

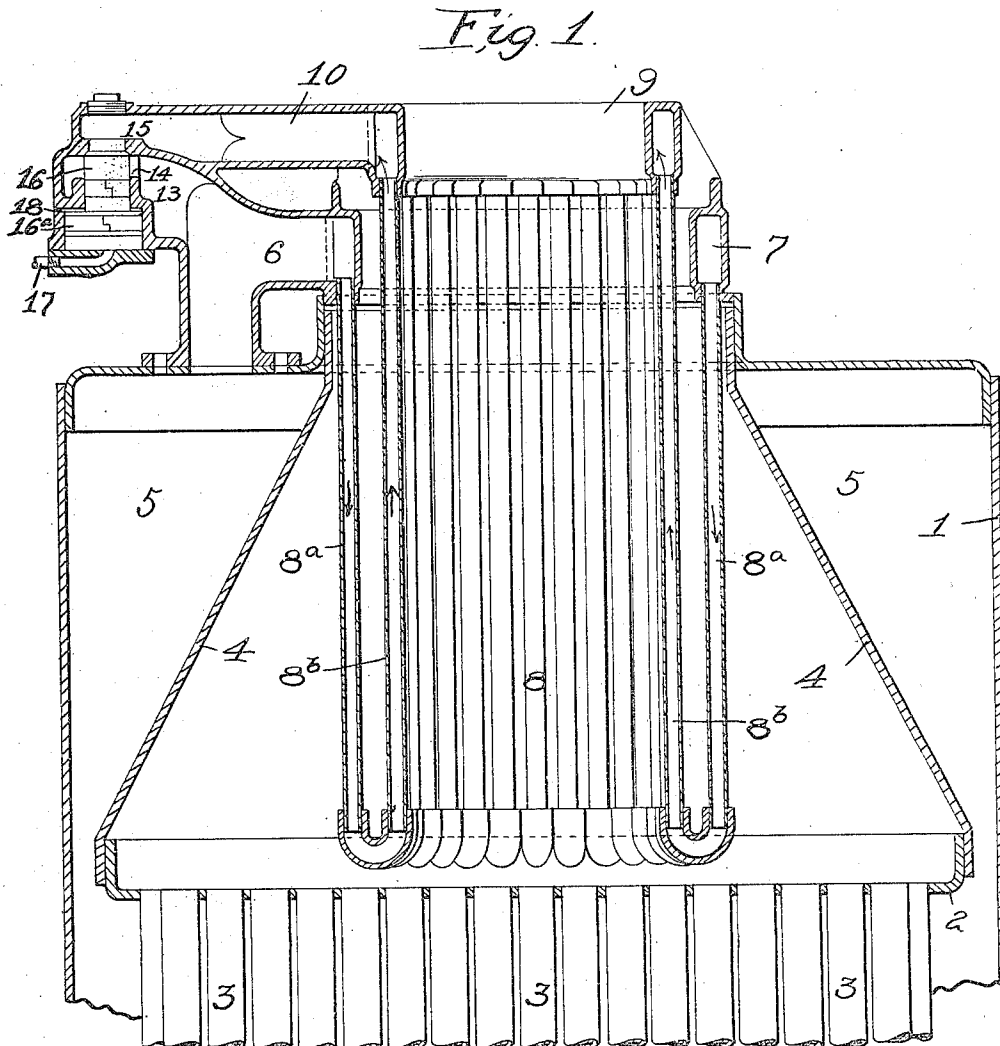
C. W. TODD.
STEAM BOILER.

APPLICATION FILED DEC. 15, 1910.

1,004,713.

Patented Oct. 3, 1911.

2 SHEETS—SHEET 1.



Attest.
Bent M. Stahl.
Edward N. Sartor *by*

Inventor.
C. W. Todd.
Spencer Middleton Donaldson & Assoc.
Attys.

