No. 838,051. PATENTED DEC. 11, 1906.

C. PALMER.

ENGINE MUFFLER.

APPLICATION FILED JAN. 8, 1906.

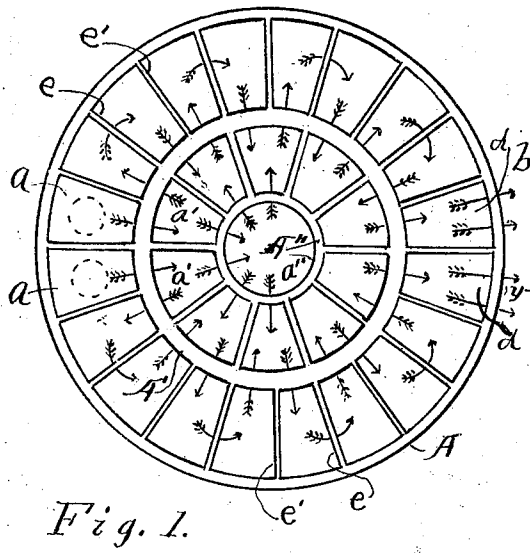


Fig. 1.

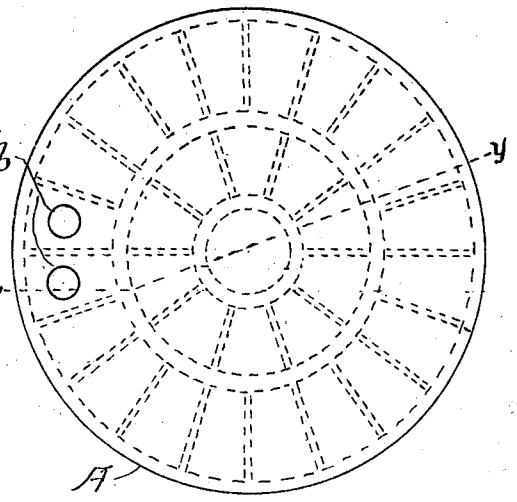


Fig. 2.

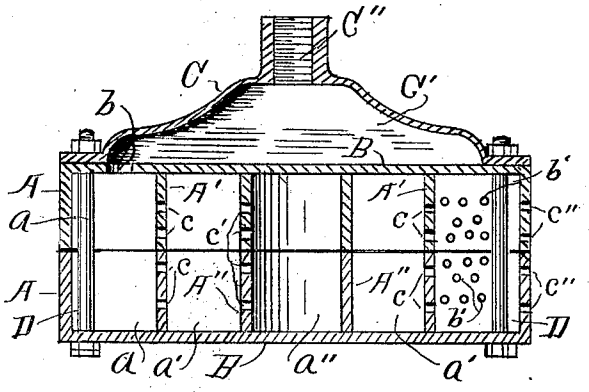


Fig. 3.

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ENGINE-MUFFLER.

No. 838,051. Specification of Letters Patent. Patented Dec. 11, 1906.

Application filed January 8, 1906. Serial No. 295,165.

To all whom it may concern:

Be it known that I, CHARLES PALMER, a citizen of the United States, residing at Lyons, in the county of Ionia and State of Michigan, have invented certain new and useful Improvements in Engine-Mufflers, of which the following is a specification.

My invention relates to improvements in appliances for muffling or deadening the sound of the exhausting gas from gasolene or other hydrocarbon engines; and its object is to so control the discharge of the exhaust as to entirely obviate the sharp explosive sounds common in this class of engines and to reduce the sound of exhaust to the minimum. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a top plan of the lower section of the subdivided chamber of my muffler. Fig. 2 is a top plan of the upper section of the same, and Fig. 3 is a vertical section of the complete muffler on the line *y y* of Fig. 2.

Similar letters refer to similar parts throughout the several views.

