

No. 754,360.

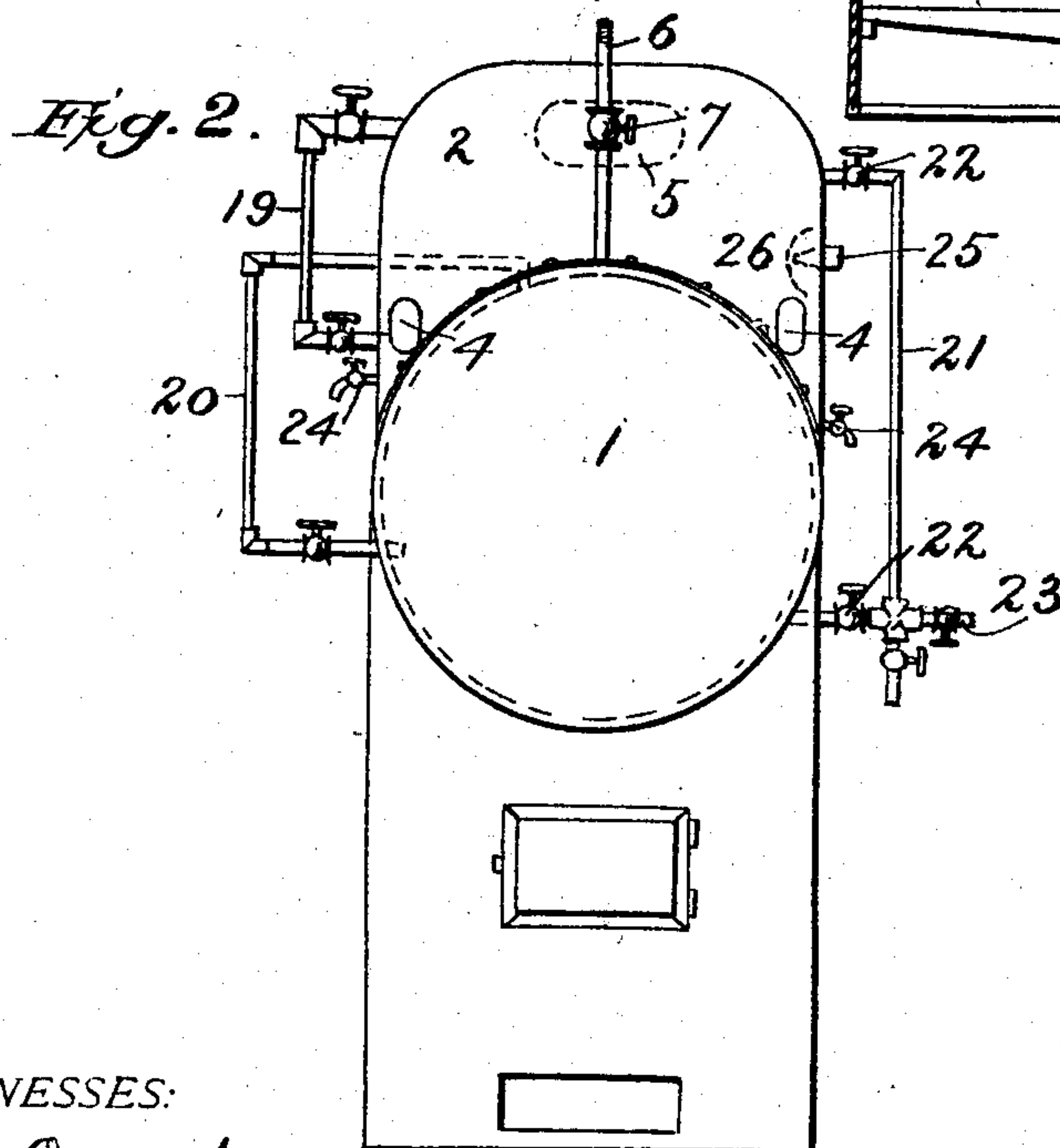