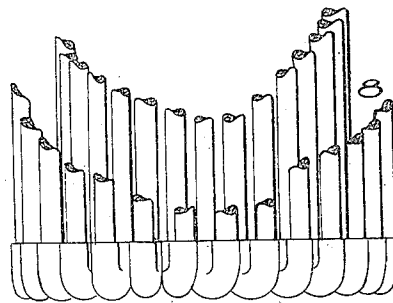
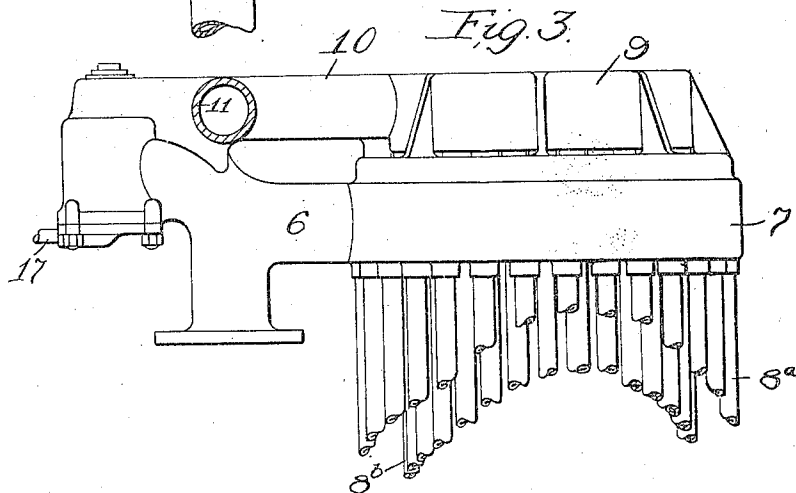
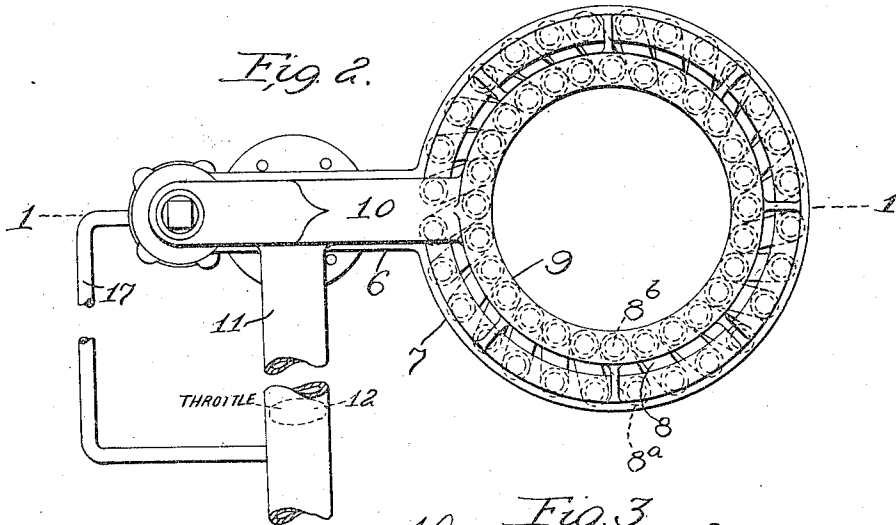
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C. W. Todd.

by Spear Middleton Donaldson & Spear
Attys.

UNITED STATES PATENT OFFICE.

CHARLES W. TODD, OF MANCHESTER, NEW HAMPSHIRE.

STEAM-BOILER.

1,004,713.

Specification of Letters Patent.

Patented Oct. 3, 1911.

Application filed December 15, 1910. Serial No. 597,517.

To all whom it may concern:

Be it known that I, CHARLES W. TODD, citizen of the United States, residing at Manchester, New Hampshire, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

My present invention relates to improvements in steam boilers of the type having a steam superheater and has for its main object to provide means by which the superheater is automatically converted into a steam dome on the closing of the throttle.

The invention comprises the novel features hereinafter described and particularly defined by the appended claims.

In the accompanying drawings the invention is shown as embodied in an upright boiler of the type particularly adapted for steam fire engines, but it will, of course, be understood that I do not limit myself to this particular style of boiler, my invention being applicable to any type of boiler having a superheater.

In the said accompanying drawings, Figure 1 is a vertical section through a sufficient portion of the upper part of a boiler to illustrate the invention, the section being taken on line 1—1 of Fig. 2. Fig. 2 is a plan view, and Fig. 3 is a side elevation with parts omitted or broken away.

