

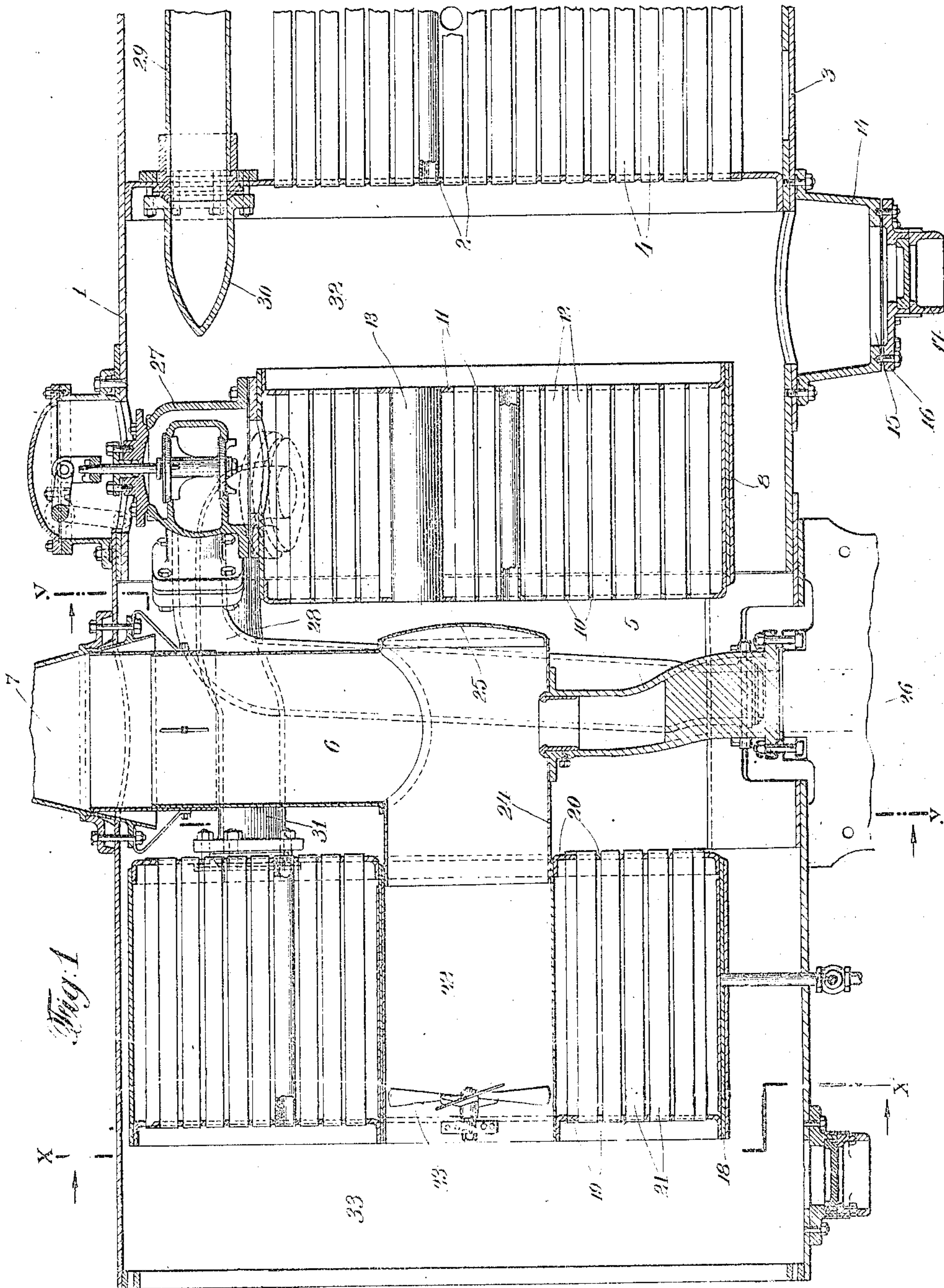
H. W. JACOBS.
SUPERHEATER.

APPLICATION FILED APR. 27, 1909.

934,729.

Patented Sept. 21, 1909.

