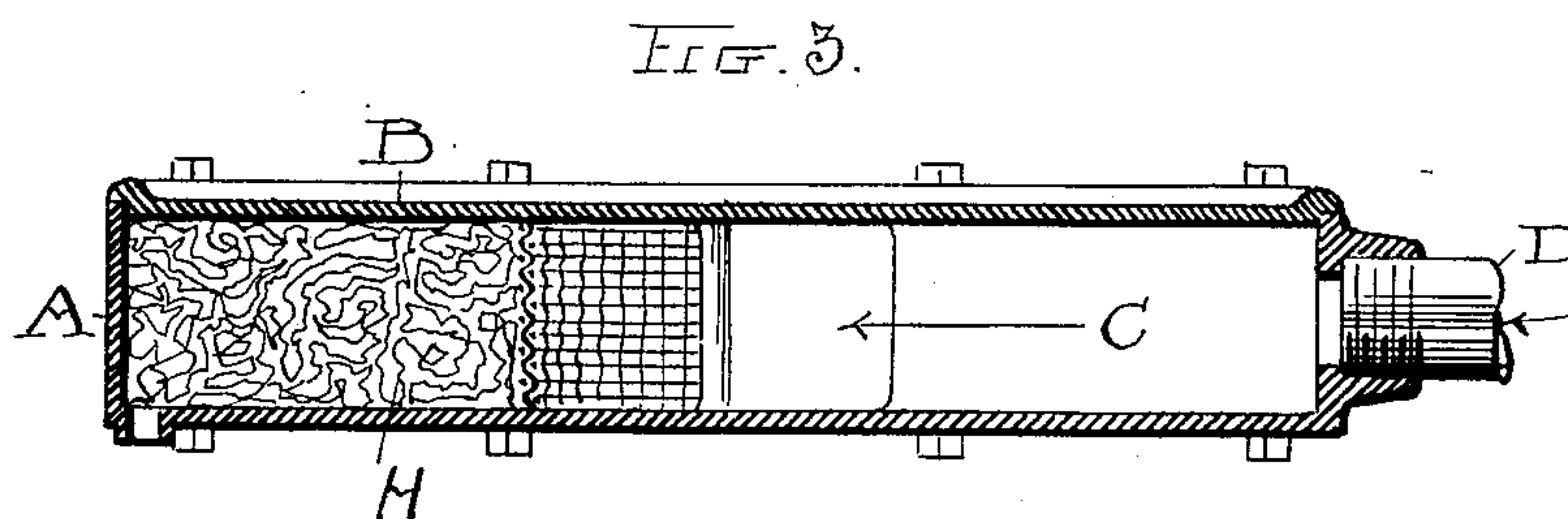
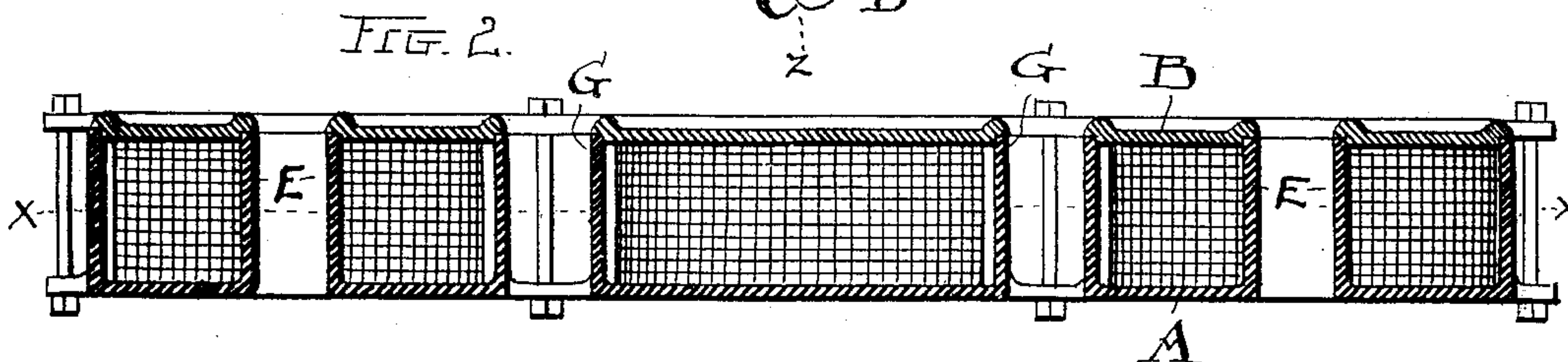
