

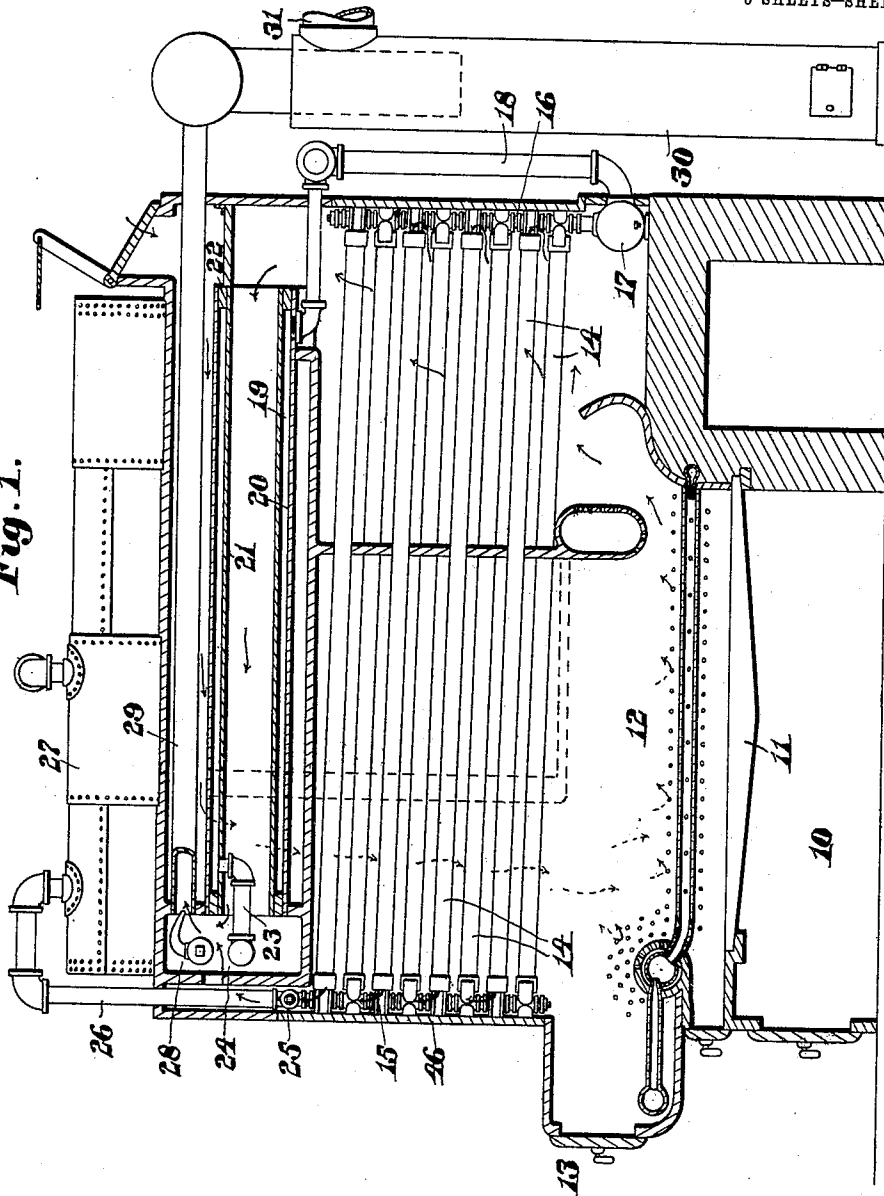
984,300.