3 SHEETS—SHEET 1.



2 Witnesses:
A. Newcomb
M. Meikle.

Inventor
Henry W. Jacobs,
By *his Attorneys*
Grindle and Bright.

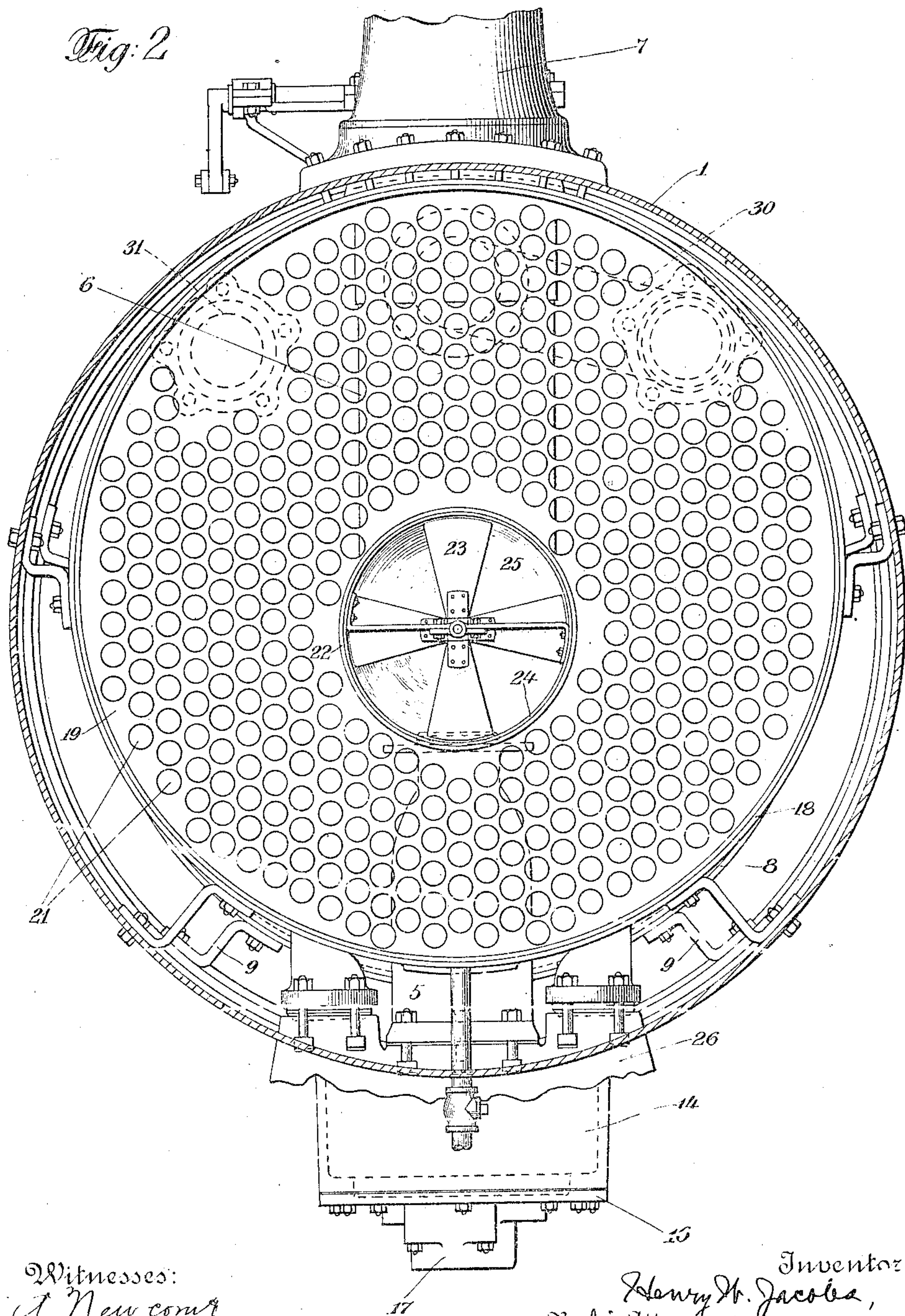
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H. W. JACOBS.

