F. C. CURIE.

Noise-Quieting Nozzle.

No. 226,905. Patented April 27, 1880.

Fig. 1.

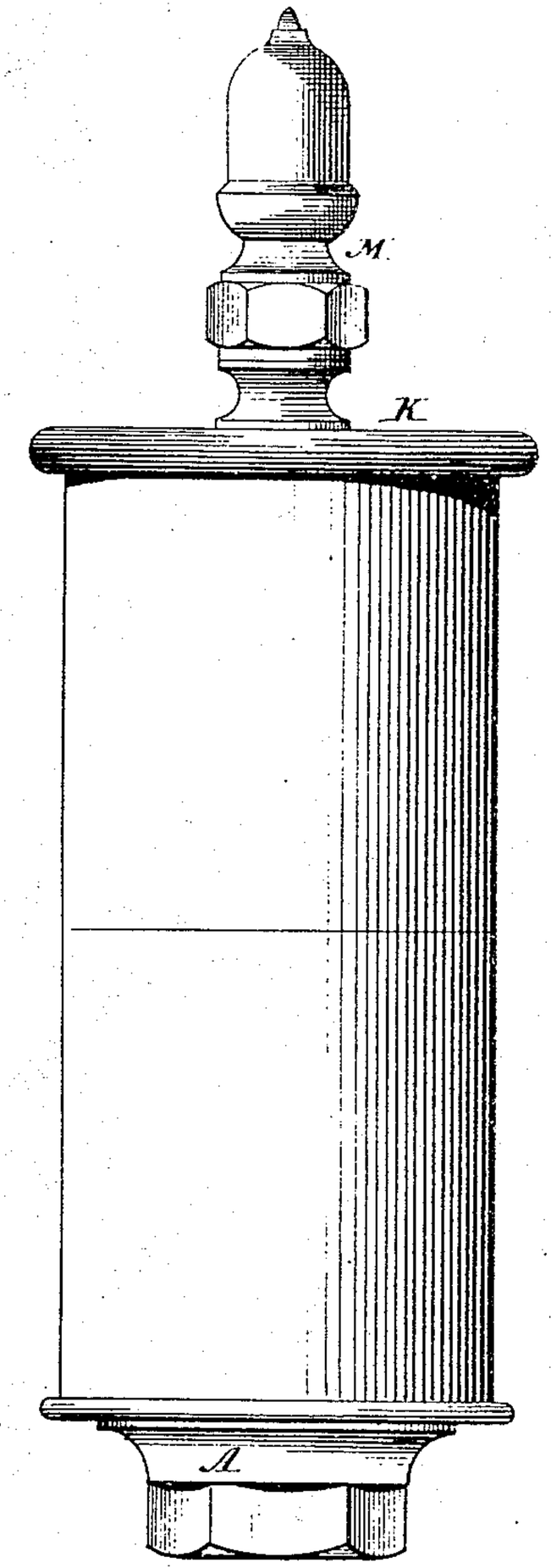


Fig. 2.

