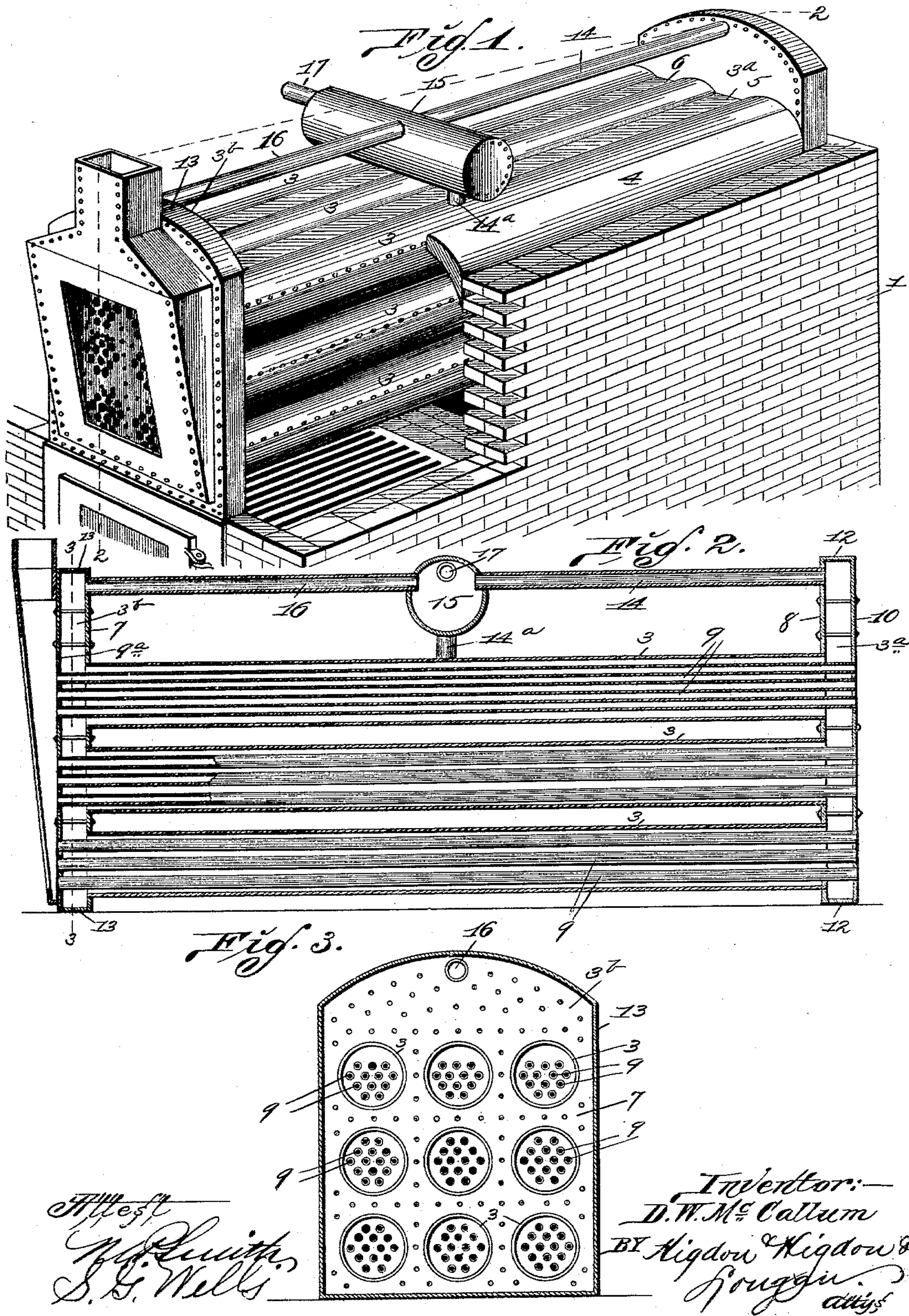


(No Model.)

D. W. McCALLUM.  
STATIONARY BOILER.

No. 596,785.

Patented Jan. 4, 1898.





# UNITED STATES PATENT OFFICE.

DANIEL W. McCALLUM, OF ST. LOUIS, MISSOURI, ASSIGNOR OF TWO-THIRDS  
TO WILLIAM E. KUHLMANN, OF FORT WORTH, AND JEFF L. FINLEY, OF  
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## STATIONARY BOILER.

SPECIFICATION forming part of Letters Patent No. 596,785, dated January 4, 1898.

Application filed March 10, 1896. Renewed August 26, 1897. Serial No. 649,652. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL W. McCALLUM, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Stationary Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a high-pressure steam-boiler; and it consists in the novel construction, combination, and arrangement of parts hereinafter described and claimed.

The object of my invention is to provide a steam-boiler for marine, locomotive, and stationary purposes which shall possess many advantages over the steam-boilers heretofore in use, both in strength and durability, and which shall be capable of carrying a much higher pressure with greater safety, and that can be built to any desired capacity without in any manner decreasing its strength or affecting its usefulness.

In the drawings, Figure 1 is a perspective view of my improved boiler in its setting, parts of the brickwork and arch being broken away to better illustrate my invention. Fig. 2 is a longitudinal sectional view taken on the line 2 2 of Fig. 1, the flues being shown partly in section and partly in elevation. Fig. 3 is a transverse sectional view taken on either of the lines 3 3 of Fig. 2.

