

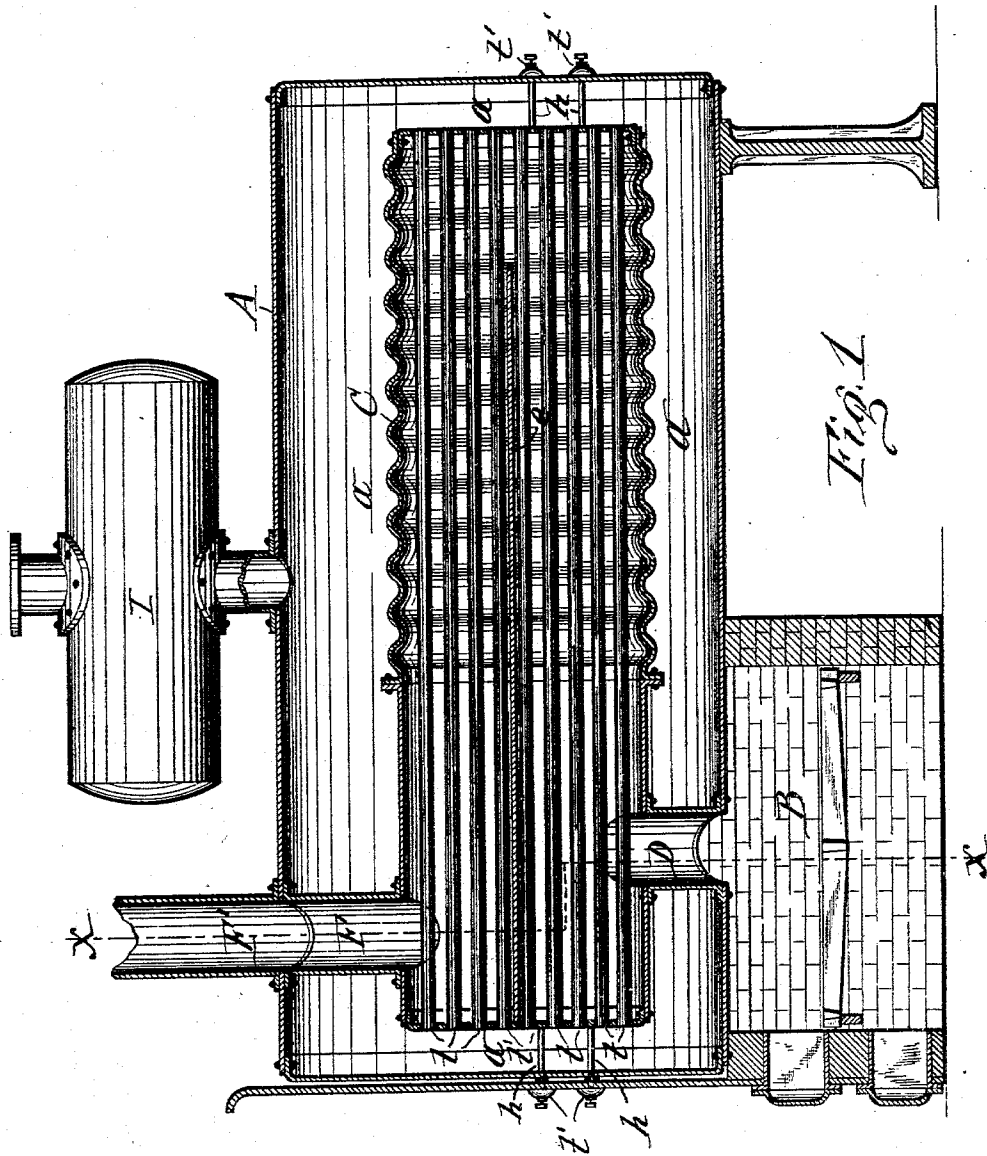
(No Model.)

2 Sheets—Sheet 1.

J. J. TONKIN.  
STEAM BOILER.

No. 556,909.

Patented Mar. 24, 1896.