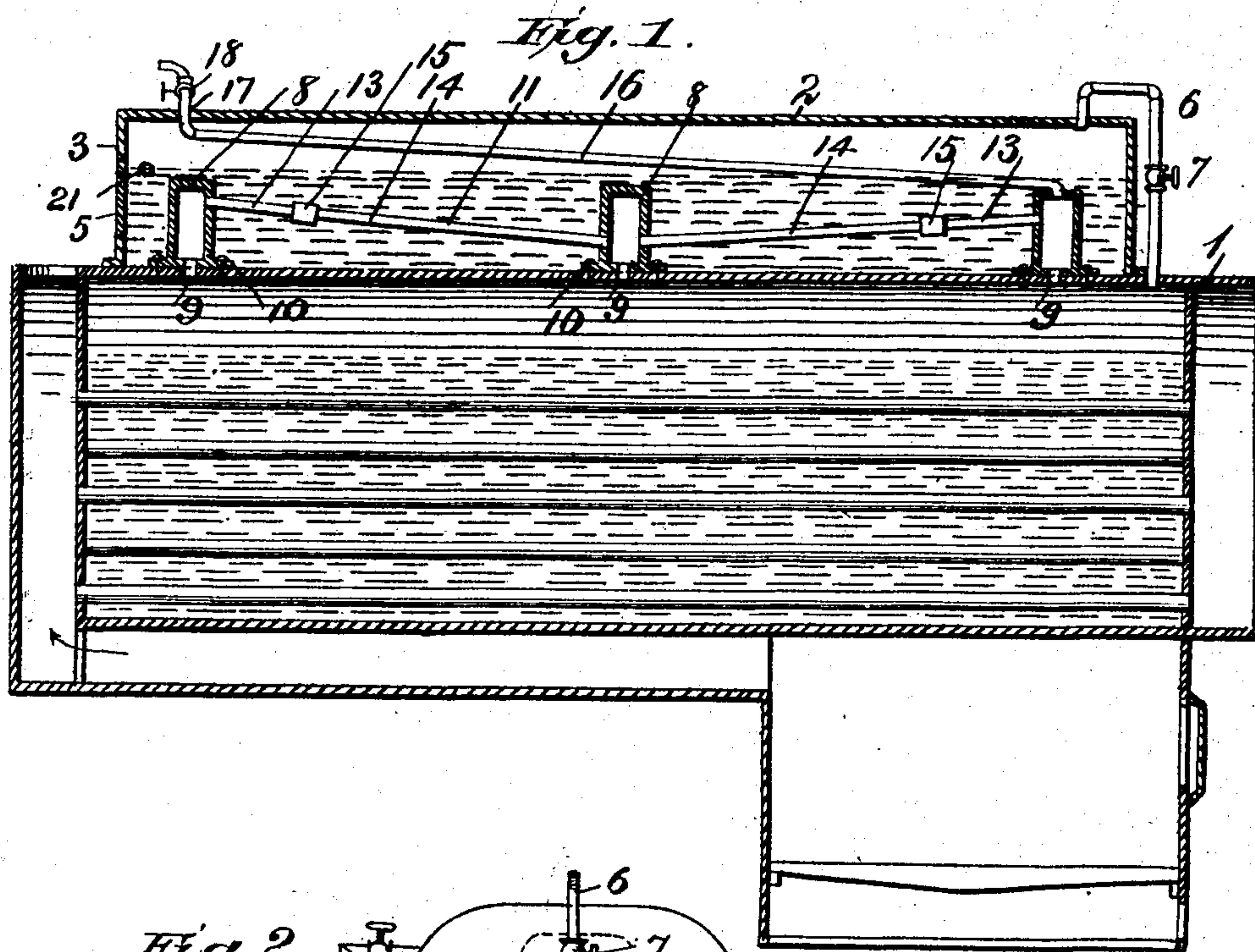
PATENTED MAR. 8, 1904.

