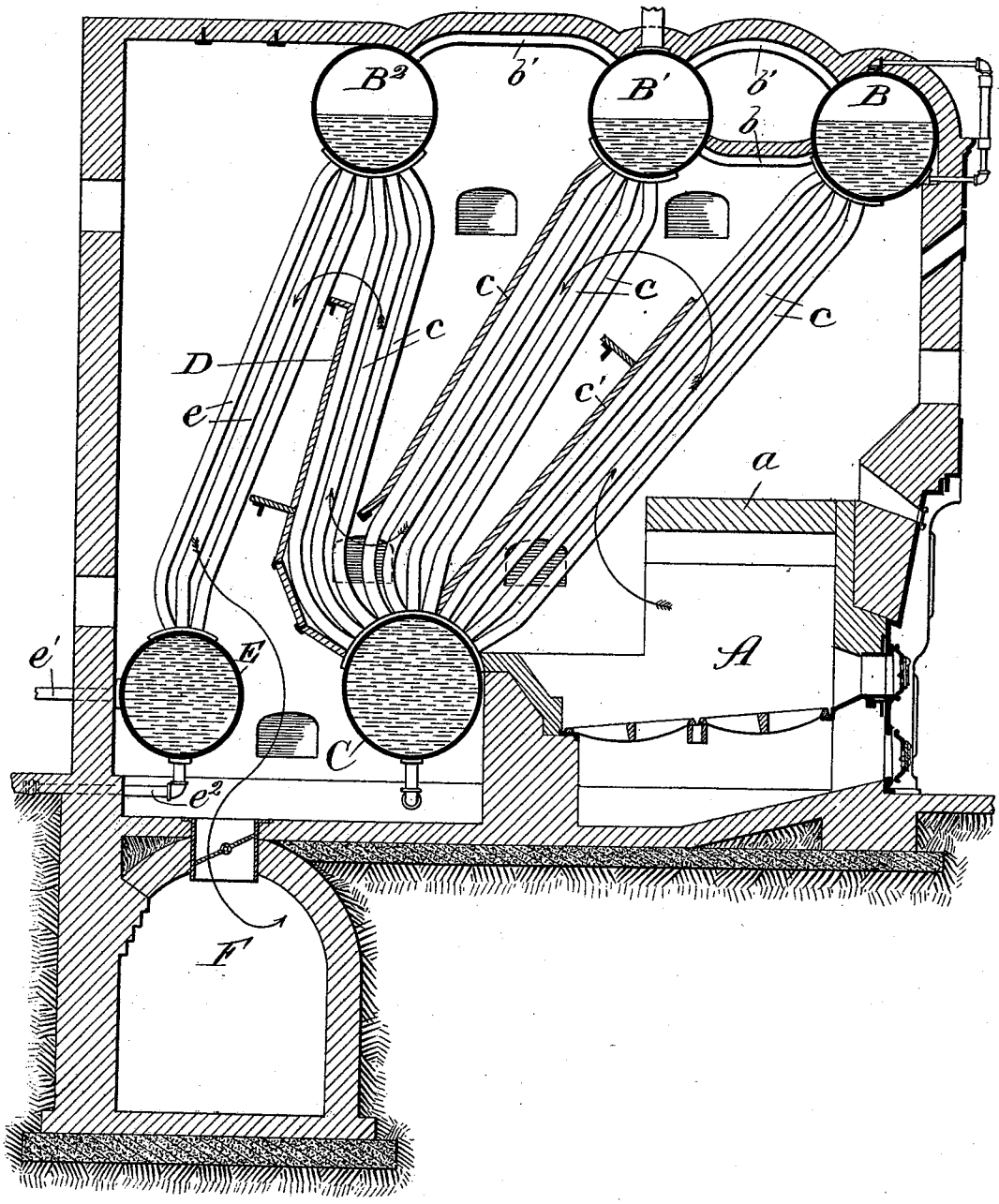
(No Model.)

H. S. PELL.

STEAM BOILER.

No. 518,858. Patented Apr. 24, 1894.



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UNITED STATES PATENT OFFICE.

HARRY S. PELL, OF AKRON, OHIO, ASSIGNOR TO THE STIRLING COMPANY, OF CHICAGO, ILLINOIS.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 518,858, dated April 24, 1894.

