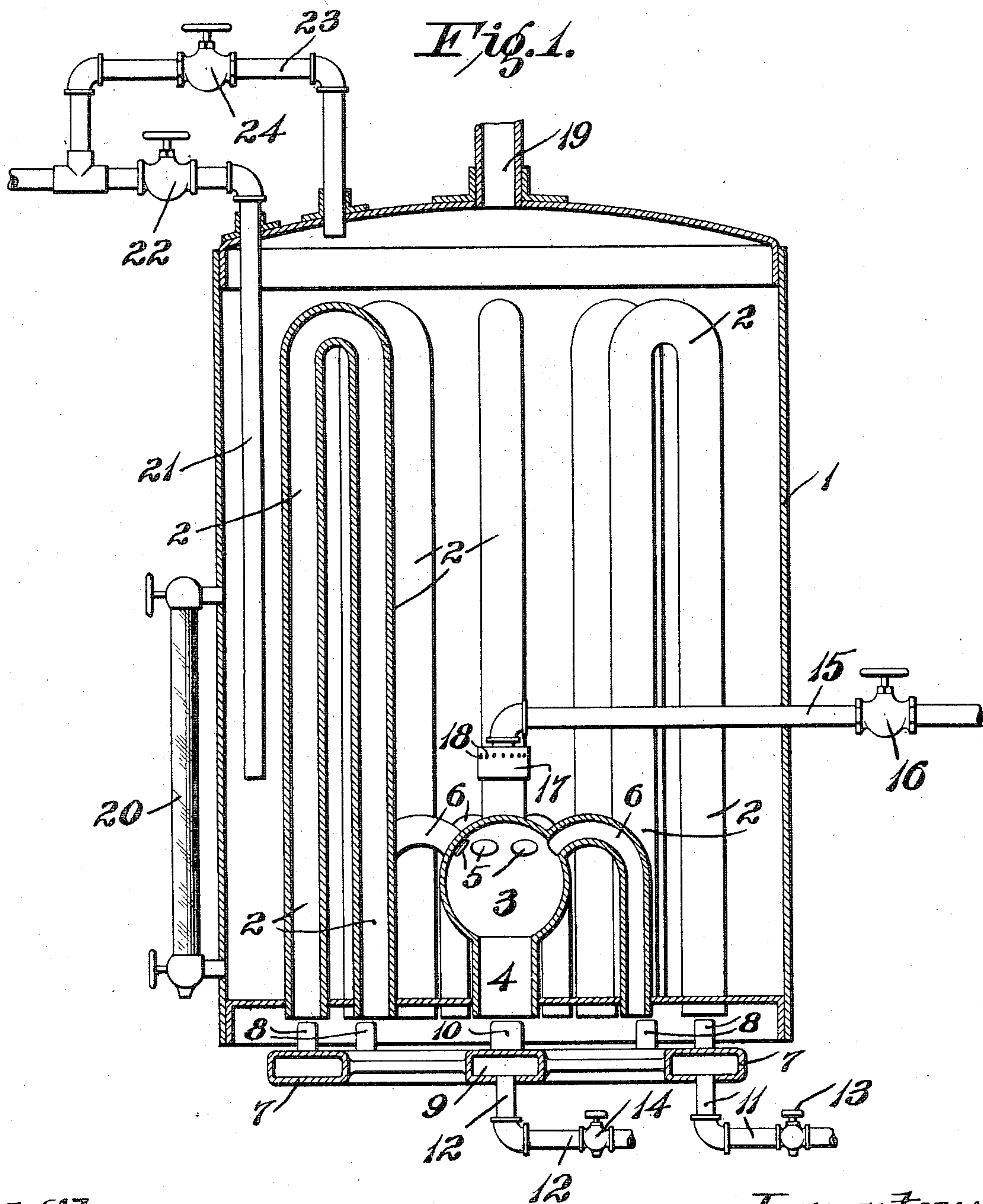


A. WALLERSTEIN.  
STEAM GENERATOR.  
APPLICATION FILED JUNE 24, 1910.

994,805.