My simpler form of muffler consists of two sections A A, each having one side inclosed by a wall B B, so that when they are placed together, as in Fig. 3, they will form an inclosed chamber or box. These sections are subdivided by the walls A′ and A″ into the chambers *a a*, *a′ a′*, and *a″*. These subdivisions are again divided by the long arms or partitions *e*, and the outer annular chamber is again divided by the partitions *e′*, so that there are twice as many chambers or divisions in the outer circle as there are in the intermediate circle. These partitions are perforated practically as indicated in Fig. 1 and as shown at *b′*, *c*, *c′*, and *c″* in Fig. 3.

When the two sections A A have been placed together, as in Fig. 3, I place the cap C upon the upper section and secure all to place by means of bolts D, so that a chamber C′ is formed above the section-wall B.

The chamber *a″* is utilized as a cushion-chamber to receive and hold a portion of the exhaust-gas and facilitate its passage through the other subdivisions of the muffler by reason of the expansive qualities of the heated exhaust contained therein receiving and distributing the exhaust-gas, as indicated by the arrows that pass into and out of this chamber through the wall or partition A″.

Gas exhausted from a hydrocarbon-engine passes through the passage C″ into the chamber C′ and thence through the port-holes *b b* into the subdivisions *a a* and from these subdivisions through the wall A′ into the subdivisions *a′ a′*, whence it is distributed through the several subdivisions of the muffler, as indicated by the direction of the arrows, to the divisions *d d*, where it is discharged from the muffler through the apertures *c″ c″*. (See Fig. 3.)

The two-section muffler, as hereinbefore described, is for small engines. If it is desired to increase the capacity of the muffler, this may be done in two ways: first, by increasing the diameter of the sections A A, and, second, by forming additional sections without the walls B and placing them between the sections A A, thus increasing the capacity of the divisions *a a* and *a′ a′* with sections of the same diameter, by which means one set of patterns or templets may be made to suffice for constructing mufflers of different capacity.

It will be seen that the walls inclosing the divisions *a a* provide no means of escape for the gas except through the wall A″ into the divisions *a′ a′*, and that there is no means of communication between the divisions adjacent to the divisions *a′ a′* between the walls A′ and A″ except through the wall A′ into the divisions in the outer circle between the walls A and A′, and that all gas entering one chamber or division of the outer circle must pass back into a division in the inner circle before it can enter the adjoining division in the outer circle, and so on until it has reached the exhaust apertures at *c″*, where it is finally discharged from the muffler.

The passage of gas from the divisions *a′ a′* into the chamber *a″* and its discharge therefrom into several divisions in the inner circle of divisions, as indicated by the arrows passing through the wall A″, Fig. 1, serves a double purpose, first, to cushion the gas, as hereinbefore suggested, and, second, it distributes the discharge through the several adjacent divisions, and thus averts the danger of producing excessive back pressure upon the engine; but it would not be well to continue the discharge from this chamber to divisions farther back as it would make the discharge so direct as to greatly decrease the efficiency of the muffler.

The divisions *d d* are closely inclosed ex-

cept for the ingress-openings c' c' and the exhaust-openings c'' c''. This is necessary for the purpose of conducting the exhaust from either side of the ingress-ports b b through the proper channels to its individual exit, so that no back pressure will be formed by the two currents coming forcibly together in the same chamber.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

In a muffler for hydrocarbon-engines, hollow flat sections divided inside by annular walls to form a round central chamber, an annular inner chamber divided by radiating walls into a series of small compartments, the inner annular walls perforated for the passage of exhaust-gas the outer annular chamber divided by radial partitions having small apertures through them and these compartments so formed subdivided by solid walls, a receiving-chamber above the hollow sections and having openings to two of the outer compartments and irregular opening thence to a discharge at the opposite periphery of the hollow sections, substantially as and for the purpose set forth.

Signed at Grand Rapids, Michigan, January 5, 1906.

CHARLES PALMER.

In presence of—
I. J. CILLEY,
A. ALLGIER.