Application filed December 22, 1893. Serial No. 494,405. (No model.)

To all whom it may concern:

Be it known that I, HARRY S. PELL, a citizen of the United States, residing at Akron, Ohio, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

The object of my invention has more particular reference to tubular steam boilers of the general type shown and described in the Stirling patent, No. 479,678, issued July 26, 1892; and my invention consists in the features and details of construction hereinafter described and claimed.

The drawing represents a transverse vertical section of my improved tubular boiler.

In making my improved steam boiler, I make a fire chamber, A, of the desired size, and cover it with an arch, *a*. I arrange water and steam drums, B and B′ and B^2, in the upper part of the boiler, and connect the first two of them with water pipes, *b*, and steam pipes, *b′*, which steam pipes are also used to connect the last two of the drums mentioned. I arrange in the lower part of the boiler a drum, C, which is intended to be connected with and suspended from the three upper drums mentioned by a series of tubes, *c*, so as to afford communication between them. Deflecting plates, *c* and *c′*, are arranged behind the series of tubes connecting the drum, C, and the drums, B and B′, so as to deflect the heat and products of combustion upward through the one series of tubes and down through the other, as indicated by arrows, in order to expose as great a portion of their length as practicable to the heat.

Up to this point, I have simply described in general terms the construction shown in the Stirling patent referred to, except in the matter of suspending the lower drum, and reference may be had to such patent for a more minute and detailed description of the construction and operation of the parts. While using these parts which are found in the Stirling construction, I do not, however, lead the heat and products of combustion directly from the last series of tubes up and out through the smoke stack; but arrange a wall or deflecting plate, D, at the back of the last series of tubes. Where a deflecting plate is used, I prefer to have it end a sufficient distance below the upper drum, B^2, so as to afford space for the heat and products of combustion to be drawn up and over its upper edge. Behind this deflecting plate, I arrange a lower feed water drum, E, which is connected to the upper drum, B^2, by a series of tubes, *e*, and which is provided with a pipe, *e′*, leading from a source of water supply and a blow-off pipe, e^2. As shown in the drawing, I have provided the boiler with an underground connection, F, leading to the chimney or smoke stack, although other means for carrying off the smoke and products of combustion may be employed if desired.

In operation, the water from the source of supply enters the lower feed water drum through the pipe, *e′*. This drum is intended to receive and catch the larger portion of the sediment that may be contained in the water, which sediment may from time to time be carried off through the pipe, e^2. The water passes up through the series of tubes, *e*, into the steam and water drum, B^2. This drum communicates through the pipe, *b′*, with the steam and water drum, B′, so that its upper portion is filled with steam exerting a pressure on the surface of the water, so as to cause its more ready feeding into the other drums of the boiler. The water passes down from the drum, B^2, into the lower drum, C, and then up through the series of tubes connecting such drum with the upper steam and water drums, B and B′. These drums, as before explained, have steam and water communication with each other, so that a circulation of the water through the drums, B and B′ and C, is constantly maintained. It is not necessary, however, that this circulation be so direct as to prevent the water from passing through the mud drum in its circulation from one elevated drum to another. Nor is it necessary that all the steam or water pass from one drum to another.

I regard the lower feed drum as a material and important feature of my invention. By causing the heavier impurities in the water to settle before reaching the elevated drums, it assists in preventing the formation of scale therein and in the middle and forward banks of tubes; and by utilizing escaping gases it enables me to economize in fuel,

and, generally, assists in securing an economical operation of the boiler.

What I regard as new, and desire to secure by Letters Patent, is—

1. In a water tube boiler, the combination of elevated drums having steam and water communication with each other, a lower mud drum, tubes connecting the elevated drums with the lower mud drum, a lower feed drum, tubes connecting the lower feed drum with one of the elevated drums, and means for supplying water to the lower feed drum, substantially as described.

2. In a water tube boiler, the combination of three elevated steam and water drums, B and B′ and B^2, a lower drum, C, series of tubes connecting the lower drum with each of the elevated drums, pipes affording steam and water communication between the drums B and B′ and steam communication between the drums B′ and B^2, a lower feed water drum, E, a series of tubes connecting the lower feed water drum, E, with the elevated steam and water drum, B^2, and means for supplying water to the lower feed water drum, substantially as described.

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