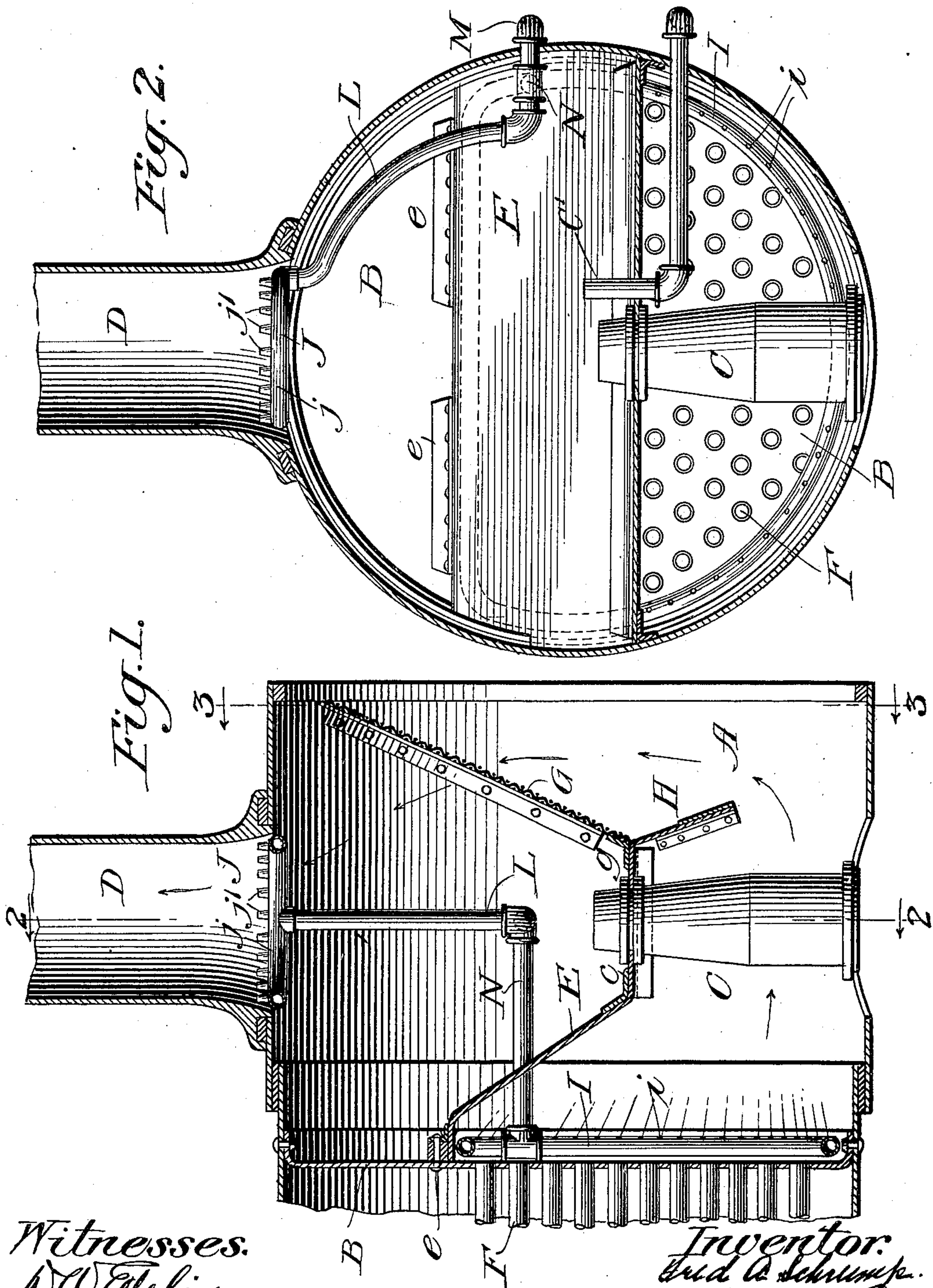


999,344.

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SMOKE CONSUMER.
APPLICATION FILED FEB. 13, 1911.

Patented Aug. 1, 1911.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 4.

