

No. 778,498.

PATENTED DEC. 27, 1904.

H. J. MARKS & C. F. DAVENPORT.

STEAM BOILER.

APPLICATION FILED NOV. 22, 1902.

Fig. 2

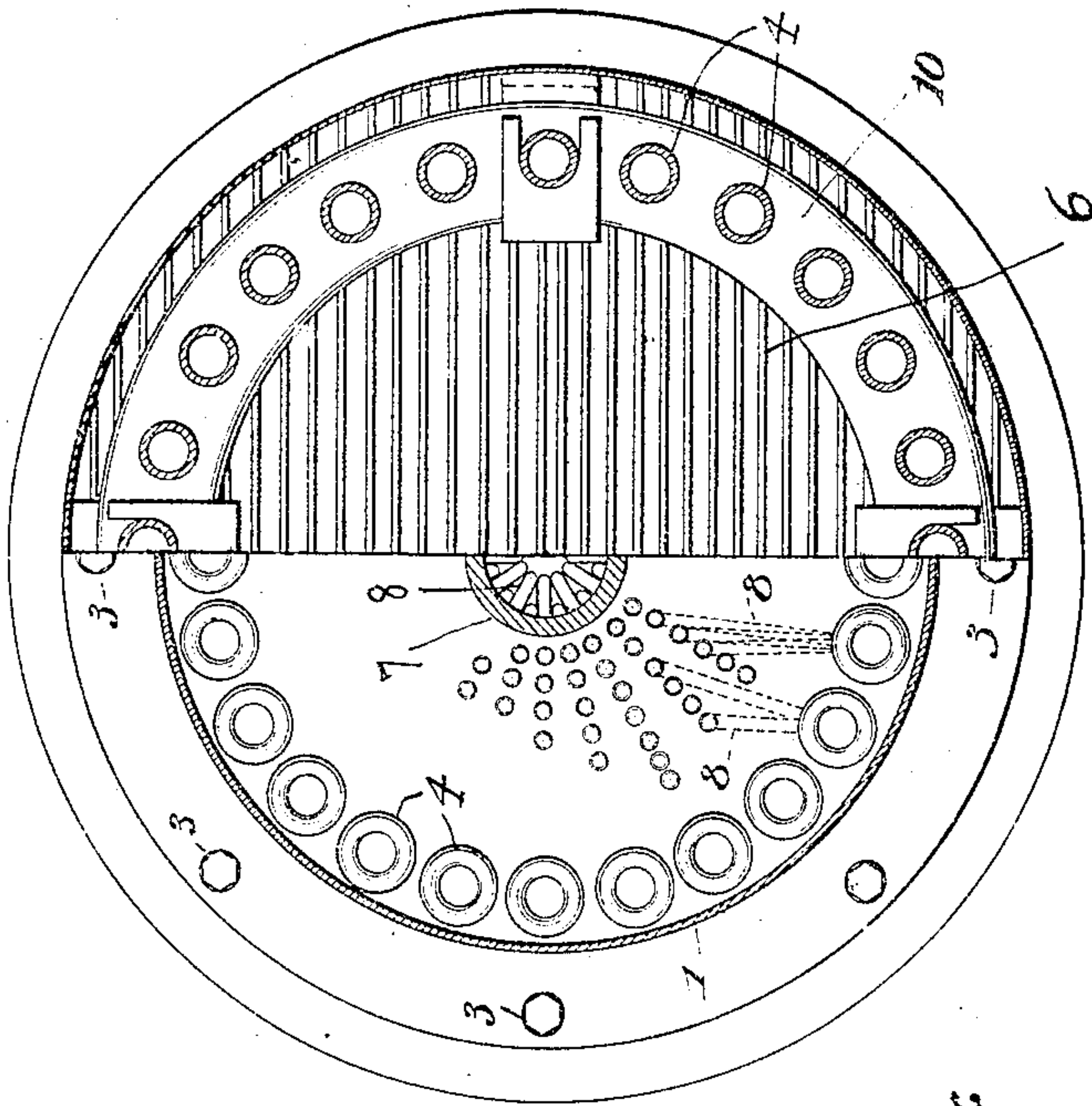