WITNESSES:

C. L. Bendixen

J. J. Saass

INVENTOR

John J. Tonkin  
By E. Laass  
his ATTORNEY

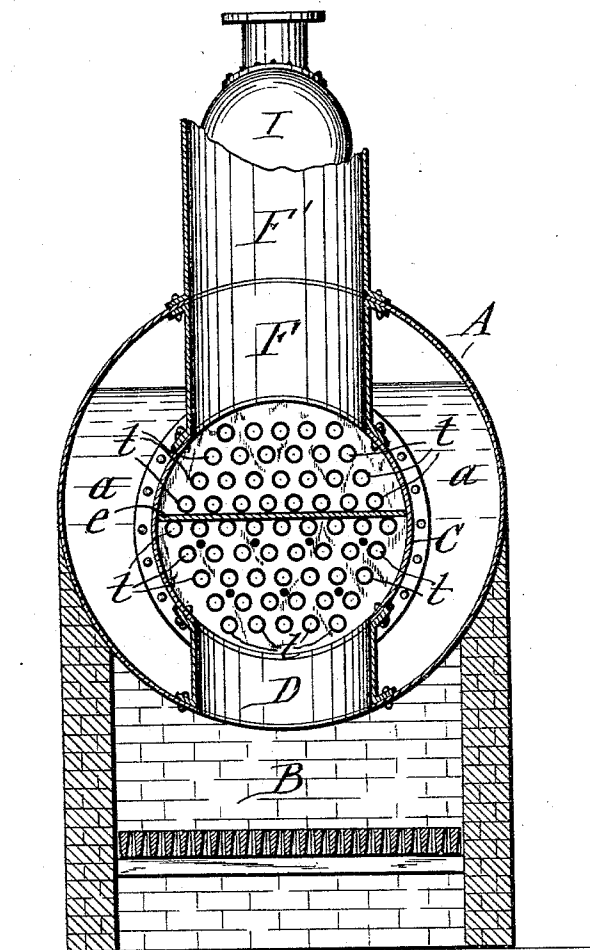
(No Model.)

2 Sheets—Sheet 2.

J. J. TONKIN.  
STEAM BOILER.

No. 556,909.

Patented Mar. 24, 1896.



*Fig. 2*

WITNESSES:

*C. L. Bendison*  
*J. J. Laass*

INVENTOR:

*John J. Tonkin*  
*By C. Laass*  
his ATTORNEY

# UNITED STATES PATENT OFFICE.

JOHN JAY TONKIN, OF OSWEGO, NEW YORK.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 556,909, dated March 24, 1896.

Application filed February 21, 1895. Renewed October 4, 1895. Serial No. 564,676. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN JAY TONKIN, of Oswego, in the county of Oswego, in the State of New York, have invented new and useful  
5 Improvements in Steam-Boilers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

The object of this invention is to provide a  
10 steam-boiler which shall be simple in construction and possess a large amount of heating-surface so disposed as to permit free circulation of the water and impart maximum efficiency to the boiler at a minimum consumption of fuel; and to that end the invention consists essentially in the combination,  
15 with the main boiler-shell, of a fire-chamber disposed completely within said shell, and water-tubes extending through said fire-chamber;  
20 and the invention also consists in certain novel features of the details of the boiler, all as hereinafter more fully described and specifically set forth in the claims.

In the annexed drawings, Figure 1 is a longitudinal section of a steam-boiler embodying my invention. Fig. 2 is a transverse section of the same on line X X in Fig. 1.

A denotes the main shell of the boiler, which shell is elongated in a horizontal direction  
30 and may be of any suitable shape in cross-section, preferably of cylindrical shape, as shown. Completely within this shell is located a fire-chamber C, consisting of a secondary shell also preferably of cylindrical shape and completely surrounded by the water-space *a*. I also prefer to corrugate this  
35 secondary shell longitudinally to increase the heating-surface and at the same time stiffen said shell, so as to render itself-sustaining and dispense with the usual braces or tie-rods.  
40 Longitudinally through said fire-chamber or secondary shell extend the water-tubes *t*, which communicate at opposite ends with the water-space *a* of the boiler and permit the water to pass freely through them and circulate  
45 from end to end of the boiler.