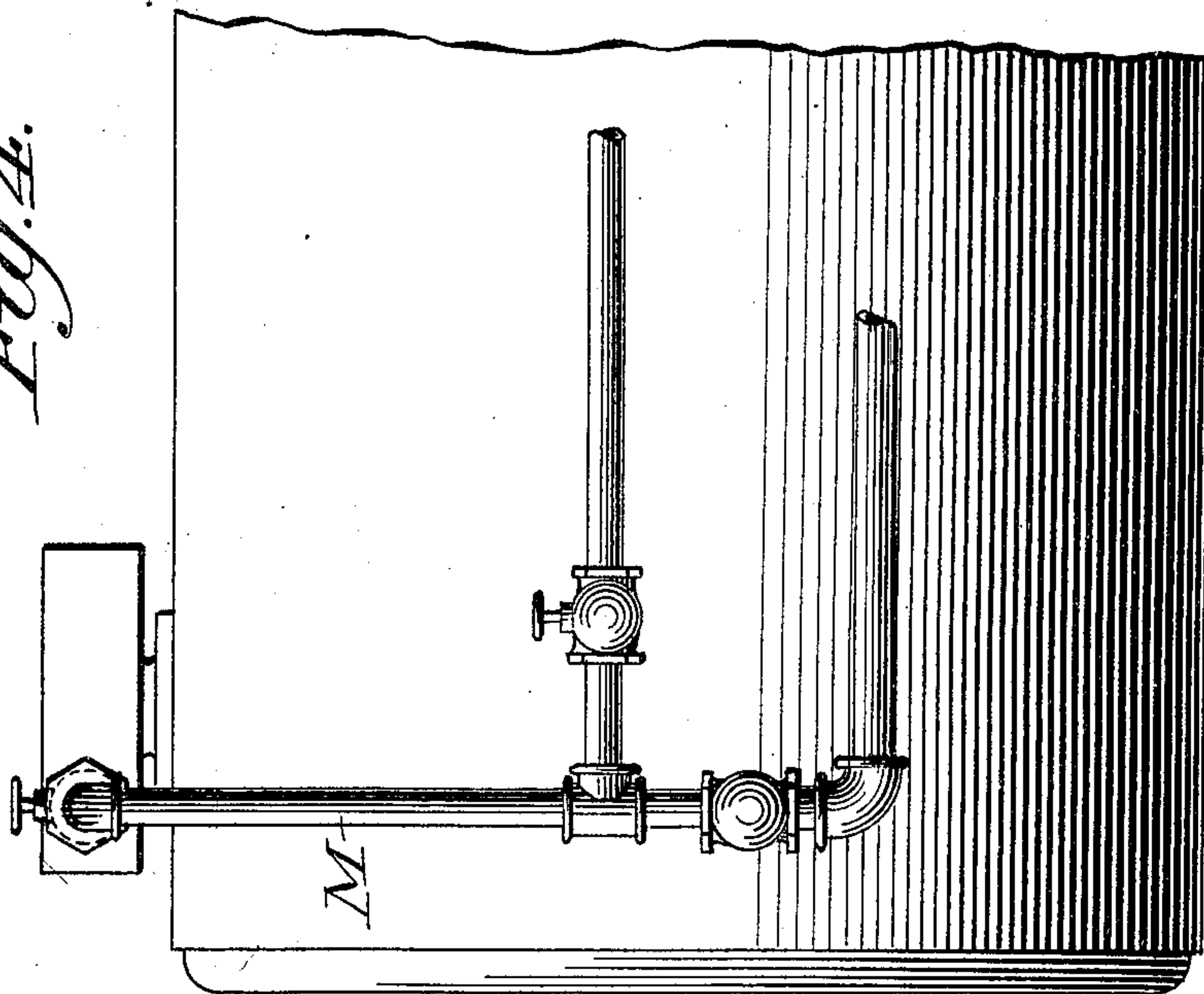
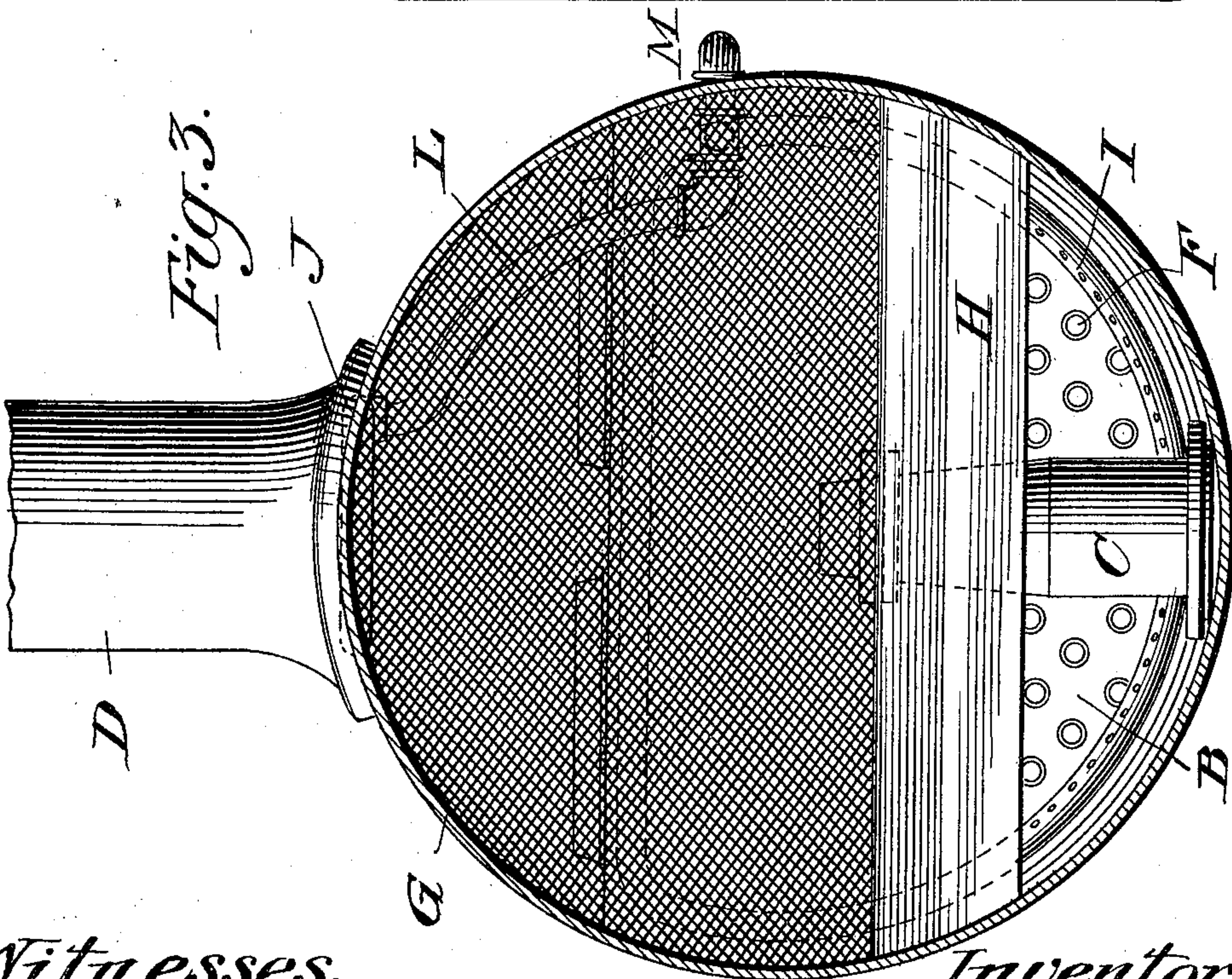


