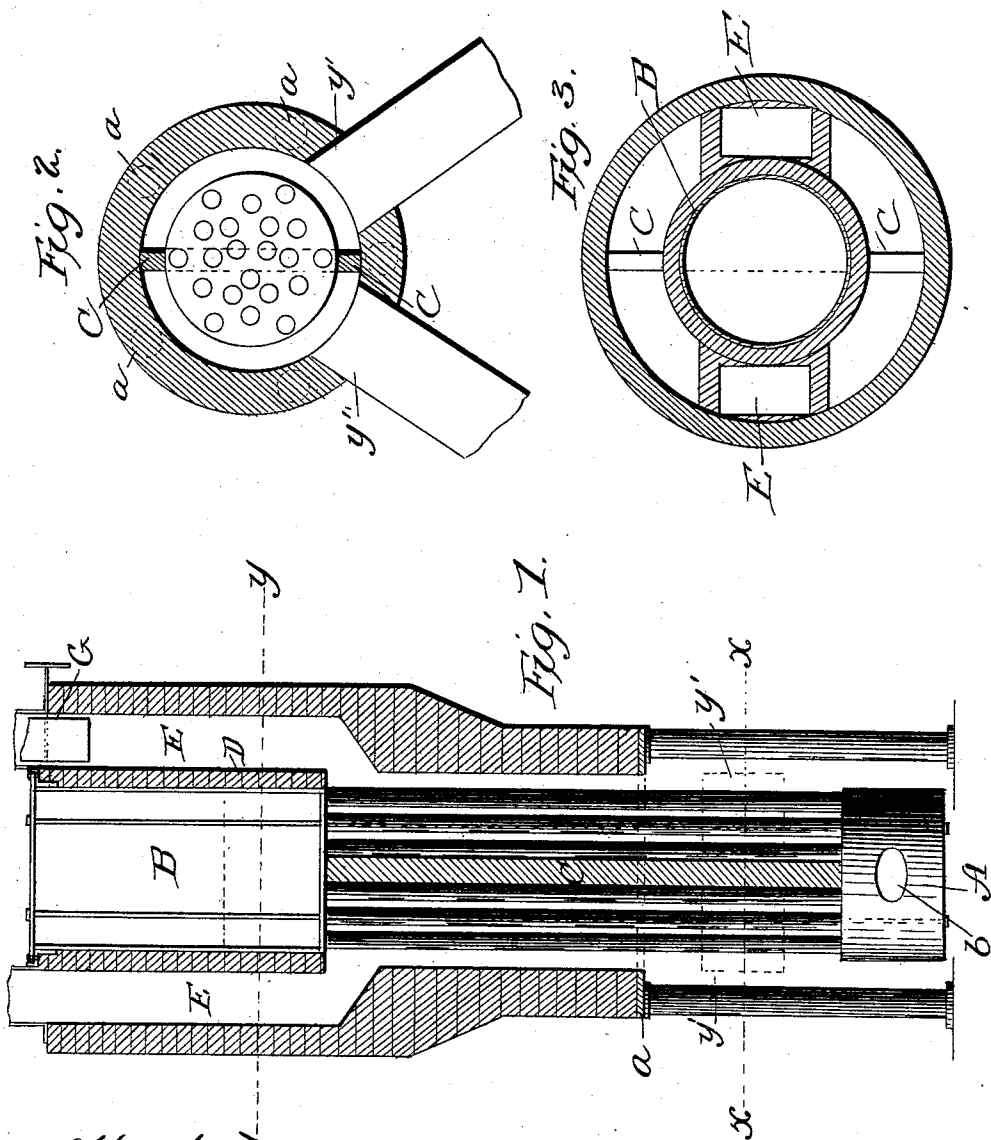


(No Model.)

S. RUNSER.
STEAM BOILER AND BOILER FURNACE.

No. 482,197.

Patented Sept. 6, 1892.



Attest
J. L. Middleton
F. L. Middleton

Inventor
Sebastian Runser
by Ellis Spear
Atty.

UNITED STATES PATENT OFFICE.

SEBASTIAN RUNSER, OF SHARON, PENNSYLVANIA.

STEAM-BOILER AND BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 482,197, dated September 6, 1892.

Application filed April 26, 1892. Serial No. 430,764. (No model.)

To all whom it may concern:

Be it known that I, SEBASTIAN RUNSER, a citizen of the United States of America, residing at Sharon, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Boilers and Boiler-Furnaces, of which the following is a specification.

My invention is an improvement in boilers of that class in which the surplus heat of a furnace is used to generate steam; and it consists in the various features of construction which I will particularly describe hereinafter.