J. WEHRLE.  
STEAM BOILER.

APPLICATION FILED DEC. 5, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:  
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2 SHEETS—SHEET 2.

Fig. 3

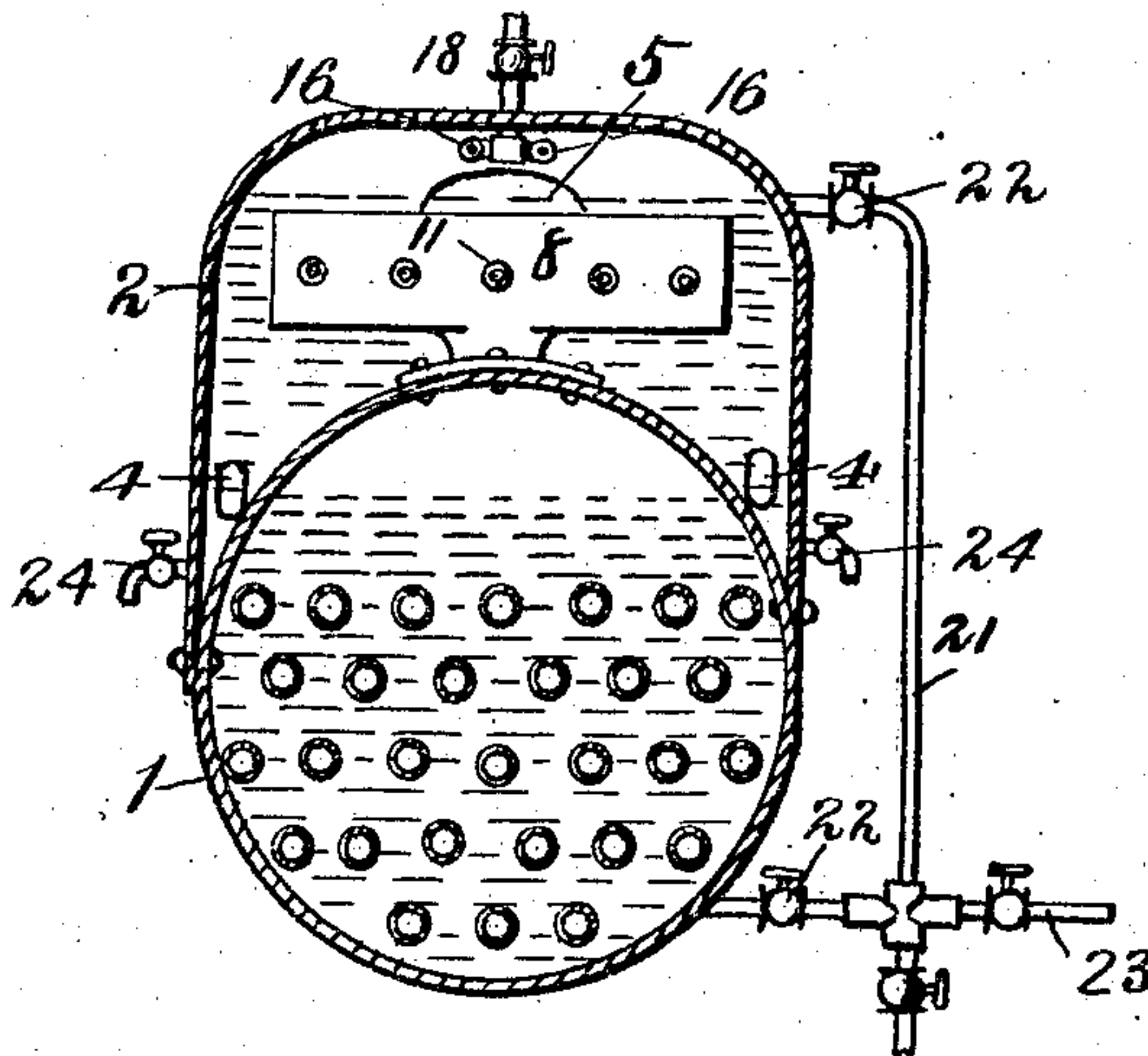


Fig. 4.

