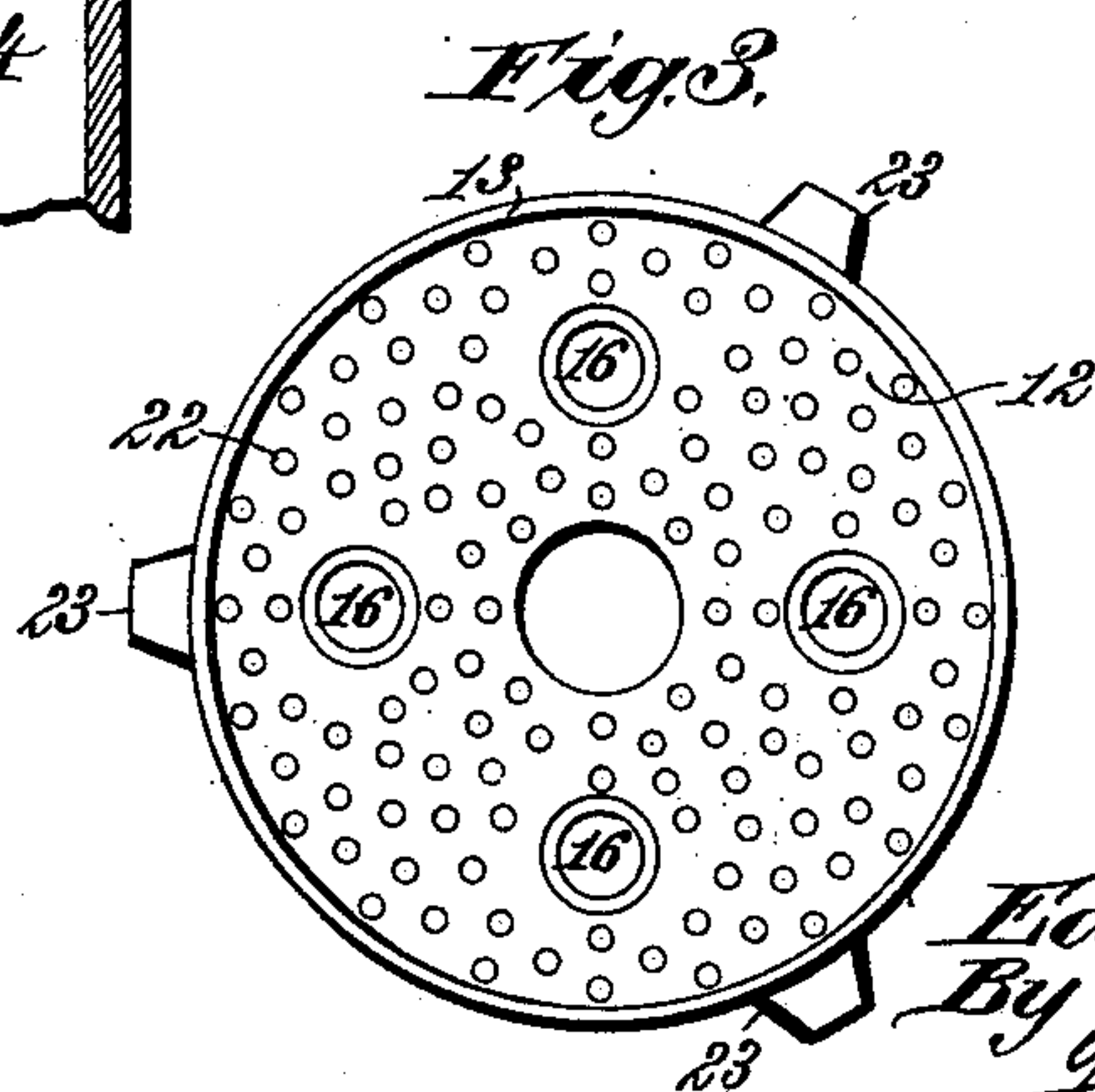
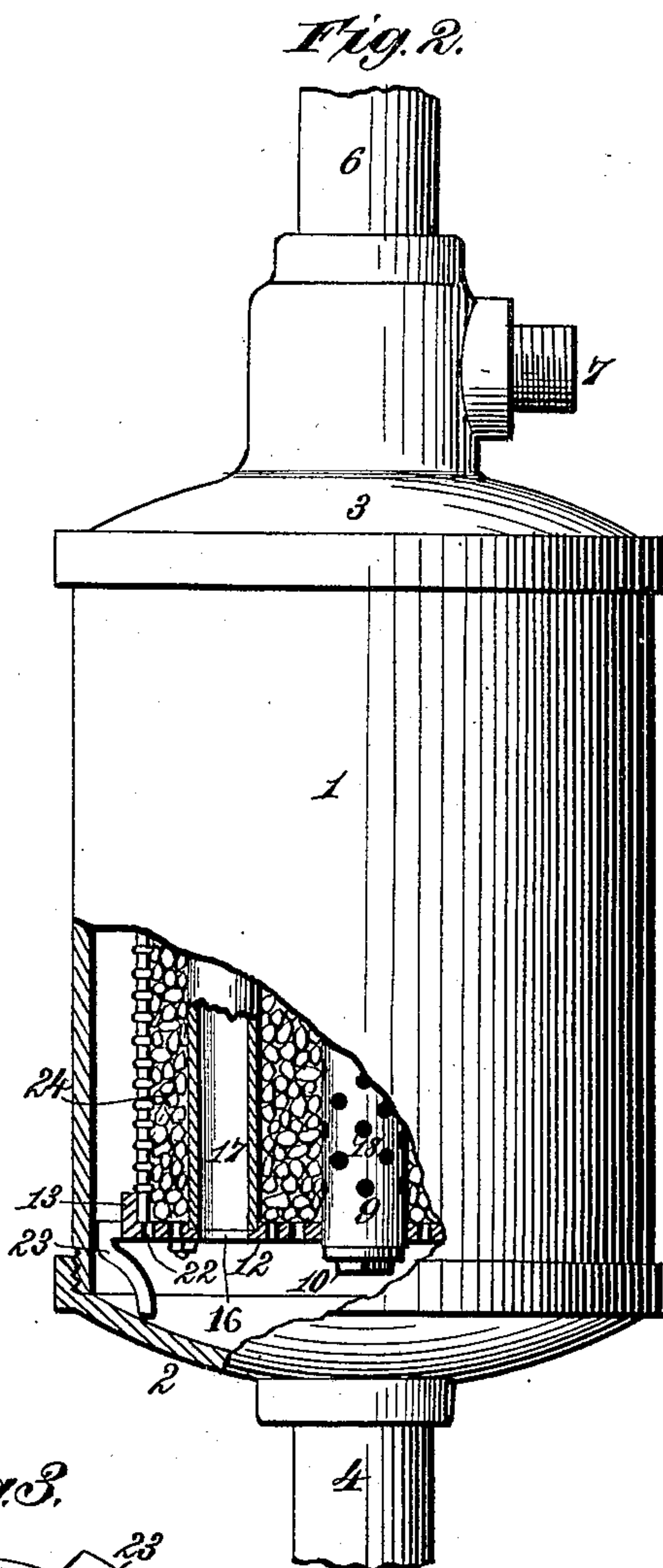