I have aimed particularly to provide convenient means for the expanding of the flue-tubes and to protect these tubes both at their upper and lower ends where they connect with the mud and steam drums. I have also endeavored to provide a construction by which the heat may be thoroughly utilized by making a confined passage through which the flues extend from the mud-drum to the steam-drum. I have also provided the dampers for controlling the exit of the heat from the boiler-space at the top of the space instead of at the bottom, as heretofore, thus enabling me to secure the action of the heat at all times and allow for the control of the products of combustion at the upper part of the boiler-space. I have also provided convenient means for access to both drums, so as to render very accessible the flue-tubes for repair or other purposes; and I further provide a convenient and economical method of supporting the brickwork, which allows for access to the lower part of the generator without destroying the superstructure.

In the accompanying drawings, Figure 1 is a sectional view taken vertically. Fig. 2 is a horizontal section on the line $x x$, and Fig. 3 is a like section on the line $y y$ of Fig. 1.

In these drawings the boiler-space is composed of brickwork, which is approximately cylindrical in cross-section, this brickwork being supported at its base upon a cast-iron ring a , which in turn rests upon a series of columns, which may be of tubular metal, these columns having spaces between them, which may be bricked up in order to add to the strength of the whole structure. The mud-drum A is located at the bottom of these columns and the flues extend from this mud-

drum upward to the steam-drum B, and in case it is desired to repair the mud-drum or the flues leading thereto it will be seen that access can be had to every part of the drum and to the tubes or the ends thereof extending into the space below the cast-iron ring a by simply taking down the brickwork between the columns without in any way interfering with the structure supported by the cast-iron ring a . The mud-drum has a manhole b , which may be in line with a suitable door, and the drum is large enough to allow access thereto by a workman, so that he may expand the flues or disconnect in case of injury or need of repair any one of the flue-tubes, which may be withdrawn without disturbing the rest of the tubes of the series from the steam-drum, as will be hereinafter fully set forth. A wall of brick or metal rises centrally through the flue-space to the steam-drum, as at C, dividing the flue-space into two parts, and each part is in connection with the heating-furnace by means of a suitable opening, so that while both parts of the boiler may be used at the same time, or one side alone can be used, if desired. As the opening from the furnace or furnaces are, as indicated at y' , above the line of the mud-drum, it will be seen that the flues are not subjected to intense heat at the point of their junction with the mud-drum, and thus the length of time that the tubes can be used is greatly prolonged. The flue-space is made comparatively narrow and of considerable length, so as to utilize the heat to the greatest extent, and at the upper part of the flue-space I provide a steam-drum B, which is made up of a metal shell surrounded by a lining of brickwork D, this brickwork serving to protect the metal shell of the drum and prevent the crystallizing of the iron. This steam-drum is wholly within the boiler-space and the water-line extends a considerable distance above the bottom of the drum, so that the ends of the flues and the bottom of the drum are never exposed to the intense action of the heat, but are always covered by the water, and this is also a great advantage, in that it prolongs the life-time of the tube and boiler and at the same time adds to the safety of the apparatus. The steam-drum is closed by a head, which is fastened to a steel ring surrounding the brickwork D, and through this

manhole access may be gained to the interior of the steam-drum, and it will thus be seen that any one of the tubes having first been loosened at the lower end may be removed
 5 very easily for repair or to be replaced by another, and this without disturbing in the slightest degree any of the other tubes. Strong stay-bolts extend through the head of the steam-drum and through the flues and the
 10 bottom of the mud-drum, securely binding the parts together. The exit-flues E extend from each side around the steam-drum, connecting in a single stack above the boiler. Instead of ordinary dampers at the lower end, as heretofore, I prefer to provide dampers G at the
 15 top of the boiler-space in each flue E, and thus I can very effectually control the heat and regulate the draft, as may be found desirable.
 20 I do not limit myself to the use of this boiler in connection with the waste heat from furnaces, as instead a grate may be used for ordinary fuel, or the boiler may be heated in any suitable manner. The central partition-
 25 wall may be omitted when desired.

I claim as my invention—

1. A steam-generator consisting of the flue or boiler space provided with a steam and mud drum and flues, said space being formed

by suitable brickwork, a series of columns, 30 and a metal ring interposed between the columns and the brickwork, substantially as described.

2. In combination, a furnace made up of brickwork, columns supporting said brick- 35 work, a mud-drum located within the space inclosed by the columns, and brickwork between the columns, substantially as described.

3. In combination with the boiler-space, a mud-drum located below the line of the heat- 40 opening, a series of flues extending therefrom and connected with the steam-drum, and a central partition-wall extending from the mud-drum to the bottom of the steam-drum, substantially as described. 45

4. In combination with a mud-drum and steam-drum and intermediate flues, a contracted space through which the tubes pass, an exit-flue from said space passing around the steam-drum, and dampers located in the 50 upper ends of said flues, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

SEBASTIAN RUNSER.

Witnesses:

A. W. WILLIAMS,
G. W. SHILLING.