Under the main shell A is built the fire-box B, which communicates with one end of the interior of the fire-chamber C by a flue D. I  
50 preferably place the fire-arch under the corresponding end of the main shell, as shown in Fig. 1 of the drawings, by which arrange-

ment the fire of the fire-box is caused to impinge said end of the main shell and drive the water toward the opposite end of said shell, 55 from whence it passes through the tubes *t t* and thus induces thorough circulation of the water.

To the top of the fire-chamber C, at the same end where it communicates with the fire-box, 60 is attached the smoke-exit flue F, which extends to an opening in the top of the main shell A and communicates with the smoke-stack F', mounted on the latter shell.

In order to cause the products of combustion to thoroughly heat the water-tubes *t t* 65 throughout their lengths, I place in the fire-chamber C a longitudinal partition *e* extending from the end of the chamber adjacent to the fire-inlet flue D part way toward the opposite end of the chamber and thus compel 70 the products of combustion to pass from the inlet-flue D through the space beneath the partition to the opposite end of the chamber C and thence return through the space over 75 the partition to the exit-flue F, and in said passages the products are caused to thoroughly circulate between the water-tubes *t t*, which absorb the heat from the products of combustion and rapidly convert the water into 80 steam.

To provide ample room for the collection of the steam, I connect to the main shell A the steam-drum I, as shown in Fig. 1 of the drawings. 85

*h h* represent tubular stay-bolts by which the ends of the fire-chamber C is connected to the main shell A. These stay-bolts tap the heads of the fire-chamber at points between the water-tubes *t t*, and the outer ends 90 of said stay-bolts extend through the heads of the main shell and are provided with suitable removable covers *t' t'*. By removing said covers and introducing steam under pressure through the tubular stay-bolts the 95 dust and ashes are blown from the surfaces of the water-tubes *t t* and the interior of the fire-chamber is thoroughly cleansed.

What I claim as my invention is—

1. The combination with the main boiler-shell, of a secondary shell within said main 100 shell, a fire-box under the main shell, a flue extending from the fire-box to one end of said inner shell, an exit-pipe extending from said

end of the latter shell, a partition extending from said end part way toward the opposite end of the inner shell, and water-tubes extending through said shell and communicating at opposite ends with the interior of the main shell as set forth.

2. The combination with the main boiler-shell, of a secondary shell disposed horizontally within said shell and surrounded by water-spaces, water-tubes extending longitudinally through said inner shell, a fire-box and smoke-exit communicating with one end of the inner shell, and a partition between the water-tubes and extending from said end of the shell part way toward the opposite end thereof as set forth and shown.

3. The combination with the main boiler-shell, of a secondary shell disposed within said main shell and with a water-space surrounding it, a fire-box under one end of the main shell, a flue extending from the fire-box into the corresponding end of the secondary shell, a smoke-exit flue extending from the top of said end of the said shell, water-tubes extending horizontally through the secondary shell and communicating at opposite ends with the interior of the main shell, and cleaning-flues extending from the ends of the secondary shell through the corresponding ends of the main shell and provided with removable covers as set forth.

4. The combination of a horizontally-elongated boiler-shell, a secondary shell disposed longitudinally within said boiler-shell and with a water-space surrounding it, a fire-box

under the said boiler-shell, and communicating with one end of the interior of the secondary shell, a smoke-exit extending from the same end of the latter shell, a partition extending from said end part way toward the opposite end of the secondary shell and interposed between the inlet and outlet of the products of combustion, water-tubes extending longitudinally through the secondary shell, and cleaning-tubes extending from the ends of the secondary shell through corresponding ends of the main shell and provided with removable covers as set forth.

5. In combination with the main shell, a fire-chamber corrugated longitudinally and disposed inside of said main shell with a water-space surrounding it, a fire-box under the main shell and communicating with the interior of one end of the aforesaid fire-chamber, an exit-flue extending from said end of the chamber, water-tubes extending through the fire-chamber and communicating at opposite ends with the interior of the main shell, and a partition in the fire-chamber extending from the end adjacent to the fire-box part way toward the opposite end of said chamber as set forth and shown.

In testimony whereof I have hereunto signed my name this 2d day of February, 1895.

JOHN JAY TONKIN. [L. S.]

Witnesses:

J. J. LAASS,

C. L. BENDIXON.