Referring by reference characters to these drawings, the numeral 1 designates the boiler shell, 2 the upper tube sheet, 3, the fire tubes and 4 the boiler sheet, forming with the upper portion of the boiler shell a steam chamber 5. An angle pipe 6 conducts the steam from this steam space to an annular steam ring or header 7 which is in communication with the downtake tubular branches 8^a of the U shaped superheater tubes 8.

The upper end of the uptake branches 8^b deliver the steam into an annular header 9. The superheater pipes are of course in the path of the products of combustion which pass out through the headers and through the stack, which latter is omitted for clearness of illustration. From the header 9 the steam passes, when the throttle is open, through a pipe 10, and branch 11 to the throttle valve 12. From the pipe or passage 6 extends a branch passage 13, which communicates by way of annular channel 14 and port 15, with the pipe 10.

The port 15 is provided with or encircled by a suitable valve seat with which coacts a piston valve 16. This valve has an enlarged head 16^a which is designed to reciprocate in a correspondingly enlarged chamber, and from the lower side of this enlarged chamber leads a pipe 17 which communicates with the main steam pipe 11, on the cylinder side of the throttle valve.

At 18 is provided a vent hole to relieve the pressure against the rear or upper face of the enlarged head of the valve in case of any leak passing the packing rings. It also, by its small size, forms a suction when the valve is going down and compression when going up, thereby securing a dash pot effect, to check the speed of the valve and prevent damage to the valve seat.

From the construction above described it will be seen that when the throttle valve is open steam will be admitted through pipe 17 to the space beneath the enlarged head, thereby forcing the piston valve up against its seat cutting off the passage of steam through branch 13 between pipes 6 and 10. With the piston valve in this position steam can only pass by way of pipe 6 through the superheater tubes and thence by pipes 10 and 11 to the engine cylinders. When, however, the throttle is closed, the pressure against the enlarged head of the piston valve is relieved, whereupon the pressure against the small head or end of the valve which has been insufficient, by reason of the difference in area to prevent closing of the valve, now forces said valve open. This establishes direct communication between pipes 6 and 10 and converts the superheater into a steam dome allowing free circulation of steam.

Having thus described my invention what I claim is:—

1. In combination a boiler having a steam space and steam delivery pipe provided with a controlling valve and a superheater interposed between said steam space and steam delivery pipe, a by-pass for placing said steam space in direct communication with the delivery side of said superheater, and means for automatically closing said by-pass when the throttle is open and opening it when the throttle is closed, substantially as described.

2. In combination a boiler having a steam space and steam delivery pipe provided with a controlling valve and a superheater

interposed between said steam space and steam delivery pipe, a by-pass for placing said steam space in direct communication with the delivery side of said superheater, 5 a differential valve controlling said by-pass, and a steam pipe leading from the steam delivery pipe on the engine side of the throttle for acting on said differential valve, substantially as described.

10 3. In combination a boiler having a steam space and steam delivery pipe provided with a controlling valve and a superheater interposed between said steam space and steam delivery pipe, a by-pass for placing 15 said steam space in direct communication with the delivery side of said superheater, a piston valve controlling said by-pass, and having an enlarged head working in a steam chamber, and a steam pipe leading 20 from the steam delivery on the engine cylinder side of the throttle valve to said steam chamber in front of said enlarged head, substantially as described.

4. In combination a boiler having a steam 25 space and steam delivery pipe provided with a controlling valve and a superheater interposed between said steam space and steam delivery pipe, a by-pass for placing said steam space in direct communication

with the delivery side of said superheater, 30 a piston valve controlling said by-pass, and having an enlarged head working in a steam chamber, and a steam pipe leading from the steam delivery pipe on the engine cylinder side of the throttle valve to said 35 steam chamber in front of said enlarged head, and a vent from said steam chamber in rear of said enlarged head.

5. In combination a boiler having a steam space and a superheater composed of U 40 shaped tubes connected at the top by annular headers, a supply pipe leading from said steam space to one header, a delivery pipe leading from the other header to the throttle 45 valve pipe, a by-pass connecting said supply and delivery pipes, a differential valve for said by-pass having its small area exposed to the steam pressure in said delivery pipe, and means for admitting steam to the large area of said valve when the throttle 50 is open, substantially as described.

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

CHARLES W. TODD.

Witnesses:

ARTHUR C. BUNKER,
WALTER B. MITCHELL.