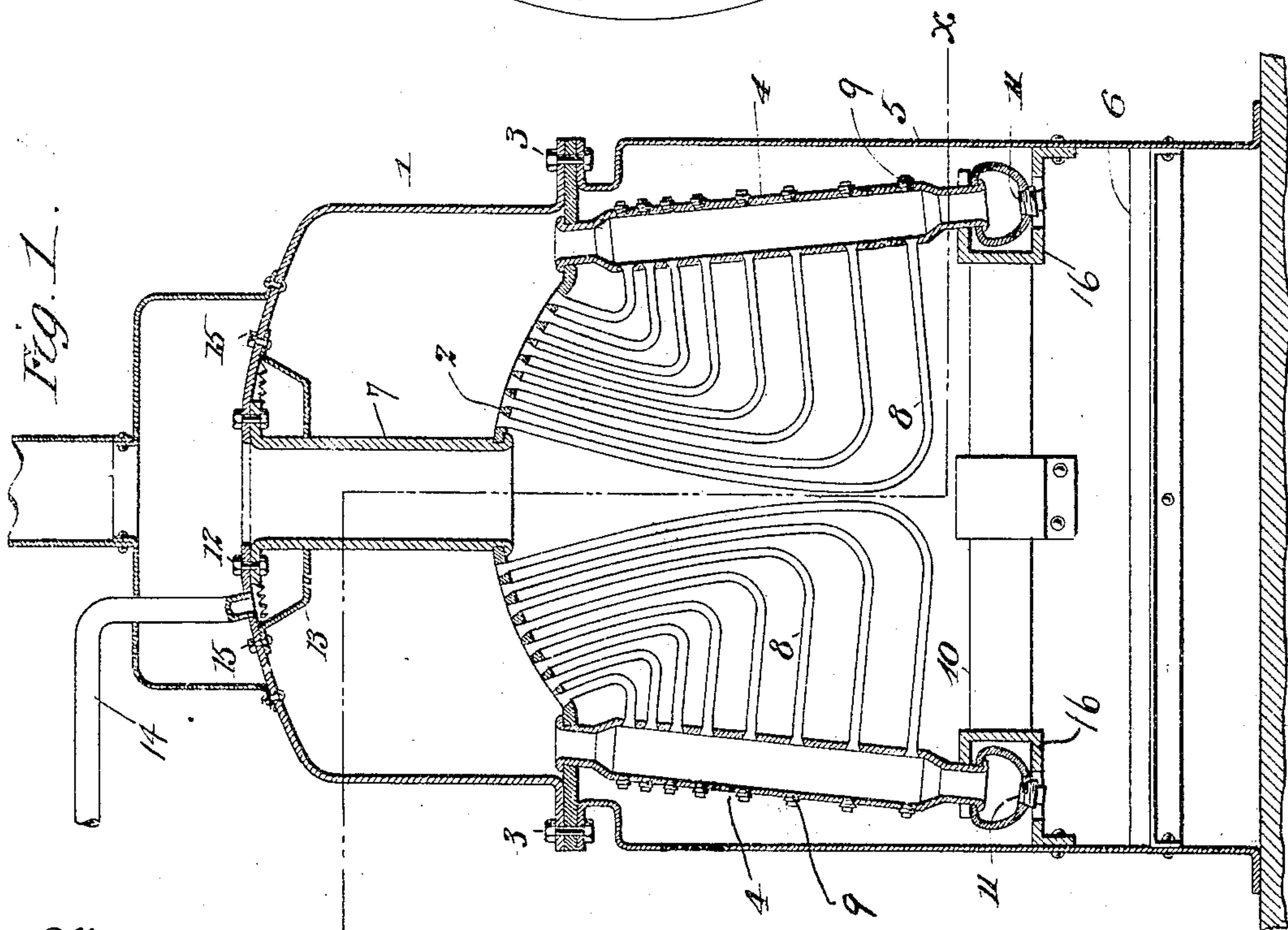


Fig. 1



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UNITED STATES PATENT OFFICE.