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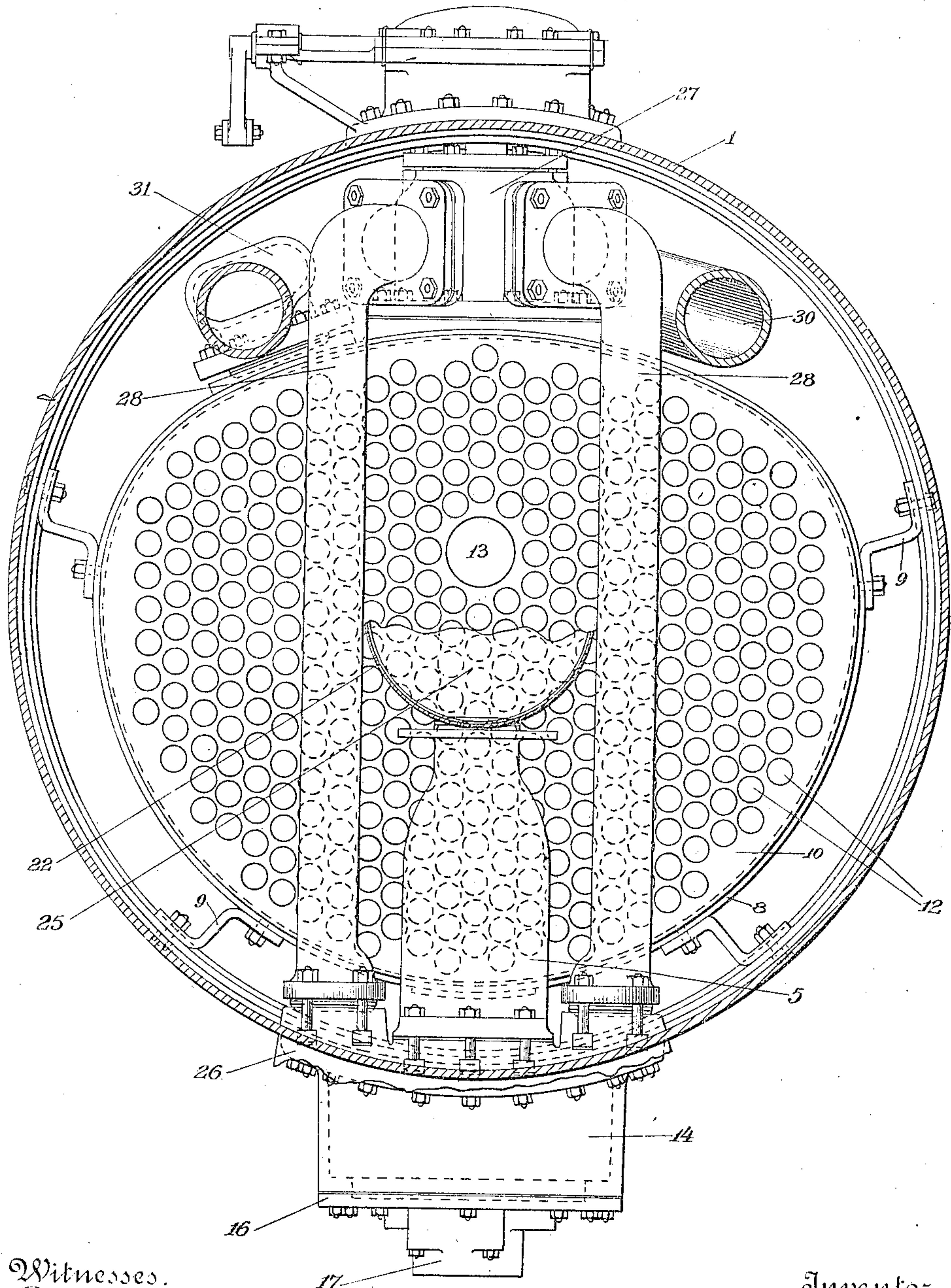
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3 SHEETS—SHEET 3.

Fig. 3



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UNITED STATES PATENT OFFICE.