Patented June 13, 1911.

2 SHEETS—SHEET 1.



*Witnesses:*

*Edgar T. Farmer.*

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*Inventor:*

*A. Wallerstein,*  
*By* *Carroll & Co.*  
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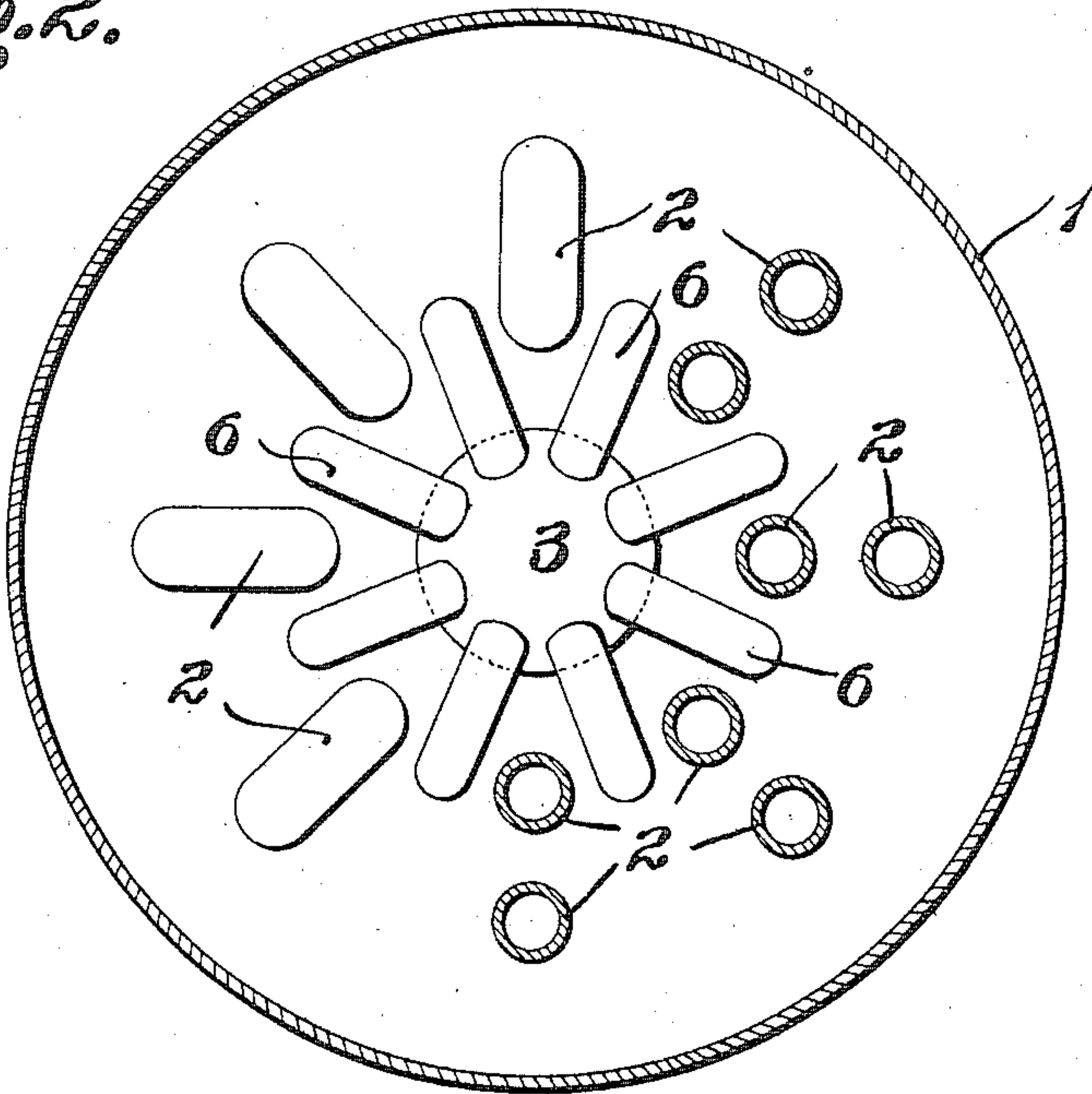
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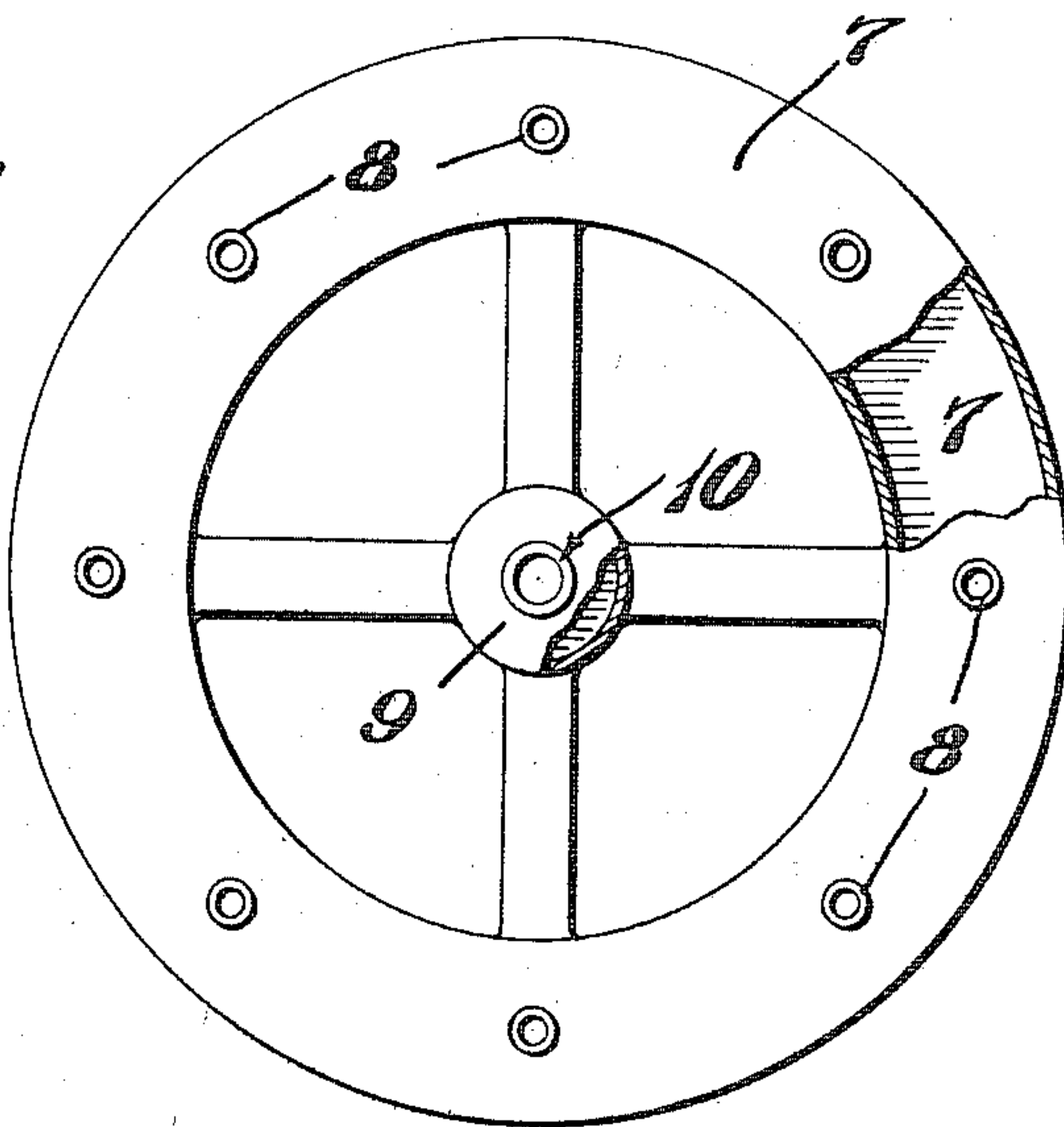
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2 SHEETS—SHEET 2.

