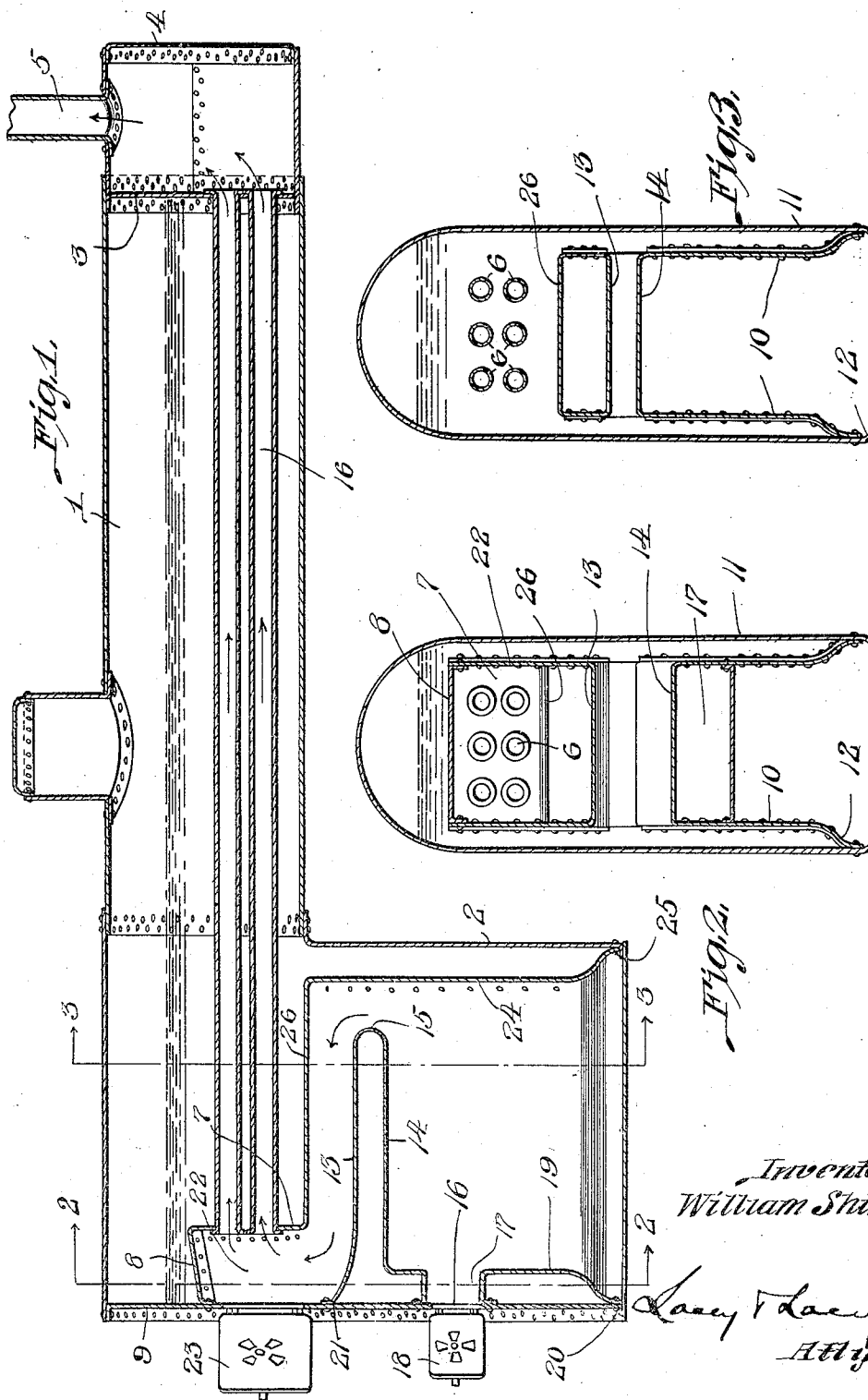


W. SHINN.
LOCOMOTIVE BOILER.
APPLICATION FILED MAR. 1, 1919.

1,328,303.

Patented Jan. 20, 1920.



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LOCOMOTIVE-BOILER.

1,328,303.

Specification of Letters Patent.

Patented Jan. 20, 1920.

Application filed March 1, 1919. Serial No. 279,973.

To all whom it may concern:

Be it known that I, WILLIAM SHINN, a citizen of the United States, residing at Grandin, in the county of Carter and State of Missouri, have invented certain new and useful Improvements in Locomotive-Boilers, of which the following is a specification.

This invention seeks to reduce the liability of a locomotive boiler to explode, and to provide a construction which will economize in the consumption of fuel by exposing the water more thoroughly and effectually to the action of heat than in constructions heretofore known. The invention is illustrated in the accompanying drawings and consists in certain novel features which will be hereinafter first fully described and then more particularly pointed out in the appended claims.

In the drawings—

Figure 1 is a longitudinal section of a locomotive boiler embodying my improvements;

Fig. 2 is a transverse section on the line 2—2 of Fig. 1;

Fig. 3 is a transverse section on the line 3—3 of Fig. 1.