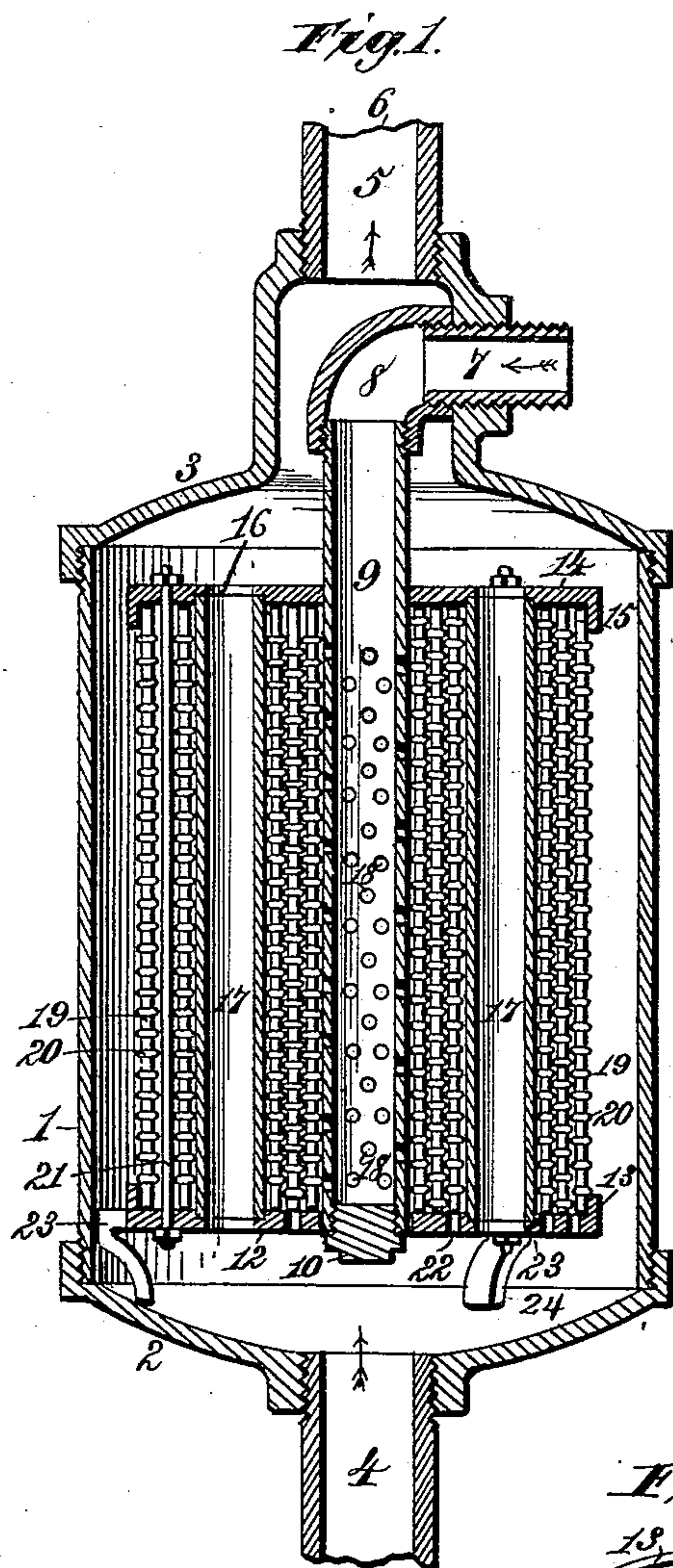