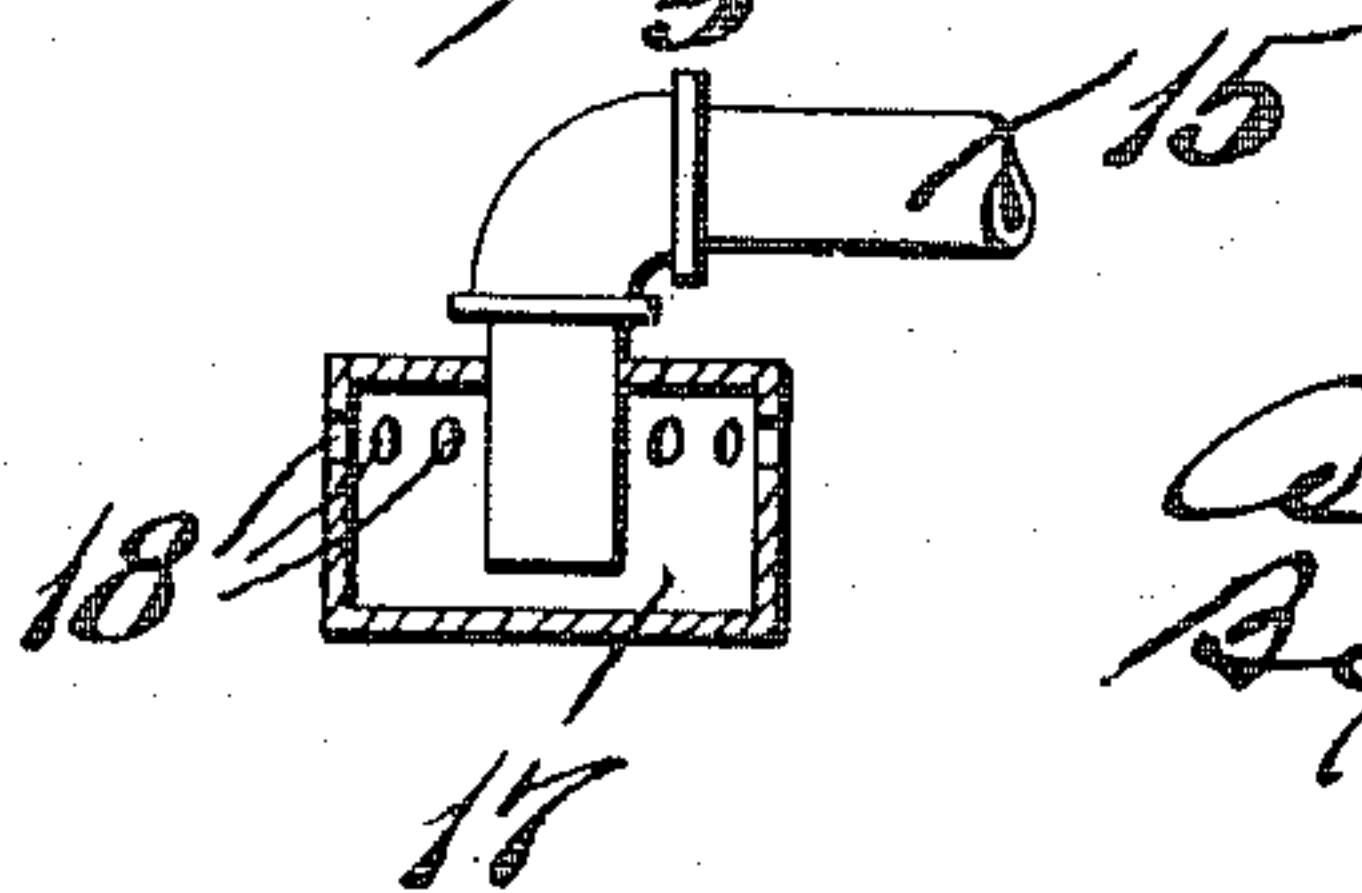
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



Witnesses

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# UNITED STATES PATENT OFFICE.