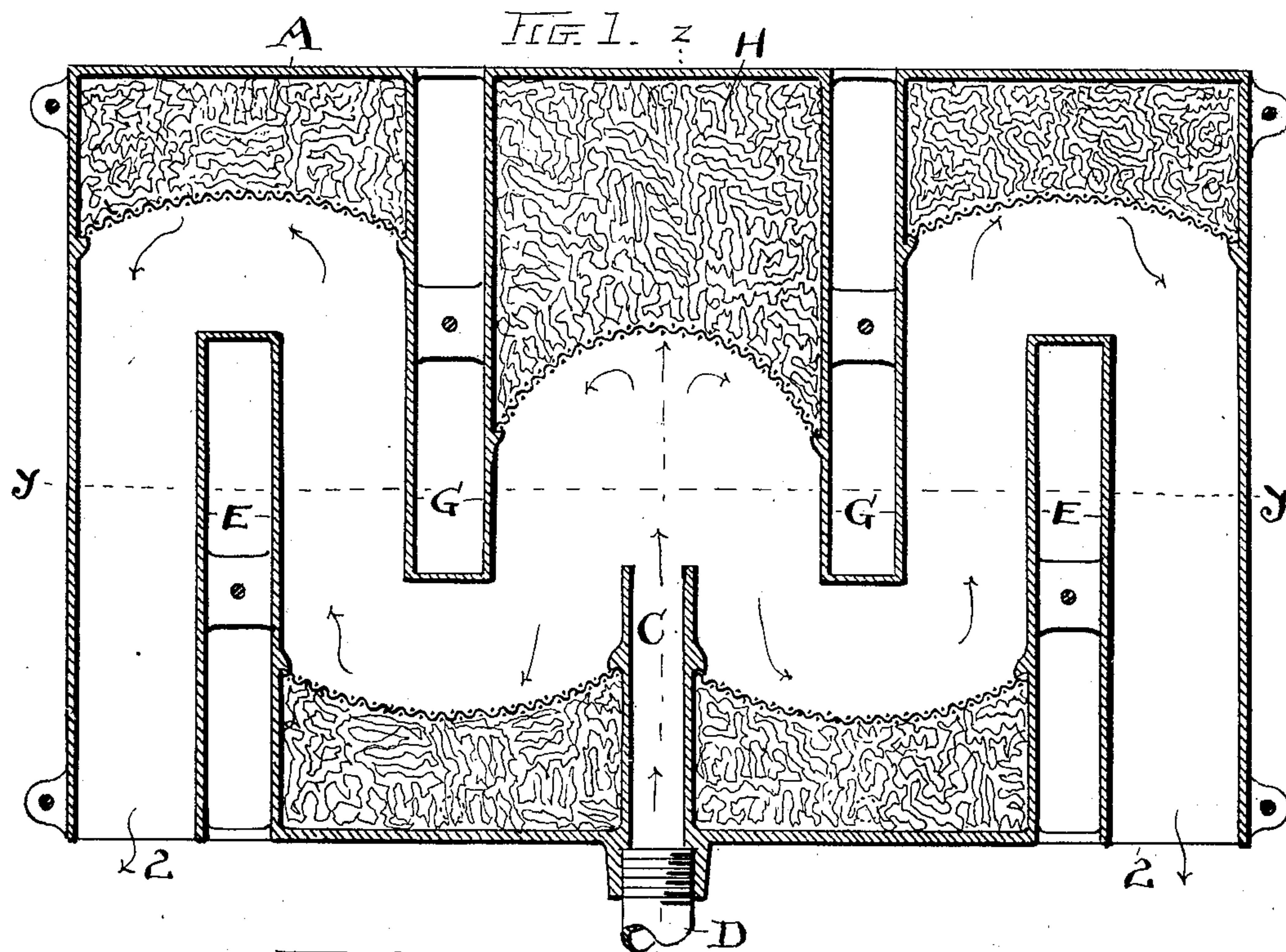