HENRY W. JACOBS, OF TOPEKA, KANSAS.

SUPERHEATER.

934,729.

Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed April 27, 1909. Serial No. 492,457.

To all whom it may concern:

Be it known that I, HENRY W. JACOBS, of Topeka, in the county of Shawnee, and in the State of Kansas, have invented a certain new and useful Improvement in Superheaters, and do hereby declare that the following is a full, clear, and exact description thereof.

The object of my invention is to provide a superheater, and especially a superheater for railway locomotives, which shall have, among others, the following advantages: that it shall have great heating surface for a given volume; that the circulation of gases shall be impeded as little as possible, and yet they shall be so divided as to readily give up their heat; that the steam shall be so baffled and conveyed as to keep it thoroughly mixed and continually impinging upon surfaces heated by the gases; that the flue gases shall be so directed and reversed that sparks and cinders shall be so broken up that neither netting nor a diaphragm plate shall be necessary; that all parts of the superheater and adjacent parts of the boiler shall be easily accessible for repairs; and to such ends my invention consists in the superheater hereinafter specified.

In the accompanying drawings Figure 1 is a longitudinal sectional view of the front end of a locomotive boiler having my invention applied thereto, the superheater being shown as applied to a simple engine; Fig. 2 is a view showing a cross-section taken on the line $x-x$ of Fig. 1; and Fig. 3 is a similar view taken on the line $y-y$ of Fig. 1, both sections looking toward the cab of the engine.

The illustrated embodiment of my invention is the best form known to me, but it is only one of many possible embodiments thereof, and is therefore to be regarded only as typical.

In the said drawings, the cylindrical shell 1 is the smoke arch or smoke box of a locomotive, situated at the front end of the boiler, the rear wall of the chamber inclosed thereby being the flue sheet 2, the flue sheet being united to the boiler shell 3, and having attached to it the boiler flues 4. Within the smoke box and intermediate between its ends is the exhaust pot or pipe 5, which is directed upwardly into a petticoat pipe 6, the latter extending to the bottom of the smoke stack 7, which is supported upon the shell 1. Between the exhaust pot and the flue sheet 2

is mounted the rear section of my superheater. Such section preferably consists of a shell 8, of smaller diameter than the shell 1, supported from the latter shell by angle irons 9. The shell is closed by a front flue sheet 10, and a rear flue sheet 11, and these sheets support a large number of flues 12. A large flue 13 is also secured in the flue sheets 10 and 11 for a purpose later to be described. This rear superheater section is placed sufficiently forward of the forward boiler flue sheet 2 to leave space between the superheater and the front end of the boiler to admit of a man's going into such space to repair either defective boiler flues or defective superheater flues facing into this chamber. To admit a man for this purpose, a cinder pot 14 is provided with a man-hole 15 closed by a cover 16, having cinder hoppers 17 attached to the cover by which cinders may be removed. The front superheater section is placed between the petticoat pipe and the front end of the smoke box, and such section preferably consists of a shell 18 having front and rear flue sheets 19 and 20 respectively, and having a large number of flues 21 connecting the latter. A large flue 22 also connects the said sheets. A fan 23 is mounted in the flue 22. The flue 22 receives one end of a pipe 24 which is connected with a petticoat pipe, and which is closed at its rear end 25.

The connections for conveying steam are as follows: The exhaust pot 5 sits upon the saddle 26. A header, preferably in the form of a throttle 27, is connected with the rear superheater section, preferably by being mounted upon it, and steam pipes 28 connect such header or throttle with the cylinders. A dry pipe 29 from the steam dome is connected by a pipe 30 with the front superheater section, the pipe 30 being bent to pass around the throttle. A pipe 31 extends from the front section to the rear section. Baffle plates in the front section cause the steam to travel from the pipe 30 by a circuitous route through such front superheater section to the pipe 31, so as to secure the most effective superheating of the steam. Likewise baffle plates are provided in the rear section to cause the steam to travel by a circuitous route from the pipe 28 to the throttle.