(No Model.)

E. A. LELAND.  
STEAM MUFFLER.

No. 428,308.

Patented May 20, 1890.



Witnesses:  
*Robert G. Smith*  
*Geo. W. Rea*

Inventor:  
*Edwin A. Leland*  
By *James L. Norris*  
Atty.



# UNITED STATES PATENT OFFICE.

EDWIN A. LELAND, OF BROOKLYN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO  
THE CONSOLIDATED CAR HEATING COMPANY, OF ALBANY, NEW YORK.

## STEAM-MUFFLER.

SPECIFICATION forming part of Letters Patent No. 428,308, dated May 20, 1890.

Application filed December 5, 1889. Serial No. 332,674. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN A. LELAND, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Steam-Mufflers, of which the following is a specification.

My present invention relates to and is an improvement upon the type of steam-mufflers shown and described in an application for Letters Patent filed by me upon the 27th day of November, 1889, Serial No. 331,830.

It is the purpose of my present invention to provide a steam-muffler having a simple and comparatively inexpensive construction, in which the steam shall be compelled to traverse dividing or dispersing devices, whereby the entering current of vapor is broken up and separated into globules of small and substantially uniform size, while one or more free and unobstructed passages for the water are provided, one path therefor being beneath, around the exterior, and over the top of the assembled dispersing devices, and the other consisting of direct water-passages carried through the body of the assembled dividing and dispersing devices. It is my purpose also to provide a novel construction and organization of steam-muffler, whereby the entering body of steam shall be broken up and divided into parts of small and substantially uniform size and commingled with the water without regurgitation or noise, the ascending temperature produced thereby giving rise to a rapid circulation.

The invention consists in the several novel features of construction and new combinations of parts, hereinafter fully set forth, and then definitely pointed out in the claims following this specification.

To enable others skilled in the art to practice my said invention, I will describe the same in detail, reference being had to the accompanying drawings, in which—

Figure 1 is a central vertical section of a muffler embodying my invention. Fig. 2 is a side elevation, the wall of the drum broken away to show a modified interior construction, the latter being in section. Fig. 3 is a detail plan view of the lower plate of the steam dispersing or dividing devices.

In the said drawings, the reference-numeral 1 denotes the drum or shell of the muffler, which is constructed of suitable material and dimensions. The ends of said drum are closed by screw-caps 2 and 3, and through the former enters the water-supply pipe 4, while through the upper cap the outlet 5 opens, to which the end 6 of the water-circulation pipe is connected. In the lateral wall of the outlet is formed an opening through which is tapped a coupling 7 for the steam-pipe supplying steam from the locomotive. This coupling also connects by a curved elbow 8 with a pipe 9, which drops in the axial line of the drum to a point somewhat above the lower closed end of the drum, at which point it terminates, its end being closed by a screw-plug 10.

Closely surrounding the lower end of the pipe 9 is a circular plate 12, having a diameter which is less than the interior diameter of the drum 1, and provided upon its periphery with an upwardly-turned flange 13. Surrounding the upper portion of the said pipe at a little distance below the upper screw-cap 3 is a similar disk or plate 14 of equal diameter and provided with a downwardly-turned circumferential flange 15. At suitable intervals in the plates between their centers and circumferences I form openings 16, which receive the ends of vertical pipes 17, open at both ends. I have shown four of these pipes. The steam-pipe 9 is provided with numerous small perforations 18, arranged in that portion of the pipe inclosed between the plates 12 and 14.