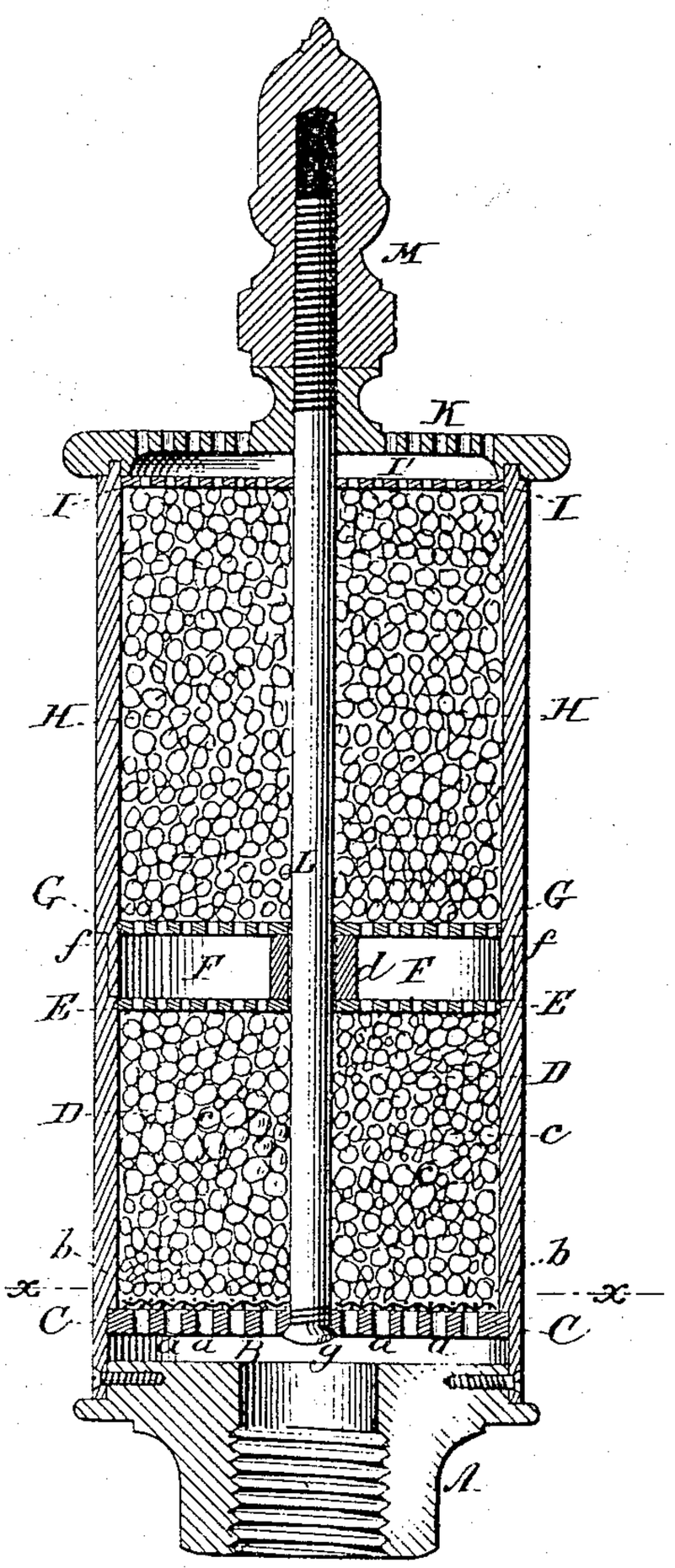
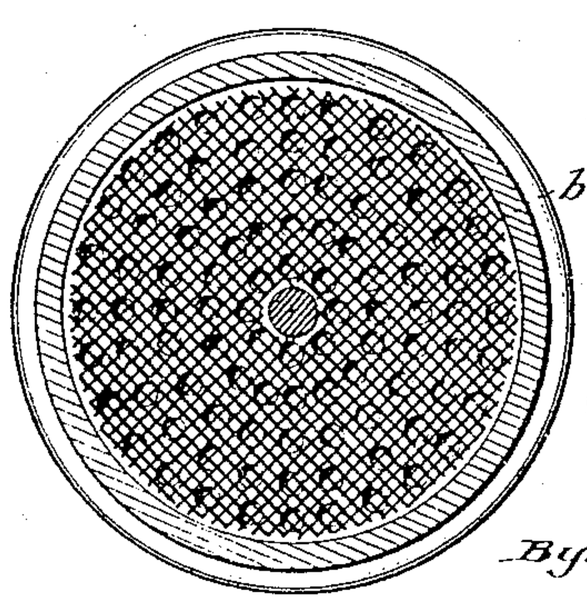


Fig. 3.



Attest:

Floyd Norris.

D. P. Lowe.

Inventor:

Frederick Charles Curie

By. Johnson and Johnson

Atty's

UNITED STATES PATENT OFFICE.

FREDERICK C. CURIE, OF LYKENS, PENNSYLVANIA.

NOISE-QUIETING NOZZLE.

SPECIFICATION forming part of Letters Patent No. 226,905, dated April 27, 1880.

Application filed September 29, 1879.

To all whom it may concern:

Be it known that I, FREDERICK CHARLES CURIE, of Lykens, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Noise-Quieting Steam-Nozzles, of which the following is a specification.

The invention relates to nozzles for the escape of steam or gases under pressure, wherein means are provided for quieting the puffing and roaring noise attending such escape. I am aware that pebbles and the like material have been used in the cylinder of the nozzle to dissipate the noise of the escaping steam, and that a perforated diaphragm has been used to support said mass of pebbles for such purpose; but my invention contemplates improvements in the construction of the nozzle which look to increasing the noise-muffling capacity of the device.

My said improvements consist, principally, in providing a bottom and top chamber filled with pebbles, supported upon perforated diaphragms, and isolating these two chambers by an intermediate chamber.

The said improvements also consist in combining with the perforated diaphragm of the bottom chamber a reticulated or gauze grating or screen of finer meshes than the diaphragm-openings proper, so that the finer particles may not fall into and clog the openings of the diaphragm, nor through them.

The main object of the improvement is to provide increased means of muffling the noise of escaping steam by causing the steam to pass first into a pebble-filled chamber, thence into an intermediate unfilled chamber, and finally through a superimposed pebble-filled chamber, through which it has its exit. In attaining this object I have made certain novel constructions, which shall be hereinafter described and claimed.