ABRAHAM WALLERSTEIN, OF ST. LOUIS, MISSOURI.

## STEAM-GENERATOR.

994,805.

Specification of Letters Patent. Patented June 13, 1911.

Application filed June 24, 1910. Serial No. 568,615.

*To all whom it may concern:*

Be it known that I, ABRAHAM WALLERSTEIN, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a new and useful Improvement in Steam-Generators, of which the following is a specification.

This invention relates to steam generators and it has for its principal objects to produce a simple and efficient generator which can be used either as a boiler or a "flasher" or instantaneous generator, to superheat the steam, to secure a maximum of efficiency with a minimum of fuel, and to attain certain advantages hereinafter more fully appearing.

The invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawings which form part of this specification and wherein like symbols refer to like parts wherever they occur, Figure 1 is a vertical section through the steam generator embodying my invention; Fig. 2 is a horizontal section through the generator tank, certain of the heating elements being shown in top plan and others in horizontal section; Fig. 3 is a plan view partly in section, showing the fuel burner; and Fig. 4 is a fragmentary view of the inner end portion of the water supply pipe and drip receptacle which is associated therewith.

In the drawings, the generator is illustrated as comprising a tank or casing 1 which may be of any desirable construction, but preferably cylindrical, as shown. Within the tank is arranged a multiplicity of inverted U-shape tubular flues 2. These tubes are preferably arranged in annular series with their respective legs in radial planes with respect to the center of the tank. The opposite ends of the tubes 2 project through and are fitted tightly in perforations in the bottom of the tank; and said tubes extend upwardly nearly to the top of the tank.

In the central lower portion of the tank is located a hollow globular member 3. This hollow globular member 3 has a downwardly extending tubular portion 4 which is fitted tightly in a perforation in the center of the bottom of the tank. The member 3 is provided with a horizontal annular series of perforations 5 in its top portion which communicate respectively with a series of

radially disposed tubes 6 whose outer end portions are turned downwardly and fitted tightly in perforations in the bottom of the tank.

A fuel burner is located beneath the bottom of the tank. This fuel burner preferably comprises an annular tubular portion 7 which is provided with a series of jet nozzles or burners 8. There is one burner for each of the outer legs of the inverted U-shape tubes 2. In the center of the burner is a chamber 9 which is provided with a nozzle or burner 10 so that its flame is directed into the tubular extension 4 of the hollow globular member 3. Separate supply pipes 11, 12, are respectively provided for the burner ring 7 and central chamber 9. These supply pipes are controlled respectively by valves 13, 14. While the burners 8 are preferably arranged to direct the heated products of combustion into the outer legs of the looped tubes 2, obviously, however, the burners may be arranged to direct the products of combustion into the inner legs of the tubes. So, too, instead of having a single central burner 10 arranged to discharge into the tube 4, it is obvious that an annular series of burners could be arranged to direct the products of combustion into the tubes 6. However, it is preferable to arrange the tubes and burners as shown in the drawings.

Extending into the tank 1 is a water supply pipe 15 which is controlled by a valve 16 or any other suitable controlling device. The inner end portion of this pipe 15 is turned downwardly above the member 3 in line with the vertical axis thereof. Mounted on the downturned end of the pipe 15 is a receptacle or cup 17. This receptacle is provided with an annular series of perforations 18 near its upper edge so that the water which enters the receptacle overflows through the perforations and dribbles or trickles onto the globular member 3. Preferably, the downturned end of the pipe 15 extends nearly to the bottom of the receptacle 17 so that in case the feed water which is conducted through the pipe 15 is not previously heated before it enters the tank, it will become heated in the receptacle 17 before it is discharged from the latter, due to the fact that the water is discharged into the body of water already in the receptacle 17 below the overflow openings therein.