W. H. RICKER.
CONSTRUCTION OF BOILERS.
APPLICATION FILED APR. 13, 1910

Patented Feb. 14, 1911.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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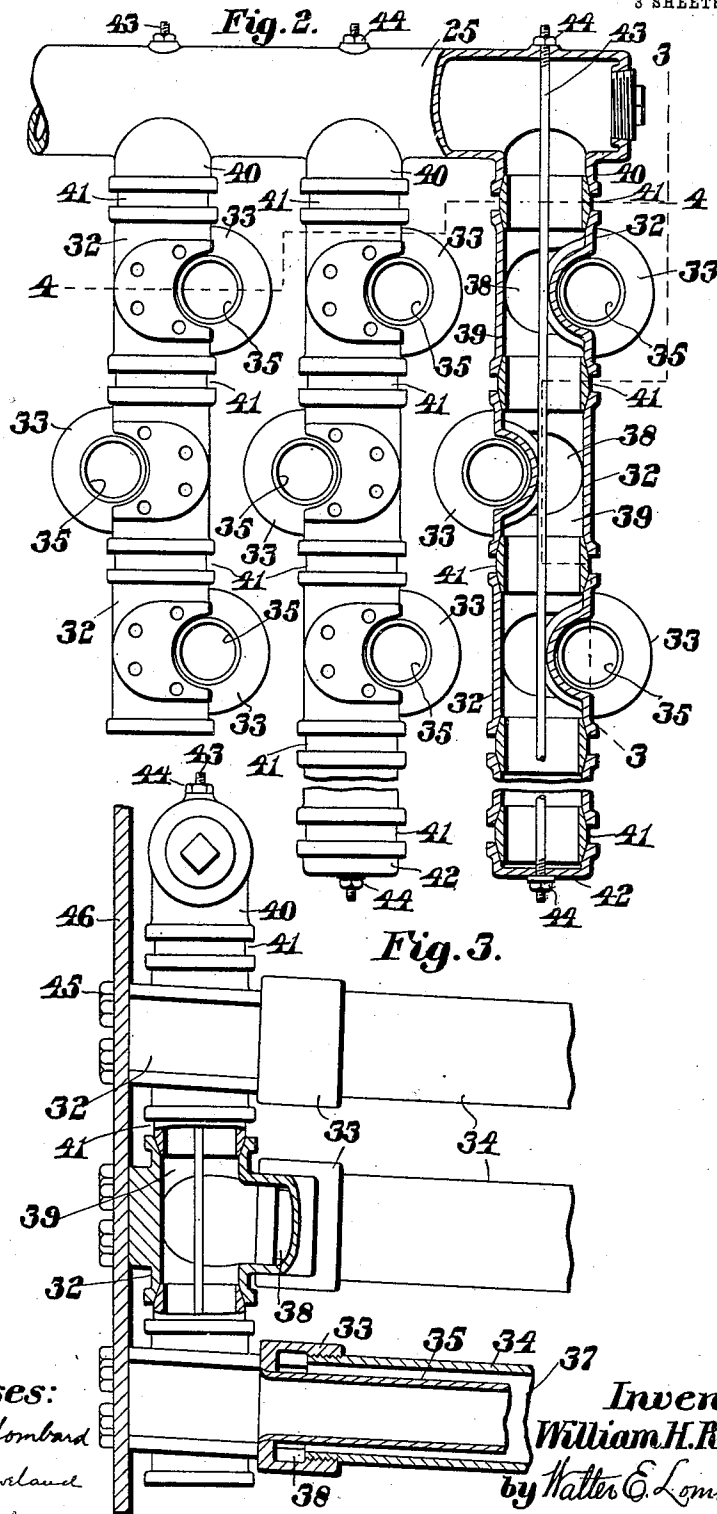
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 4.

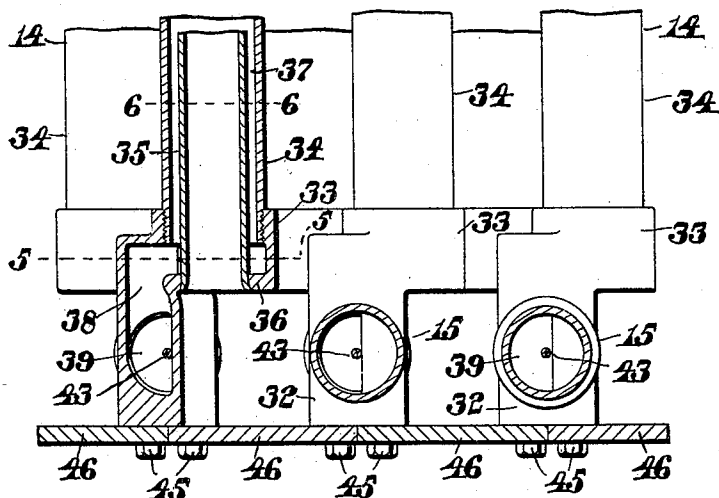


Fig. 5.

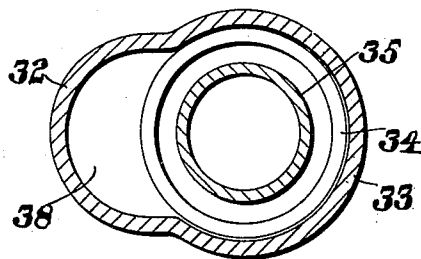
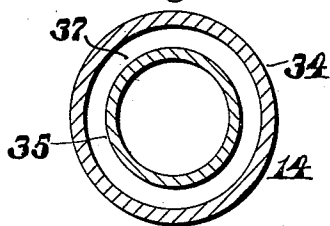


Fig. 6.