In the accompanying drawings, Figure 1 represents an elevation of a steam-nozzle embracing my invention; Fig. 2, a vertical section; and Fig. 3, a horizontal section taken at the line *x x* of Fig. 2, showing the relation of the grating-screen with the perforated base-plate.

The following is a literal description of a noise-muffler embracing my invention. The base A is provided with a screw-threaded opening, or a male screw for attachment to the boiler, communicating with a chamber, B, about one-half inch in height (assuming the whole device to be eighteen inches high by five inches in diameter) and of a diameter the same as the inside of nozzle. A diaphragm, C, forms the top of this chamber, and is perforated by a number of one-fourth-inch holes, *a*, while above this diaphragm, either separated by suitable devices or flat upon it, is a screen or brass-wire gauze, *b*, and upon this gauze or screen the filling of pebbles *c* in the chamber D rests. This prevents the smaller pebbles from clogging and dropping through the holes of the diaphragm. The chamber D is capped by a perforated diaphragm, E, similar to the bottom diaphragm, or a simple screen might answer. Above this diaphragm E is a chamber, F, about an inch in height, and separated from the bottom perforated diaphragm G of the top pebble-filled chamber, H, by a collar, *d*, or other support. This chamber F is not filled with any material, but is an empty space. The pebble-filled chamber H is topped by a brass-wire screen, I, and above this screen is a space, I′, or chamber one-fourth inch in height, capped by the nozzle-cap K, also perforated, and united to the nozzle by steam-tight packing or recessed joint.

The two filled chambers, which are separately cast cylinders, united by steam-tight joints *f f*, which, in their lapping, form the sides of the intermediate empty chamber, F, are drawn firmly together and held in place by a bolt, L, headed at *g* below the bottom diaphragm of the lower filled chamber, and secured at the top by a nut, M, tightly screwed down, making a convenient construction, which, however, may be varied. The nozzle is screwed upon a connecting-pipe leading from the safety-valve of any boiler, whether of locomotive, steamboat, or stationary engines, and as the surplus steam from the boiler escapes it passes through the passage in the base A in an upward direction through the holes *a* of the diaphragm C, thence upward in minute divisions through the mass of pebble-stones *c* in the chamber D, and through the grating E, reunites in the intermediate chamber, F, passing thence through the holes in the bottom dia-

phragm of the top filled chamber, and through that chamber under a second division to its exit through the perforated cap into the open air.

My improvement reduces the noise of escaping steam at least fifty per cent. more than any nozzle that I know of.

By having two filled chambers with an intermediate space I effect a greater division and separation and condensation of the volume of escaping steam, and consequently greatly reducing the noise.

I have in use a nozzle five inches in diameter by fifteen inches long on a three-and-a-half-inch discharge-pipe from the boiler, and with a boiler-pressure of one hundred and twenty pounds, the noise of escaping steam is so slight as not to interfere with conversation on or about the locomotive. This advantage is due to the two filled chambers, one upon the other, and intensified in noise-muffling capacity by the intermediate chamber.

In experimenting with my nozzle of the size described I find there is not much back-pressure. I have tried it on a locomotive with eight and a half by three and ten-twelfths feet fire-box burning anthracite coal, and while standing still steam will escape faster than it is made in the boiler.

The apparatus is both simple and cheap in construction and requires but few repairs.

The intermediate non-filled chamber is of vital importance in effecting the results described, partly by increased condensation and as a medium for reuniting the currents of steam from the lower muffling-chamber, in its passage from which middle chamber it is again divided into minute streams so much reduced in force in its passage through the upper muffling-chamber.

I claim—

1. In a noise-quieting steam-nozzle, the combination, with the lower pebble-filled chamber, D, the intermediate empty chamber, F, and the upper pebble-filled chamber, H, of the entrance chamber B, substantially as described.

2. In a noise-quieting steam-nozzle, the combination, with an upper and a lower chamber, each filled with pebbles or the like, of an intermediate empty communicating chamber, substantially as described.

3. In a noise-quieting steam-nozzle, the chamber filled with pebbles and provided with a screen, in combination with the perforated supporting-diaphragm, for the purpose of preventing the clogging of the holes of said diaphragm by small particles of the pebbles, substantially as set forth.

4. In a noise-muffler for steam or gas under pressure, the combination, with an upper and a lower chamber filled with muffling material and communicating by a non-filled chamber, of a divided cylinder forming the upper and lower chamber parts, united by a steam-tight joining, the center connecting-rod, and the clamp-nut, substantially as herein set forth.

5. As a means of suppressing or muffling the noise of escaping steam, a nozzle consisting of an upper and a lower filled chamber, D H, communicating by a non-filled intermediate chamber, F, an attaching-base, A, a bottom diaphragm, C, covered with a screen, *b*, and a perforated cover, K, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

FREDERICK CHARLES CURIE.

Witnesses:

R. C. PEEBLES,

E. H. WILLSON.