When it is desired to use the generator as a "flasher," the valve 16 in the supply



pipe 15 is adjusted so that the water flows slowly into the tank and trickles or dribbles drop by drop, as the case may be, onto the globular member 3 which is heated by the burner 10. The water is thus instantly converted into steam which is preferably conducted from the generator through a pipe 19 opening into the top thereof.

When it is desired to superheat the steam in the tank 1, the burners 8 are lighted and the heated products of combustion pass upwardly through the outer legs of the inverted U-shape tubes 2 and down the inner legs thereof, thereby heating the tubes and superheating the steam in the upper portion of the tank. The products of combustion from the burner 10 which heats the globular member 3 are conducted off through the downturned tubes 6. In some cases, when the generator is used as a "flasher," it is unnecessary to heat the flues or tubes 2, so the member 3 and its outlet flues 6 are alone heated.

When it is desired to use the generator as a steam boiler, the water is filled into the bottom portion of the tank 1 preferably to a level with the drip cup or receptacle 17, and the valve 16 in the water supply pipe 15 is closed. In this case, both the series of tubes or flues 2 and the member 3 and its flues 6 may be heated; or, the one or the other alone may be used, as desired.

Any suitable water gage 20 may be employed to indicate the level of the water in the tank. A pipe 21 is extended into the tank so that its lower end is located at the desired water level; and said pipe may be connected to a suitable water tank so that the steam pressure on top of the water will force any excess water out of the tank 1 through the pipe 21. A valve 22 is provided in the pipe 21 so that said pipe may be closed when desirable. A by-pass pipe 23 communicates with the top of the tank and is connected to the pipe 21 beyond the valve 22. This pipe 23 is provided with a valve 24 which may be opened when the valve 22 in the pipe 21 is closed, so that pressure may be conducted to the feed water supply tank to which the pipe 21 is connected. This arrangement of pipes 21, 23, and the feed water supply tank (not shown), forms no part of the present invention and is more fully set forth in Letters Patent No. 930,817 granted to me on August 10, 1909.

Obviously, my generator admits of considerable modification without departing from my invention; and, therefore, I do not wish to be limited to the specific construction and arrangement shown.

What I claim is:

1. A steam generator comprising a tank, a hollow globular member located in the lower portion of said tank and having an

opening to the outside of the tank through the bottom thereof, and an outlet flue communicating with the top portion of said hollow globular member and opening to the outside of the tank, means for directing heated products of combustion through said hollow globular member and through said outlet flue, and means for supplying water in said tank so that it drops or trickles on said hollow globular member.

2. A steam generator comprising a tank, a hollow globular member located in the lower portion of said tank and having an opening to the outside of the tank through the bottom thereof, and an outlet flue communicating with the top portion of said hollow globular member and opening to the outside of the tank, means for directing heated products of combustion through said hollow globular member and through said outlet flue, and a series of tubular flues looped into said tank and extending to the top portion thereof, the opposite ends of said looped tubular flues being open to the outside of the tank, and means for directing heated products of combustion through each of said looped tubular flues.

3. A steam generator comprising a tank, a hollow globular member located in the lower portion of said tank and having an opening to the outside of the tank through the bottom thereof, and an outlet flue communicating with the top portion of said hollow globular member and opening to the outside of the tank, means for directing heated products of combustion through said hollow globular member and through said outlet flue, a series of inverted U-shape tubular flues in said tank, said flues extending to the upper portion of the tank and having their opposite ends open to the outside of the tank through the bottom thereof, and means for directing heated products of combustion through each of said tubular flues.

4. A steam generator comprising a tank, a heating element located in the lower portion of the tank, means for heating said element, and means for supplying water into said tank, said means comprising a receptacle located centrally above said heating element, and a supply pipe arranged to discharge into said receptacle so that the water overflows from the latter onto the heating element.