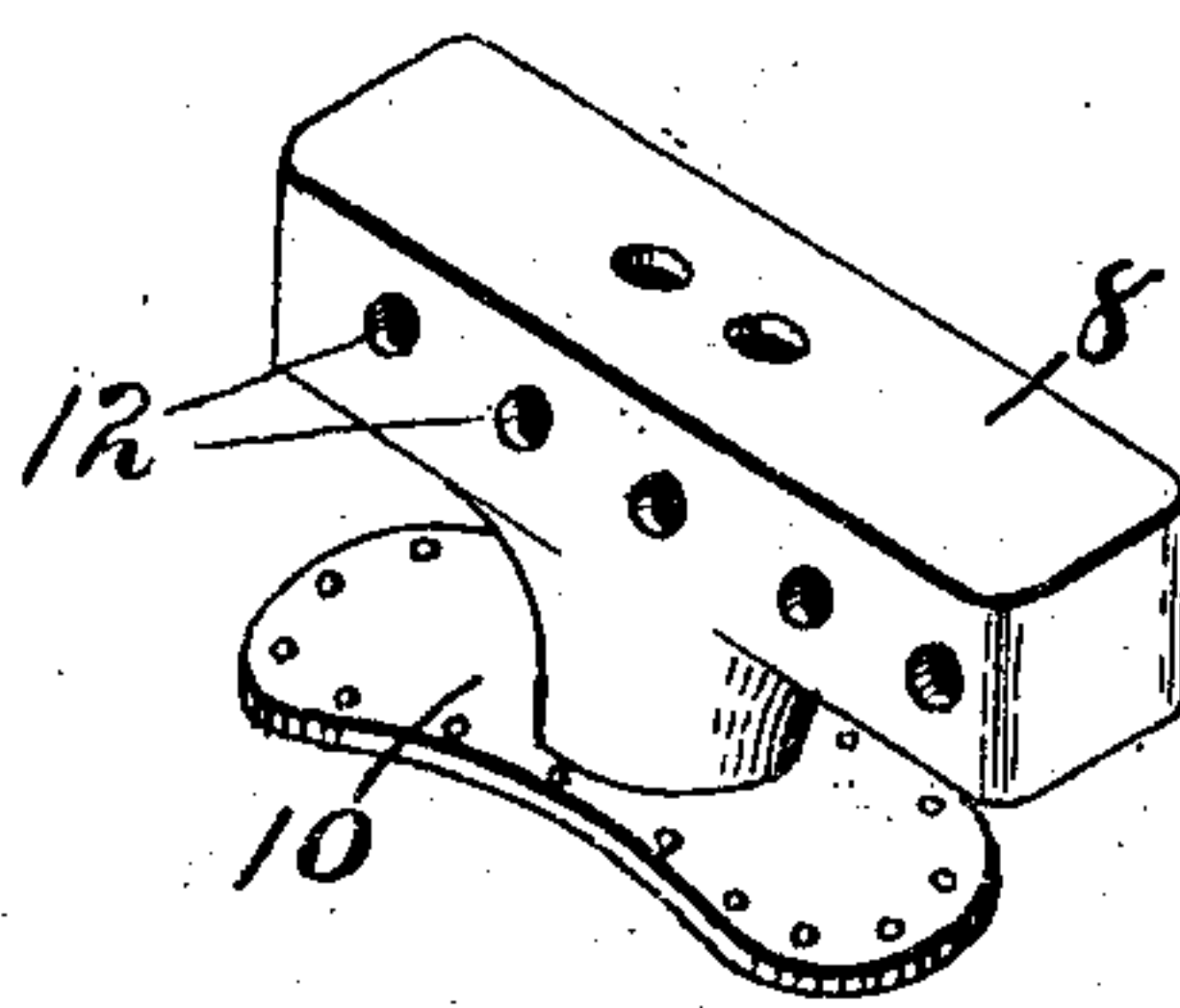
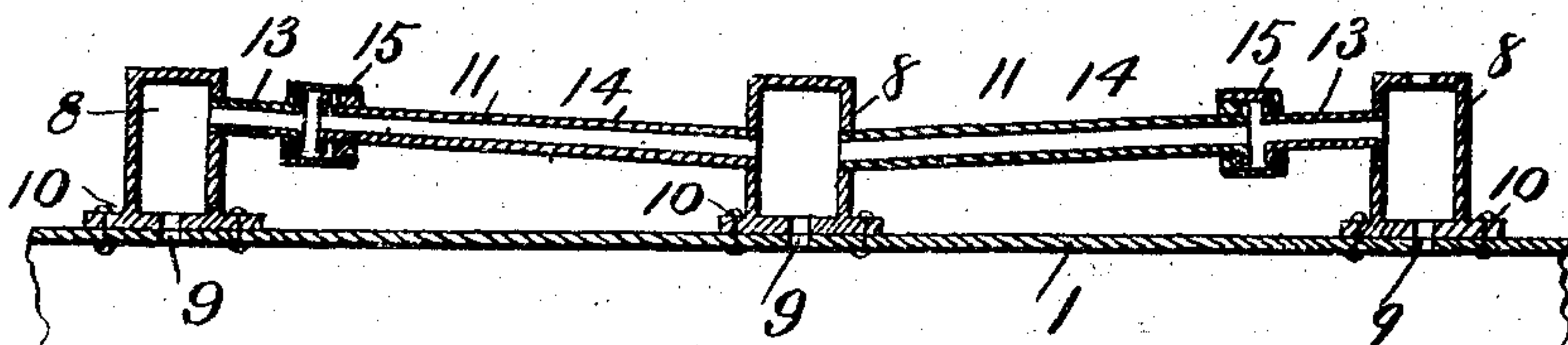