In the operation of the illustrated embodiment of my superheater, the steam coming from the dome through the pipe 29 is conveyed by the pipe 30 to the front superheater

section, and then, passing through its tortuous passage therein, reaches the pipe 31, by which it is conveyed to the rear superheater section, where it again traverses a long irregular route and issues through the throttle 5 29. The steam here passes by the pipes 28 to the cylinders, and is exhausted through the exhaust pot 5, from which it emerges in a jet, passing up the petticoat pipe and causing a draft in the smoke stack. The gases 10 emerge from the boiler flues 4 into the space 32, between the front end of the boiler and the rear superheater section, and in this space the gases are intimately mixed. They 15 then pass both around the outside of the shell 8 of the rear superheater section, and through the flues of the said section, and thence around the exhaust pot and petticoat pipe and through the flues 20 of the front 20 superheater section, whence they emerge into the space 33, between the front superheater section and the front end of the smoke box. The gases here turn and pass into the large flue 22, and in so passing rotate the fan 23. 25 The gases are then drawn up the smoke stack by the exhaust. The passage for the gases, while not offering objectionable resistance to them, is sufficiently tortuous that the cinders and sparks are so broken that as they pass 30 up the smoke stack they are not objectionably large. The rotation of the fan breaks up passing cinders or sparks.

It will be observed that a man can enter the space 32 and repair either flues in the 35 boiler or flues in the superheater. If a flue in the boiler is to be replaced, it can be passed through the large flue 13, and a new one passed to the boiler in the same manner.

As above stated, the illustrated construction is only one of many possible embodiments of my invention, and I do not wish my claims to be limited beyond their necessary intendment and the requirements of the 40 prior art.

45 I claim:

1. In a locomotive, the combination of a boiler shell, a smoke-box in line therewith, boiler flues extending longitudinally of said shell, and a superheater mounted in said 50 smoke-box, and sufficiently removed from said boiler flues to permit access between the superheater and flues for repairs, said superheater having a passage formed therein parallel to said boiler flues, through which 55 boiler flues may be passed for repairs.

2. In a locomotive, the combination of a boiler shell having a smoke-box in the forward end, a flue sheet forming the rear wall

of the smoke-box, and a superheater mounted in said smoke-box, said superheater being 60 sufficiently forward of said flue sheet to permit access in the space therebetween for repairs.

3. In a locomotive, the combination of a boiler shell having a smoke-box in the forward end, a flue sheet forming the rear wall 65 of the smoke-box, an exhaust pot in said smoke-box, a superheater section between said exhaust pot and said flue sheet, said section and sheet being spaced sufficiently apart 70 to permit access for repairs, a man-hole providing for such access, and a superheater section forward of the exhaust pot.

4. In a locomotive boiler, the combination of a boiler shell having a smoke-box in the 75 forward end, a flue sheet forming the rear wall of said smoke-box, a superheater mounted in said smoke-box sufficiently forward of said flue sheet to provide for access 80 therebetween, said superheater comprising a shell and flue sheets having flues passing therethrough, a large flue being provided in said superheater to permit the passage 85 through of flues for the generating section of the boiler.

5. In a locomotive boiler, the combination of a boiler shell having a smoke-box in the forward end thereof, a flue sheet forming the rear wall thereof, an exhaust pot in said 90 smoke-box intermediate its ends, a petticoat pipe above said exhaust pot, superheater sections forward and to the rear of said exhaust pot, said sections having longitudinally-extending flues, a pipe connected with said 95 petticoat pipe and extending longitudinally through one of said superheater sections, and a fan mounted in said pipe.

6. In a locomotive boiler, the combination of a boiler shell having a smoke-box in the forward end thereof, a flue sheet forming the 100 rear wall thereof, an exhaust pot in said smoke-box intermediate its ends, a petticoat pipe above said exhaust pot, superheater sections forward and to the rear of said exhaust pot, said sections having longitudinally-extending 105 flues, a pipe connected with said petticoat pipe and extending longitudinally through the forward superheater section, and a fan mounted in said pipe.

In testimony that I claim the foregoing I 110 have hereunto set my hand.

HENRY W. JACOBS.

Witnesses:

EDWIN J. PRINDLE,
A. NEWCOMB.