Fig. 3.



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UNITED STATES PATENT OFFICE.

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SMOKE-CONSUMER.

999,344.

Specification of Letters Patent.

Patented Aug. 1, 1911.

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To all whom it may concern:

Be it known that I, FRED A. SCHRUMP, a citizen of the United States, residing in Elkhart, in the county of Elkhart and State of Indiana, have invented certain new and useful Improvements in Smoke-Consumers, of which the following is a specification.

My invention relates to smoke consumers of the class in which the products of combustion are passed through a screen which arrests cinders, sparks and other solid particles and in which the smoke is mingled with steam under pressure before it is passed from the stack, and the object of my invention is to so treat the smoke and other products of combustion that no soot, dirt or black vapor is discharged into the atmosphere.

My invention is embodied in a locomotive boiler and in carrying out the invention I arrange on the front face of the front tube sheet and surrounding the ends of the fire tubes, a perforated pipe from which live steam is ejected in numerous small jets arranged at different angles, the jets being directed toward the space beneath a deflecting plate arranged in the smoke box opposite the front ends of the fire tubes.

In the front portion of the smoke box there is a screen below which is a baffle plate, beneath the bottom of which the products of combustion pass on their way to the screen. The jets of steam are so directed that they converge toward the opening below the baffle plate and the steam is made to thoroughly mingle with, and act on, the smoke on its way through the smoke box and through the screen in the front portion of the smoke box. A blower consisting of an annular pipe with jet nozzles is provided at the base of the stack through which steam is ejected to act on the smoke as it passes through the ring.