HARRY J. MARKS AND CHARLES F. DAVENPORT, OF NEW YORK, N. Y.,
ASSIGNORS TO EMPIRE STATE ENGINEERING COMPANY, A CORPORATION OF NEW YORK.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 778,498, dated December 27, 1904.

Application filed November 22, 1902. Serial No. 132,371.

To all whom it may concern:

Be it known that we, HARRY J. MARKS and CHARLES F. DAVENPORT, citizens of the United States, residing at New York city, New York, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a full, clear, and exact description.

Our invention relates to improvements in steam-boilers, particularly those adapted for use on automobiles; and our object is to improve and simplify the construction of the same.

Our invention will be defined in the claims. In the drawings showing the preferred embodiment of our invention, Figure 1 is a central vertical section, and Fig. 2 is a plan view in section on line *x x* of Fig. 1.

In the drawings, 1 is a shell for containing the water which is to be converted into steam, and 2 is a crown-sheet at the lower part, preferably forming the bottom of said shell. This crown-sheet is preferably formed convex toward the inside of the shell. The shell and crown-sheet may both be flanged, as shown, and bolts 3 may pass through these flanges, so that the shell may be readily removed from the crown-sheet for the purpose of cleaning or repairing the water-tubes, as will be hereinafter explained.

4 4 are legs formed by tubes opening into and upset or expanded in the crown-sheet and preferably set therein in a circle and slightly sloped outward. They may thus serve as supports for the boiler and give great rigidity and strength to the construction. An outer shell 5 may surround the tubes 4.

6 is a source of heat, such as a fire, and 7 is a passage for the heat extending through the crown-sheet and water-containing shell 1 for conducting away the products of combustion. The space inside shell 5 and below the crown-sheet thus forms a heat-chamber.

8 8 are water-tubes located in the heat-chamber and at one end opening into and expanded or upset in the legs 4 one above the other and at the other end opening into and similarly fastened in the crown-sheet. These pipes or tubes are preferably staggered in

their arrangement on any one tube 4, as shown in Fig. 2, so that the heat will pass between them and contact with them more efficiently than if they were all located in the same vertical plane. The tubes 8 thus form water-passages between the legs and the water-containing shell 1, and both ends of these tubes will be covered with water unless the water is practically all exhausted from the boiler. This prevents unequal expansion of the ends of the water-tubes, which unequal expansion is a defect in boilers in which the water-tubes have one end normally above the water, as in such boilers the exposed ends of the tubes often become loose.

9 9 are screw-plugs in legs 4, opposite the ends of the tubes, which plugs may be removed in order to upset the ends of the tubes or to clean the tubes. We prefer to also provide a hollow ring 10, in which the lower ends of the legs 4 are upset, and 11 represents removable portions, such as screw-plugs, in this ring below the ends of the legs.

12 represents bolts fastening the pipe or passage 7 to the shell 1.

If one of the tubes 8 or legs 4 should become defective or broken, the shell may be removed and the defective tube or leg plugged up at one end and one of the plugs 11 also removed, so that the leg 4 may be plugged up at its lower end, thus cutting off that leg and its tube, or a single tube 8 may be cut off by plugging its upper end and also plugging its lower end through the hole in which is located the screw-plug 9, which is opposite that tube.

13 is a baffle-plate, serrated at the upper edge, over which the steam may pass and strike the pipe 7, which will superheat the steam before it passes out of the steam-supply pipe 14.