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UNITED STATES PATENT OFFICE.

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CONSTRUCTION OF BOILERS.

984,300.

Specification of Letters Patent.

Patented Feb. 14, 1911.

Application filed April 13, 1910. Serial No. 555,196.

To all whom it may concern:

Be it known that I, WILLIAM H. RICKER, a citizen of the United States of America, and a resident of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in the Construction of Boilers, of which the following is a specification.

This invention relates to steam boilers and has for its object the production of a boiler in which the tubes are made with double walls leaving an annular space through which the water circulates, said water being subjected to heat caused by the products of combustion passing through the interior of said tube and around the exterior thereof.

The invention consists in a novel construction of vertical standpipes to which the various tubes are connected, said vertical standpipes being made up of a plurality of sections locked together by some suitable means, each of which sections communicates with the annular passage in one of said tubes while a central passage is provided through which the products of combustion are free to pass.

The invention further consists in certain novel features of construction and arrangement of parts which will be readily understood by reference to the description of the drawings and to the claims hereinafter given.

Of the drawings: Figure 1 represents a boiler embodying the features of the present invention. Fig. 2 represents a front elevation, shown partly in section, of a plurality of vertical standpipes, and the horizontal pipe communicating with the upper ends of said standpipes. Fig. 3 represents an elevation partly in section of one of said standpipes showing a plurality of tubes communicating therewith, the cutting plane being on line 3—3 on Fig. 2. Fig. 4 represents a horizontal section through the same, the cutting plane being on line 4—4 on Fig. 2. Fig. 5 represents an enlarged sectional detail of one of the tubes and its connecting member forming one of the sections of the vertical standpipe, the cutting plane on line 5—5 on Fig. 4, and Fig. 6 represents an enlarged section through one of the tubes, the cutting plane being on line 6—6 on Fig. 4.

Similar characters designate like parts throughout the several figures of the drawings.

In the drawings, 10 represents the ash-pit of a boiler above which is located the usual grate 11. Access to the fire-pot 12 is provided through the fire door 13. Above the fire-pot 12 are located a plurality of double-walled tubes 14, the opposite ends of which are connected in a novel manner to the standpipes 15 and 16, respectively, at the front and rear ends of the boiler.

The vertical standpipe 16 communicates with a chamber 17 in the rear of the boiler connected by a pipe 18 to the annular passage 19 formed between the cylinder 20 and the inner tubular member 21 concentrically located therein, the ends of the passage 19 being closed by the annular members 22 interposed between said members 20 and 21 as clearly indicated in Fig. 1 of the drawings.

The passage 19 is connected at its opposite end by means of a pipe 23 with an inlet pipe 24. All of the front standpipes 15 connect with a horizontal pipe 25 from which extends a pipe 26 communicating with a steam drum 27. The products of combustion pass upwardly from the fire-pot in the direction of the arrows on Fig. 1 and through the pipe 21 and around and along the outer surface of the pipe 20. The products of combustion passing through the pipe 21 are forced by means of the aspirator 28 through the pipe 29 into the reservoir 30 where any soot or unconsumed matter is collected, the gas itself passing outward from said reservoir through the pipe 31.

The vertical standpipes 15 are composed of a plurality of T-shaped members 32 each member having a lateral branch 33, one wall of which is threaded to receive the end of a pipe 34 forming one wall of a tube 14 while a smaller, longer pipe 35 concentrically disposed within the pipe 34 is reamed or otherwise fitted to the opposite wall 36 of said branch 33, as indicated clearly in Fig. 4 of the drawings. These pipes 34 and 35 thus centrally disposed relative to each other form an annular passage 37 communicating at either end with the passage 38 within the T-shaped member, said passage 38 in turn communicating with the vertical passage 39 extending therethrough. Each end of the pipe 35 is open and the products of combustion passing from the fire-pot 12 are free to pass through the interior of this pipe and also around the exterior surface of the pipe 34. By this means the water circulates

ing through the passage 37 is subjected to a greatly increased heating surface, which obviously is of a great advantage.