5. A steam generator comprising a tank, a heating element located in the lower portion of the tank, means for heating said element, and means for supplying water into said tank, said means comprising a circular receptacle having a series of perforations in the upper portion of its side wall, a water supply pipe arranged to discharge into said receptacle so that the water overflows through the perforations in the latter onto the heating element, and means for



regulating the flow of the water through said water supply pipe.

6. A steam generator comprising a tank, a heating element located in the lower portion of the tank, means for heating said element, and means for supplying water into said tank, said means comprising a receptacle located centrally above said heating element and having a series of perforations in the upper portion of its wall or walls, and a water supply pipe arranged to discharge into the bottom portion of said receptacle so that the water overflows through the perforations in the latter onto said heating element.

7. A steam generator comprising a tank, a heating element located in the lower portion of the tank, means for heating said element, and means for supplying water into said tank, said means comprising a receptacle located centrally above said heating element and having a series of perforations in the upper portion of its wall or walls, and a water supply pipe arranged to discharge into the bottom portion of said receptacle so that the water overflows through the perforations in the latter onto said heating element, and means for regulating the flow of the water through the supply pipe so that the water may be caused to trickle or dribble from said receptacle.

8. A steam generator comprising a tank, a hollow heating element located in the lower portion of the tank and having an opening to the outside of the tank through the bottom of the latter, a series of outlet flues communicating with the upper portion of said hollow heating element and an overflow receptacle located centrally above said hollow heating element, a supply pipe extending into said tank and arranged so that its inner end discharges into said overflow receptacle, means for regulating the flow of water through said supply pipe whereby the water may be caused to trickle or dribble from said overflow receptacle onto said hollow heating element, and means for directing heated products of combustion through said hollow heating element.

9. A steam generator comprising a tank, a hollow heating element located in the lower portion of the tank and having an opening to the outside of the tank through the bottom of the latter, a series of outlet flues communicating with the upper portion of said hollow heating element and opening to the outside of the tank through the bottom of the latter, an overflow receptacle located centrally above said hollow heating element, a supply pipe extending

into said tank and arranged so that its inner end discharges into said overflow receptacle, means for regulating the flow of water through said supply pipe whereby the water may be caused to trickle or dribble from said overflow receptacle onto said hollow heating element, means for directing heated products of combustion into said hollow heating element, and an annular series of inverted U-shape tubular flues surrounding said hollow heating element, said inverted U-shape tubular flues extending to the upper portion of the tank and being open at their opposite ends to the outside of the tank through the bottom of the latter, and means for directing heated products of combustion into one leg of each of said inverted U-shape tubular flues.

10. A steam generator comprising a tank, a hollow globular member in the lower portion of said tank, said member being open at its bottom to the outside of the tank through the bottom thereof, a series of radially disposed flues communicating at their inner ends with said hollow globular member and being open at their outer ends to the outside of the tank through the bottom thereof, means for discharging water into the tank onto said hollow globular member, an annular series of inverted U-shape tubular flues surrounding said hollow globular member inside of said tank, said inverted U-shape tubular flues extending to the upper portion of said tank and being open at their opposite ends to the outside of the tank through the bottom thereof, and a fuel burner arranged so that the heated products of combustion therefrom are directed through said hollow globular member and also through each of said inverted U-shape tubular flues.

11. A steam generator comprising a tank, a hollow heating element located in the lower portion of said tank, said hollow heating element having an inlet flue and an outlet flue each of which are open to the outside of the tank, a series of tubular flues looped into said tank to the top portion thereof and each having their opposite ends open to the outside of the tank, and means for directing heated products of combustion through said hollow heating element and also through said looped tubular flues.

Signed at St. Louis, Missouri, this 20th day of June 1910.

ABRAHAM WALLERSTEIN.

Witnesses:

G. A. PENNINGTON,  
J. B. MEGOWN.