The construction shown thus provides a boiler which is strong, simple in construction, and in which defective water-pipes may easily be cut off from operation or repaired without the necessity of shutting down the entire boiler.

We are aware that many variations from the embodiments shown may be made with-

out departing from the spirit of our invention as claimed, and we therefore do not limit ourselves to the construction illustrated and described.

5 What we claim is—

1. In a steam-boiler in combination, a water-containing shell having a crown-sheet at the bottom of the same, a heat-chamber below the same, a stack running from said heat-chamber upward through said shell, a plurality of separate water-legs arranged around said stack and opening into said crown-sheet at a distance from said stack and extending downwardly in said heat-chamber, each of said water-legs having a plurality of smaller water-tubes tapped at one end into said leg one above another and running upwardly in said chamber and opening into said crown-sheet between said leg and stack, said water-shell being removably fastened to said crown-sheet.

2. In a steam-boiler in combination, a water-containing shell having a crown-sheet at the bottom of the same, a heat-chamber below the same, a stack running from said heat-chamber upward through said shell, a plurality of separate water-legs arranged around said stack and opening into said crown-sheet at a distance from said stack and extending downwardly in said heat-chamber, each of said water-legs having a plurality of smaller water-tubes tapped at one end into said leg one above another and running upwardly in said chamber and opening into said crown-sheet between said leg and stack, and a hollow water-ring connecting the bottoms of said water-legs.

3. In a boiler in combination, a water-containing shell and a crown-sheet at the lower part of said shell above which the water normally stands, a heat-chamber below said crown-sheet, a plurality of water-legs depending from and opening into said shell, and a plurality of tubes located in said heat-chamber and opening into said legs above each other and staggered, the other ends of said tubes opening into said crown-sheet and serving as water-passages between said legs and water-shell.

4. In a boiler in combination, a water-shell having a crown-sheet at the bottom of the same, said water-shell being provided with an outwardly-extending flange running around the same and resting on said crown-sheet, and removable means for fastening said flange to said crown-sheet, a heat-chamber below said crown-sheet, a stack running from said heat-chamber upwardly through said crown-sheet

and water-shell and having a flange at its upper portion abutting against the under side of said shell, and removable means for attaching the same together, a plurality of separate water-legs arranged around said stack at a distance therefrom and at one end opening through said crown-sheet and extending downwardly in said heat-chamber and at their lower ends opening into a water-ring, each of said water-legs being provided with a plurality of smaller tubes opening at one end into said leg one above the other and extending toward the center of said heat-chamber and curving upwardly and opening through said crown-sheet between said leg and stack.

5. In a steam-boiler in combination, a water-containing shell having a crown-sheet at the bottom of the same, a heat-chamber below the same, a stack running from said heat-chamber upward through said shell, a plurality of separate water-legs arranged around said stack and opening into said crown-sheet at a distance from said stack and extending downwardly in said heat-chamber, each of said water-legs having a plurality of smaller water-tubes tapped at one end into said leg one above another and running upwardly in said chamber and opening into said crown-sheet between said leg and stack, and a hollow water-ring connecting the bottoms of said water-legs, said legs constituting the sole communication between said shell and ring.

6. In a steam-boiler in combination, a water-containing shell having a convex crown-sheet, a heat-chamber below the same, a stack running from said heat-chamber upward through said shell, a plurality of separate water-legs arranged around said stack and opening into said crown-sheet at a distance from said stack and extending downwardly in said heat-chamber, each of said water-legs having a plurality of smaller water-tubes tapped at one end into said leg one above another and running upwardly in said chamber and opening into said crown-sheet between said leg and stack, the lower ones of said smaller tubes being tapped into said crown-sheet nearer said stack than the tubes above them, and a hollow water-ring connecting the bottoms of said water-legs.

Signed at New York, N. Y., this 15th day of November, 1902.

HARRY J. MARKS.
CHARLES F. DAVENPORT.

Witnesses:

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F. A. SHAW.