Referring by numerals to the accompanying drawings, 1 represents the brickwork of the boiler-setting, the same being broken away to show the boiler. The boiler consists of a number of small round shells 3, which connect at the ends of the boiler with the square shells 3<sup>a</sup> and 3<sup>b</sup>. The square shell 3<sup>a</sup> is formed by the sheets 8 and 10 and the wrought-iron frame 12, to which said sheets are connected, said sheets being of boiler-metal and are held to each side of the frames by securely riveting thereto. The square shell 3<sup>b</sup> is formed by the sheets 7 and 9<sup>a</sup> and the wrought-iron frame 13, to which said sheets are connected, said sheets being of boiler-metal and held to each side of the frames by securely riveting thereto. The frames 12 and 13 may be of any suitable width and thickness and have holes drilled through them by which they may be riveted

to the respective sheets. The shells 3<sup>a</sup> and 3<sup>b</sup> are stayed by the stay-bolts 18 in any convenient manner.

The round shells 3 are securely joined to the two inner sheets 7 and 8, and through these shells extend the tubes 9, which are securely joined to the two outer sheets 9<sup>a</sup> and 10 at their respective ends, which are termed the "flue-sheets." To the outer sheet 9<sup>a</sup> of the shell 3<sup>b</sup> is secured the base of the smoke-stack. From the inner sheet 7 of the shell 3<sup>b</sup> a steam-pipe 16 communicates with the steam-dome 15, and from the inner sheet 8 of the shell 3<sup>a</sup> a steam-pipe 14 communicates with the opposite side of said steam-dome. Two small vertical pipes 14<sup>a</sup> convey the steam from the two upper shells 3 of the outer rows to the steam-dome 15, and fillings of fire-clay 5 and 6 close the spaces between the upper row of shells, thus preventing the heat from escaping from the upper part of the boiler.

There are ordinary grates under the boiler. Archwork 4 extends from the brickwork to the upper outside shells. The steam-dome 15 has an outlet 17 to the engine. The space in the shell 3 outside of the tube 9 connects with the space in the shells 3<sup>a</sup> and 3<sup>b</sup> and together form the steam and water space.

In illustrating my invention I have shown in the drawings a marine boiler; but the invention is equally applicable to a locomotive, stationary, and all other classes of steam-boilers.

It will be noticed that the shells 3<sup>a</sup> and 3<sup>b</sup> are placed in three rows with three shells in each row, the same being arranged horizontally, one above the other; but any number, length, or diameter of shells may be employed in this class of steam-boilers without departing from the principle of my invention.

A locomotive-boiler will have four or more of the small shells 3, which form the body of the boiler, and one square shell forming the front end of the boiler, the four or more small shells joining the inner sheet at the front end and will be joined to the throat-sheet at furnace end of the boiler.

I desire it understood that such changes as would be required and coming within ordinary mechanical skill may be made without departing from the principle of my invention.



A steam-boiler constructed in accordance with my invention will be found to be a perfect generator, as the heat will perform a double application on the shells and tubes both externally and internally and the water and steam will have a perfect circulation throughout the entire boiler. The steam will have a perfect flow from all parts of the boiler and will be conveyed through the steam-reservoir and through the four steam-pipes connecting therewith at the four points of the boiler. In this class of steam-boilers any desired capacity can be obtained by increasing the shell in length and diameter and increasing the number of tubes.

In the practical operation of my improved high-pressure boiler fire is built upon the grate in the ordinary way. The heat surrounds the shells 3 and the draft carries the smoke and gases back behind the flue-sheet 10, and from thence the draft passes through the flues 9 to the base of the smoke-stack and thence up said stack.

Among the advantages I claim for my invention is the fact that a plurality of small shells will stand a far greater steam-pressure than will a large shell constructed of the same material and the further fact that it presents a greater heating-surface to the fire in proportion to the volume of water than any of the old devices.

I claim—

1. In a steam-boiler, a series of water-shells in horizontal parallel positions, a series of fire-flues in each of said water-shells, a vertically-positioned water-jacket at each end of said shells, said shells being attached to the inner walls of said jackets and said fire-flues being attached to the outer walls of said jackets

and the upper ends of said jackets extending above the upper ones of said water-shells, a steam-dome above said water-shells, steam connections between the upper ends of said water-jackets and said steam-dome, masonry between the upper ones of said water-shells, a smoke-stack base at one end of said water-shells and a fireplace under said water-shells and communicating with the ends of said fire-flues opposite said smoke-stack, substantially as specified.

2. In a steam-boiler, a series of water-shells in horizontal parallel positions, a series of fire-flues in each of said water-shells, a vertically-positioned water-jacket at each end of said shells, said shells being attached to the inner walls of said jackets and said fire-flues being attached to the outer walls of said jackets and the upper ends of said jackets extending above the upper ones of said water-shells, masonry between the upper ones of said water-shells, a smoke-stack base at one end of said water-shells, a fireplace under said water-shells and communicating with the ends of said fire-flues opposite said smoke-stack, a steam-dome shell positioned above said water-shells and transversely thereof, steam connections between the upper ones of said water-shells and said steam-dome, and steam connections between the upper ends of said water-jackets and said steam-dome, substantially as specified.

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

DANIEL W. McCALLUM.

Witnesses:

S. G. WELLS,  
MAUD GRIFFIN.