T. S. McKINNIE.

MUFFLER FOR STEAM OR OTHER ENGINES.

(Application filed July 25, 1901.)

(No Model.)



WITNESSES
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UNITED STATES PATENT OFFICE.

THOMAS S. MCKINNIE, OF CLEVELAND, OHIO.

MUFFLER FOR STEAM OR OTHER ENGINES.

SPECIFICATION forming part of Letters Patent No. 701,496, dated June 3, 1902.

Application filed July 25, 1901. Serial No. 69,612. (No model.)

To all whom it may concern:

Be it known that I, THOMAS S. MCKINNIE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Mufflers for Steam or other Engines; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to mufflers for steam and other engines; and the invention consists in a construction of muffler wherein the sound of discharge from the engine is deadened and the steam or other escaping vapor is more or less completely condensed and all without the production of any material back pressure by reason of resistance in the muffler, substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a horizontal plan view of the muffler, taken on a line corresponding to X X, Fig. 2; and Fig. 2 is a central cross-section of the muffler on a line corresponding substantially to Y Y, Fig. 1. Fig. 3 is a cross-section of the invention on a line corresponding substantially to Z Z, Fig. 1.

In the drawings thus shown and described I employ a muffler-casing A, which is comparatively shallow in depth, but may be deeper, if preferred, and is preferably rectangular, though it may be circular or other shape and is provided with a removable cover or top plate B. In the operation of the muffler I have planned to have such free discharge of the steam, if it be used in connection with a steam-engine, or of the vapor or products of combustion, if used with a gas or gasoline or other explosive engine, that there will be no material back pressure or resistance by reason of the discharge being through the muffler, as so frequently occurs in mufflers designed to serve the purposes of my invention. To these ends I construct the casing with a suitable nozzle or discharge C, set centrally in or through its edge and adapted to discharge into about the middle of the casing or a pipe D, making connection from the outside. At the sides of this central nozzle there is a chambered formation divided up by the

four several double-walled projections E E and G G. These projections have an internal air-space open to the outside air at their edges on both sides of the casing and at their outer ends, so that the walls serve as condensing-surfaces for the muffler in addition to dividing up the same into a succession of partly-closed compartments or chambers, as shown. It will be seen, furthermore, that the two sets of said projections E and G overlap each other about half their length, though they are set apart so as to leave a passage of ample size between them laterally, and the nozzle C discharges into the space between the two inner projections G, which project from the opposite wall of the casing at its sides. Said casing is provided with outlets 2 at one edge, and in this instance at the edge having nozzle C; but if the compartments were extended in numbers so as to have more subdividing-walls like E the discharge might be at the opposite edge as well.

It is of course desirable to get the most complete condensation and deadening of sound in the least possible space compatible with minimum back pressure. I have found that I can get this best by the use of mineral wool, asbestos, or like substance to cushion the impact of the discharge. Such material is comparatively open or loose in bulk and is a ready absorbent which is not affected by heat or steam or the like, and by placing this material directly in front of the discharge-nozzle, as well as at the turns about the ends of walls E and G, so as to arrest the sound and the escaping vapors here and there in their travel out through the muffler, I am enabled to both condense the escaping vapors and practically absorb all sounds.

It will be seen that I have placed a body of cushioning material H between the two projections G directly opposite nozzle C and confine it there by a wire-netting or its equivalent arranged, as here shown, on a circle and by means of which arrangement and construction the nozzle discharges directly against said material. I have found that by delivering sound against a yielding porous absorbent substance of this kind the sound is very largely absorbed and lost at the outset, and this is supplemented by the wool at the turns about projections E and G. The wool there-

fore serves both my purposes admirably and enables me to make a compact, cheap, and efficient muffler.

The cover B is removable, which enables me to replace the wool or whatever substitute therefor is used as frequently as may be required to keep the device in its best working condition.

A muffler thus constructed is admirably adapted to automobile and like vehicles, but is not limited to any given place or kind of engine in its use.

What I claim is—

1. A steam-muffler having a series of walls overlapping each other and spaced apart to form an open circuitous passage for the steam, an absorbent, condensing and cushioning material between said walls at each turn of said passage, and means to hold said material in place at said turns, substantially as described.

2. In a steam-muffler, a casing having oppositely extending and overlapping walls to form an open circuitous steam-passage from its inlet to its outlet, a removable cover sub-

stantially over the full length of said passage, an absorbent condensing material in the turns of said passage and a wire-netting to keep said material in place and maintain a free passage for the steam at the turns, substantially as described.

3. A muffler having a casing with double-walled air-spaces extending part way across the interior of the muffler from opposite directions, said air-spaces closed to the inside of the muffler and open to the outer air, substantially as described.

4. A muffler having double-walled projections extending into the interior and forming condensing-surfaces and division-walls, and an absorbent condensing and cushioning material between said projections at their base, substantially as described.

Witness my hand to the foregoing specification this 20th day of July, 1901.

THOMAS S. MCKINNIE.

Witnesses:

R. B. MOSER,
H. E. MUDRA.