Closely surrounding the steam-pipe 9 and the pipes 17 are vertical rods 19, of small diameter, each provided at short intervals with circumferential ribs or collars 20, which alternate in arrangement, the edges of these ribs on one rod lying between those of the ribs on the adjacent rod or rods. These rods are packed as closely as possible in the space inclosed by the flanges upon the two plates 12 and 14, between which they stand, and they are confined in place by said flanges, the plates being preserved in proper relative position by tie-rods 21. Within its circumferential flange 13 the lower plate 12 is provided with numerous perforations 22, to per-



mit the water to pass up and surround the rods and the tubes 17. Projecting radially from the periphery of the lower plate 12 are brackets 23, which extend far enough to abut  
5 against the inner surface of the drum 1, from which point legs or feet 24 are turned inward and downward. These brackets serve to take up all lateral movement produced by the movement of the car.

10 The operation of the muffler thus described is obvious. The water entering by way of the inlet 4 finds an unobstructed passage beneath and around the exterior of the steam dividing and dispersing devices, and passing  
15 over the same escapes by the outlet. It also passes directly through the pipes 17, interposed among the rods 19. I may use any number of these vertical pipes and may arrange them at any interval or at regular intervals and at different radial distances from  
20 the axis of the pipe 9. The steam entering by way of the pipe 9 flows through the perforations in the same and percolates between the rods 19, mingling at the same time with  
25 the water which penetrates between said rods. Being rapidly divided and dispersed by said devices the steam mingles with the water in volumes in substantially equal periods of time and is commingled therewith without  
30 noise, raising the temperature with great speed and producing a rapid circulation.

I may substitute for the mass of ribbed rods 19 a body of pebbles or coarse clean gravel 24, packed around the steam-pipe 9 and the  
35 vertical water-tubes 17, said body being confined by a single series of the rods 19, arranged immediately within the flanges of the plates 12 and 14, as shown in Fig. 2.

40 By the construction shown the whole interior apparatus of the muffler may be withdrawn together in a single body by simply detaching the steam-pipe and removing the cap 3.

The plates 12 and 14 may be extended to meet the wall of the drum, and the tubes 17  
45 may be alone relied upon to afford an unobstructed passage for the water; but I prefer the construction and arrangement shown and set forth.

What I claim is--

50 1. In a steam-muffler, the combination, with a drum having a water inlet and outlet and a steam-inlet, of a body closely surrounding the perforated steam-pipe within said drum, said body being composed of material adapted  
55 to divide or break up the inflowing current of steam, and one or more pipes traversing said body and providing an unobstructed passage or passages for the water, substantially as described.

60 2. In a steam-muffler, the combination, with a drum having a water inlet and outlet and a steam-inlet, of a body closely surrounding the outlet-openings in the steam within said drum and composed of material adapted to

divide or break up the inflowing current of 65 steam, means for confining said body within the interior to afford an unobstructed passage for the water about its exterior between the same and the wall of the drum, and one or  
70 more pipes traversing said body to afford auxiliary water-passages, substantially as described.

3. In a steam-muffler, the combination, with a drum having a lower and upper water inlet and outlet, respectively, of a steam-pipe en- 75 tering through the upper part, its closed end lying above the bottom of the drum, flanged plates closely surrounding the upper portion and lower end of said pipe, a body of material confined between said plates and closely sur- 80 rounding a perforated portion of the steam-pipe, said material adapted to divide and break up the steam, and vertical pipes having their open ends lying in openings in the perforated lower plate and imperforate upper 85 plate, substantially as described.

4. In a steam-muffler, the combination, with a drum having an upper outlet and a lower inlet for water, of a steam-pipe entering the upper portion and having its closed end ter- 90 minated above the bottom of the drum, a plate of less diameter than the interior of the drum closely surrounding the closed end of the drum and having an upwardly-turned flange, a plate of similar size surrounding the 95 upper portion of the steam-pipe and having a downwardly-turned flange, ribbed rods packed closely together and around a perforated portion of the steam-pipe, said rods being confined by the flanges of the plates, and 100 tubes having their open ends lying in openings in the lower perforated plate and the upper imperforate plate, the former being provided with brackets projecting radially and having supporting-feet, substantially as de- 105 scribed.

5. In a steam-muffler, the combination, with a drum having a water inlet and outlet in its lower and upper ends, respectively, of a steam- 110 pipe entering through said outlet and dropping nearly to the lower end of the drum, a perforated flanged plate closely surrounding the lower closed end of the pipe, an imperforate plate closely surrounding the upper por- 115 tion of the pipe, a series of ribbed rods packed around a perforated portion of the steam-pipe, the ribs of one rod alternating with those of another, and vertical pipes having their open ends set in the plates confining said rods and forming water-passages through the mass of 120 said rods, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

EDWIN A. LELAND.

Witnesses:

CHAS. L. RICHARDSON,  
E. W. SQUIRES.