The upper ends of the vertical standpipes 15 are connected to the horizontal pipe 25, as indicated clearly in Fig. 2 of the drawings. Between the branch 40 of the pipe 25 and the end of the T-shaped member 32 is a ring 41 having both ends tapered to fit within the ends of the branch 40 and the T-shaped member 32. Similar rings are interposed between the various T-shaped members 32 while the end opposite to the horizontal pipe 25 is provided with a header 42.

A rod 43 extends centrally through the various rings 41, members 32, header 42, and through a wall of the pipe 25, nuts 44 threaded to either end of said rod serving as a means of locking all the various sections together to secure a tight joint.

The rear vertical standpipe 16 is similarly constructed and connected to the horizontal chamber 17. The branches 33 of each of the T-shaped members 32 are so constructed relative to the vertical portions of said members that the inner pipe 35 of each tube may be withdrawn without disconnecting the sections from the outer pipe member 34.

Secured to the T-shaped members 32 by means of bolts 45 are a plurality of removable plates 46 at the front and rear of the boiler by removing which access may be readily obtained to any particular stack of tubes for the purpose of withdrawing an inner pipe member 35 and replacing it when desired.

The advantages of constructing a boiler in this manner whereby the heating surface of the various tubes is doubled is very apparent and it is believed that in view of this the invention will be thoroughly understood without further description.

Having thus described my invention, I claim:

1. In an apparatus of the class described, the combination of two standpipes each composed of a plurality of T-members provided with lateral branches each of less depth than the body portion of said members; a pipe extending through and connecting two of said branches; and a second pipe surrounding the first-mentioned pipe and also connected to said branches and forming an annular passage communicating with the interior of both standpipes.

2. In an apparatus of the class described, the combination of two standpipes each composed of a plurality of T-members provided with lateral branches; a rod passing through said T-members; means thereon for locking said members together; a pipe extending through and connecting two of said branches; and a second pipe surrounding the first-mentioned pipe and also connected to said branches and forming an annular pas-

sage communicating with the interior of both standpipes.

3. In an apparatus of the class described, the combination of two standpipes each composed of a plurality of T-members provided with lateral branches extending alternately in opposite directions; means for locking said members together; a pipe extending through and connecting two of said branches; and a second pipe surrounding the first-mentioned pipe and also connected to said branches and forming an annular passage communicating with the interior of both standpipes.

4. In an apparatus of the class described, the combination of two standpipes each composed of a plurality of T-members; a horizontal pipe communicating with the upper end of one of said standpipes; another horizontal pipe communicating with the lower end of the other standpipe; headers in the opposite ends of said standpipes; rods extending through said standpipes, said headers, and horizontal pipes; means on said rods for locking the various parts of said standpipes, headers, and horizontal pipes together; and two pipes connecting a T-member of one standpipe with a T-member of the other whereby water may circulate through the annular space between said two pipes from one standpipe to the other.

5. In an apparatus of the class described, a plurality of aligned standpipes in two rows, each having a plurality of lateral branches extending alternately in opposite directions; a pipe extending through a branch in each of said rows through which heat is adapted to pass; a shorter pipe surrounding said first-mentioned pipe and connected at each end to a branch, thereby forming an annular communicating passage between said standpipes for the circulation of a fluid; and a casing for said pipes having removable front and rear plates.

6. In an apparatus of the class described, the combination of two standpipes, each composed of a plurality of T-members each having a lateral branch, one wall of which is provided with a threaded opening and the opposite wall of which is provided with a smaller opening concentric to said threaded opening; and a pipe threaded to the larger openings of two opposed branches and another pipe extending through the last-mentioned pipe with its ends positioned in said smaller openings.

7. In an apparatus of the class described, the combination of two standpipes each provided with lateral cylindrical branches the axes of which are at one side of the axes of said vertical passages through said standpipes; a pipe extending through and connecting two of said branches; and a second pipe surrounding the first-mentioned pipe and also connected to said branches and

forming an annular passage communicating with the interior of both standpipes.

8. In an apparatus of the class described, the combination of a standpipe composed of
5 a plurality of T-shaped members, the vertical branches of which have their inner walls tapered; a tapered nipple interposed between said T-shaped members and fitting said tapered walls; a header at one end of
10 said standpipe; a horizontal pipe at the

other; and means extending through the bore of said T-shaped members and said header and horizontal pipe for locking them all together.

Signed by me at 4 Post Office Sq., Boston, 15 Mass., this 8th day of April, 1910.

WILLIAM H. RICKER.

Witnesses:

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