Fig. 5.

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# UNITED STATES PATENT OFFICE.

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## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 754,360, dated March 8, 1904.

Application filed December 5, 1903. Serial No. 183,866. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH WEHRLE, a citizen of the United States, residing at Wampum, in the county of Lancaster and State of Pennsylvania, have invented new and useful Improvements in Steam-Boilers, of which the following is a specification.

This invention relates to steam-boilers, and has for its object to provide a means whereby the water may be heated and purified expeditiously and the steam delivered for use substantially in a highly-heated condition.

With these and further objects in view the invention virtually consists of certain attachments which can be secured to or connected with an ordinary boiler, or they may be formed therewith when the boiler is originally constructed.

Although I have shown what I consider the most desirable form for embodying my invention, yet it will be apparent that changes and alterations may be made therein, and I do not wish to be understood as limiting my claims to the particular construction shown and described.

In the accompanying drawings, in which the same reference-numerals indicate corresponding parts in each of the views in which they occur, Figure 1 is a longitudinal sectional view of a horizontal boiler provided with an attachment embodying my invention. Fig. 2 is an end elevation of the same. Fig. 3 is a transverse sectional view through the boiler. Fig. 4 is a longitudinal sectional view showing one means of connecting two of said parts together. Fig. 5 is a detail view of one of the parts.

Referring more particularly to the drawings, 1 indicates the boiler, which may be of any shape, size, or dimensions, to which the attachment embodying my invention is secured. One portion of the attachment comprises a shell 2, which is preferably secured at its ends and edges to the boiler 1 in a water-tight manner, as by ordinary rivets. In the drawings the shell is substantially semi-cylindrical in cross-section and secured at its edges substantially midway along the center of the boiler and is provided with two heads

3, which are substantially crescent-shaped and provided with hand-holes 4 near their points, and one of them is preferably provided with an ordinary manhole 5. The shell 2 may be of any suitable length, preferably less than the boiler to which it is attached, and the upper part of it forms a steam space or dome which communicates with the steam-space of the boiler through the pipe 6, the valve 7 being provided for controlling said communication as may be desired.

Located upon the top of the boiler within the shell 2 is a series of projections, as hollow saddles or legs 8, each of which is secured to the top of the boiler around the opening 9 therein, as by means of the flange 10. Extending between these saddles and forming a communication therebetween is a series of tubes or pipes 11. These tubes are preferably inclined, and in the drawings I have shown three saddles, with the inner ends of the tubes or those communicating with the middle saddle lower than the outer ends. The saddles are preferably made substantially T-shaped, with the stem hollow and communicating with the opening 9 and the upper portion or head provided with horizontally-arranged openings 12, within which the ends of the tubes 11 are secured in any suitable manner. In Fig. 4 I have shown one means for attaching the tubes, in which each tube is formed of two sections 13 and 14, which are joined together by a union 15 after the ends have been screwed into or otherwise secured in the opening 12.