In the accompanying drawings:—Figure 1 shows a vertical section of the front portion of a locomotive boiler, with my improvements applied. Fig. 2 shows a vertical transverse section thereof on the line 2—2 of Fig. 1. Fig. 3 shows a vertical transverse section on the line 3—3 of Fig. 1. Fig. 4 shows an elevation of some of the pipe connections.

In the drawings I have shown my invention applied to a locomotive boiler having a smoke box, A, arranged in the front of the boiler in advance of the front tube sheet, B.

The exhaust pipe, C, is arranged immediately below the stack, D, as usual.

C¹ indicates a blow-pipe which is often used in locomotive boilers being connected with the steam space of the boiler in the usual way.

A deflector plate, E, is secured at *e* to the front tube sheet above the tubes, F, and this plate inclines downwardly toward the exhaust pipe, C, being supported thereon at *c*. A screen, G, of wire cloth or other suitable reticulated material extends from the front upper portion of the smoke box downwardly and rearwardly, being supported at *g* on the upper part of the exhaust pipe, C. This screen may be of any suitable construction. Below the screen is arranged a baffle plate, H, the lower portion of which is considerably above the bottom of the smoke box. This plate may be made in adjustable sections, as shown, to regulate the draft below it. The products of combustion as they pass from the fire tubes move across the lower portion of the smoke box below the deflector plate, E, and under the baffle plate, H. They then pass through the screen, G, and out through the smoke stack, D. On the front side of the front tube sheet, B, surrounding the front ends of the fire tubes, F, is a pipe, I, provided with numerous openings or jets, *i*, through which steam is ejected. These jets are set at different angles and converge toward the space in the smoke box below the baffle plate, H.

J indicates a blower at the base of the stack, D. This consists of an annular pipe, *j*, having jet nozzles, *j'*, through which steam is forced and suitable pipe connections are provided for supplying the blower, J, and the pipe, I, and the passage of steam through the pipes may be controlled by suitable valve devices in or near the cab of the engine.

As shown in the drawings the blower, J, is connected by a pipe, L, with a supply pipe, M, and this supply pipe is also connected by a pipe, N, with the jet pipe, I, the particular pipe connections not being of vital importance. The arrangement is such that as the products of combustion pass out of the front ends of the tubes they are directed to the space below the deflector plate, H, and at the same time are acted upon by jets of steam passing from the pipe, I, and converging toward the space below the baffle plate. After passing under the baffle

plate the particles of combustion pass through the screen, G, where solid particles are arrested and drop back into the smoke box, while the lighter particles and vapors
5 pass to the stack where they are further treated by the blower, J.

Practical demonstrations have proved that the products of combustion are thoroughly mingled with steam by my apparatus, and the emission of soot, sparks, cinders and black smoke is entirely avoided.
10

I claim as my invention:—

1. The combination with a smoke box, a front tube sheet, and fire tubes, of a deflector plate in the smoke box in front of
15 the tubes, a screen in the front portion of the smoke box through which the products of combustion pass, a baffle plate below the screen, and a steam pipe on the front tube
20 sheet surrounding the front ends of the tubes having perforations directed toward the lower end of the baffle plate, substantially as described.

2. The combination of a smoke box, a front tube sheet, fire tubes opening into the
25 smoke box, a stack connected with the smoke

box, an exhaust pipe below the stack, a deflector plate secured to the front tube sheet and supported by the exhaust pipe, an inclined screen in the front portion of the
30 smoke box below the stack, a baffle plate below the screen, and a steam pipe attached to the front tube sheet and surrounding the front ends of the fire tubes provided with perforations directed toward the baffle plate.
35

3. The combination of a smoke box, a stack connected therewith, a front tube sheet, a steam pipe secured to the front tube sheet and surrounding the front ends of the tubes provided with perforations directed toward
40 the lower part of the smoke box, a screen in the front portion of the smoke box below the stack, and a blower at the base of the stack consisting of a steam pipe having nozzle jets, for the purpose specified.
45

In testimony whereof, I have hereunto subscribed my name.

FRED SCHRUMP.

Witnesses:

ROBT. E. GREENE,
VERNE G. CAWLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents
Washington, D. C."