In carrying out my invention, I provide the usual cylindrical water chamber 1, the outer wall of which is extended downwardly, as at 2, at its rear end to provide the outer wall of the fire-box. A flue sheet or head 3 is provided across the water chamber 1 in rear of the front plate or head 4 and the usual stack 5 rises from the smoke chamber provided between the two heads 2 and 4. The fire-tubes 6 are supported at their front ends in the head 3 and open through the same, while the rear ends of the said tubes are supported in and open through a head or plate 7 which is disposed in advance of the rear end of the boiler and terminates short of the side walls of the same. An arch 8 extends between the upper edge of the head 7 and the rear wall plate 9 of the boiler and thereby bridges the space between the said plates and aids in supporting the tube sheet or head 7. The sides of the fire-box are double, as shown clearly in Figs. 2 and 3, and are defined by inner walls 10 which are disposed in spaced relation to the outer side walls 11 and are connected at their lower ends directly to the outer walls,

as shown at 12. The inner walls 10 are connected by an upper crown sheet 13 and 55 a lower crown sheet 14 which extend forwardly from the rear wall plate 9 and are joined at their front edges, as shown at 15, thereby providing a water space in communication with the space between the inner and outer walls 10 and 11 so that the water may circulate freely therethrough and be readily heated and converted into steam. An opening 16 is provided in the rear wall plate 9 and a fuel chute 17 is provided at 65 the rear of said opening to permit the insertion of fuel into the fire-box. The opening is controlled by a door 18 in the usual manner. An inner rear wall 19 is provided in spaced relation to the rear wall plate 9 and is joined thereto at its lower end, as shown at 20, in the same manner that the inner side walls are joined to the outer side walls. The water space between the inner and outer rear walls communicates with the 75 space between the upper and lower crown sheets and the upper crown sheet is secured to the outer rear wall, as shown at 21, while inner vertically disposed plates 22 connect the said crown sheet with the arch 8 to define a fire space at the rear ends of the fire tubes 6, the space between the said plates 22 and the outer side walls 11 communicating with the space between the crown sheets and the space between the inner and outer walls 85 10 and 11, as clearly shown, so that water will be exposed to the heat of the fire-box at the rear of the same and at both sides thereof. Access may be had to the fire tubes through a door 23 so as to readily clean the same. At the front of the fire-box is an inner wall 24 which is in spaced relation to the front wall 2 of the fire-box and is secured thereto at its lower end, as shown at 25. The upper end of the wall 24 is secured 95 to or formed integral with the lower wall 26 of the water chamber leading to the flue sheet or plate 7 and it will be noted that the said plate or wall 26 is spaced above the upper crown sheet 13.

In use a fire is kindled within the fire chamber in the usual manner, it being understood that grate bars (not shown) extend between the points 20 and 25 in the usual manner. It will be readily observed that 105 the crown sheets provide a water space over

the grate bars which extends toward and nearly to the vertical water leg constituting the front wall of the fire-box. It will also be noted that there is a water leg at each side and at the rear of the fire-box so that when a fire is kindled the heat will play directly upon water-containing chambers and will, therefore, very quickly raise the water to the desired temperature and form steam. The smoke and other products of combustion and the currents of hot air rising from the fire cannot pass directly through the fire tubes but must flow forwardly to the narrow space between the front water leg and the front leg or end of the water-containing compartment formed by the crown sheets. The restricted area of the passage at the front of the crown sheets will retard the flow of the heated currents and, consequently, will retain the heat for the maximum period within the fire-box. As the heated currents pass up in front of the crown sheets they will be diverted rearwardly and flow through the narrow space above the crown sheets and between the same and the bottom of the main water chamber and will then rise in the space between the flue sheet 7 and the rear wall of the boiler to enter the rear ends of the fire tubes. They will then pass forwardly and out through the stack 5 in the usual manner. It will be readily noted that by providing the upper and lower crown sheets spaced from and below the bottom of the main water chamber, I am enabled to use longer fire tubes than has been heretofore possible without increasing the length of the boiler and as the fire tubes are not exposed directly to the fire the safety of the boiler is increased.

Having thus described my invention, what is claimed as new is:

1. In a steam boiler, a water chamber, a fire-box disposed below the rear end of the water chamber, the rear portion of the bottom wall of the water chamber terminating short of its side walls, inner side walls extending from the bottom of the water chamber to the bottom of the fire-box and spaced from the side walls of the water chamber and secured to the same at the lower ends thereof, spaced inner and outer walls extending from the bottom of the water chamber and constituting the front wall of the fire-box and secured together at their lower ends, and spaced crown sheets extending across the fire-box below the water chamber and spaced from the inner front wall of the fire-box and forming a water compartment in communication with the spaces between the inner and outer side walls.

2. A locomotive boiler having a water chamber with its rear portion disposed over the fire-box, a water leg extending from the water chamber and forming the front of the fire-box, the bottom wall of the water chamber terminating in advance of the rear wall of the same and supporting a flue sheet, an arch connecting the upper end of said flue sheet with the rear wall of the water chamber, fire tubes extending from said flue sheet through the water chamber to the front end thereof, and spaced crown sheets secured to the rear wall of the water chamber and connected at their front ends and spaced from the bottom of the water chamber and from the water leg depending therefrom.

In testimony whereof I affix my signature.

WILLIAM SHINN. [L. S.]