Leading from one of the saddles, preferably the end one, is one or more steam-pipes 16, which project through the shell, as at 17, from which steam is delivered wherever desired, a valve 18 being located in a convenient position for controlling said outlet. Where two pipes are used, they can be joined together by the ordinary T-coupling before or after projecting through the shell.

As my attachment when secured in position virtually forms a double-compartment boiler, each compartment being provided with a water-space and a steam-space, it is desirable to provide two steam and water gages 19 and 20. The feed-water pipe 21 may be arranged



to supply either compartment with water and also be utilized for feeding the water from the upper compartment into the lower compartment or boiler proper, suitable valves 22 being arranged for closing said pipes and also for closing the water-supply pipe 23. Blow-off pipes or mud-valves 24 are located near the bottom of the shell or close to the point where its edges are secured to the sides of the boiler.

In operating a boiler constructed in accordance with my invention the desired amount of water is fed to the two compartments through the supply-pipe, after which the valves are arranged to open communication between the two compartments and close it with the supply-pipe. As steam is generated in the lower boiler it enters the saddles and the communicating pipes, thereby heating the water in the upper compartment, and it also passes through the valved pipe up into the upper portion of the upper compartment. As the water in the lower compartment is evaporated a fresh supply is fed in from the upper compartment through the overflow-pipe 21, which preferably communicates with the shell a slight distance below the steam-gage 19 and at a point above the tops of the saddles, whereby the saddles and their communicating pipes are always submerged under water, and the feed-water is drawn off from the top, whereby the hottest water is always delivered to the boiler. The water for the upper compartment after the boiler has been put in operation is supplied by any ordinary means, as a pipe 25, over the inner end of which a deflector 26, as a strainer, is located, which will prevent the cold water coming in contact with the heated pipes too directly or in too great a volume. As a portion of the steam within the pipes and saddles will be condensed by reason of the cold water in the upper compartment, the inclination of the pipes will cause any water from the condensation to immediately return to the boiler through the hollow leg, to which the lower end of the inclined pipes are connected. As the communication between the saddles and the steam-space of the boiler is direct, live steam occupies the legs and pipes, and thereby heats the water to a very high temperature—almost to the steam-point—before the water is delivered from the upper water-compartment to the water-compartment of the boiler. In this manner the steam from the boiler is utilized to the greatest efficiency for heating the water, and at the same time any sediment or foreign substance that is contained within the water that is fed into the upper compartment is caused to settle or be deposited before it is delivered to the boiler, thereby securing substantially pure water for the boiler and avoiding incrustation or other damage to the boiler proper and its tubes or flues. Most of the sediment is deposited in the long narrow spaces formed between the edges of the shell

and the sides of the boiler, from whence it is easily removed through the hand-holes 4. The portion of steam that is not condensed in thus heating the feed-water passes through the inclined pipes 16 and is delivered for use in any ordinary manner. As the pipes 16 are located within the steam-space of the upper compartment and preferably extend substantially the entire length of the shell or upper compartment and as this space is occupied by the live steam from the boiler which enters through the pipe 6, it is evident that the steam which passes through said pipes is subjected to the high temperature of the live steam and is thereby delivered for use in a highly-heated condition. Any sediment that is deposited from the feed-water before it is delivered to the boiler settles upon the top of the boiler and gradually finds its way down the sides into the narrow space formed between the edges of the boiler and the shell, from which it can be removed in any desired manner through the hand-holes 4, and when it is desired to more thoroughly cleanse the entire compartment or to repair the pipes or for any other purpose entrance may be had to the upper compartment through the manhole 5, and by means of the valve in the pipe 6 communication may be shut off between the upper and lower compartments, and the steam from the boiler can pass through the saddles and pipes and be delivered for use, while entrance may be had to the upper compartment for temporary repairs, thereby preventing the necessity of closing down the boiler for such work, or the feed-water may be temporarily shut off from the upper compartment and be delivered direct to the boiler in the ordinary manner, thereby permitting of the boiler being operated for a short while without utilizing the upper compartment as a water-heater.

From the foregoing it is evident that by means of my attachment the steam from the boiler is utilized in a very efficient manner both for heating the feed-water and also the steam before it is delivered for use, and at the same time the feed-water is purified before entering the boiler.

By arranging my attachments at the top of the boiler they are readily and cheaply secured in position, and access is easily had to either compartment at any time. In order to secure my attachment in position either at the time the boiler is constructed or subsequently, all that is necessary is to provide the openings in the upper part to register with the saddles and to form the necessary holes for the pipes and gages.

Having thus described my invention, I claim—

1. In combination, a double-compartment boiler, each compartment being provided with a water-space and a steam-space and a projection from the steam-space of one of the compartments extending through both spaces and



beyond the same of the other compartment, and means for establishing communication between the steam-spaces of the two compartments.

2. In combination, a double-compartment boiler, each compartment being provided with a water-space and a steam-space, means for passing the steam from one of the compartments through the water-space and then through and out of the steam-space of the other compartment, and means for establishing communication between the steam-spaces of the two compartments.

3. In a steam-boiler, two compartments, one of which is a feed-water compartment, a pipe from the boiler-compartment to form a conduit for the passage of steam from the boiler-compartment through the feed-water compartment, and means for heating said steam after said passage.

4. In a steam-boiler, two compartments, one of which is a feed-water compartment, an inclined pipe from the boiler through the feed-water compartment to form a conduit for passing a portion of the steam from the boiler-compartment through the feed-water, and means for subjecting said portion of the steam to the action of other steam from the boiler after said passage.

5. In a steam-boiler, a boiler, a shell secured thereto forming a space, hollow portions from the boiler in said space, a pipe leading from one of said portions to the top of the shell, means for keeping said space partly filled with water, and means for establishing communication between said space and the steam-space and the water-space respectively, of the boiler.

6. In a steam-boiler, a boiler, a shell secured thereto forming a space, intercommunicating, hollow saddles in said space communicating with the live-steam space of the boiler, a pipe leading from one of said saddles to the top of the shell, means for keeping said space filled with water above the tops of said saddles, and means for establishing communication between said space and the steam-space and the water-space respectively of the boiler.

7. In a steam-boiler, a boiler, a shell secured thereto forming a space, hollow saddles in said space communicating with the steam-space of the boiler, inclined pipes connecting said saddles, a pipe leading from the top of one of the saddles to the top of the shell, means for keeping water above the tops of said saddles, and means for establishing communication be-

tween said space and the steam-space and the water-space respectively, of the boiler.

8. In a steam-boiler, a boiler, a shell secured thereto, forming a space, three hollow saddles in said space communicating with the steam-space of the boiler, inclined pipes connecting said saddles, the ends of the pipes at the middle saddle being lower than at the end saddles, a pipe leading from one of the end saddles to the top of the shell, means for keeping water above the tops of said saddles, and means for establishing communication between said space and the steam-space and the water-space respectively, of the boiler.

9. In a steam-boiler, a boiler, a shell secured thereto forming a space, communicating projections from the boiler in said space, an inclined pipe extending from the projection at one end of the boiler to the opposite end of the shell, means for keeping said projections covered with water, and means for enveloping said pipe with live steam from the boiler.

10. In a steam-boiler, a boiler, a shell secured thereto forming a space, a steam-gage for the space and for the boiler respectively, an overflow-pipe leading from the space at a point below the steam-gage thereof to the boiler, intercommunicating hollow projections from the boiler into said space, the tops of which are each below the outlet of the overflow-pipe, a pipe leading from one of said projections to the top of the shell, and means for establishing communication between the upper portion of said space and the steam-space of the boiler.

11. In a steam-boiler, a boiler, a semicylindrical shell secured at its side edges thereto forming thereby a space above the boiler with a long, narrow space along each side, a crescent-shaped end piece at each end of the shell, the points of which are each provided with a hand-hole, a manhole in one of the end pieces, a conduit leading from the top of the boiler to and through the top of the shell, means for keeping said space above the boiler partly filled with water, and means for establishing communication between said water-space and the boiler.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH WEHRLE.

Witnesses:

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