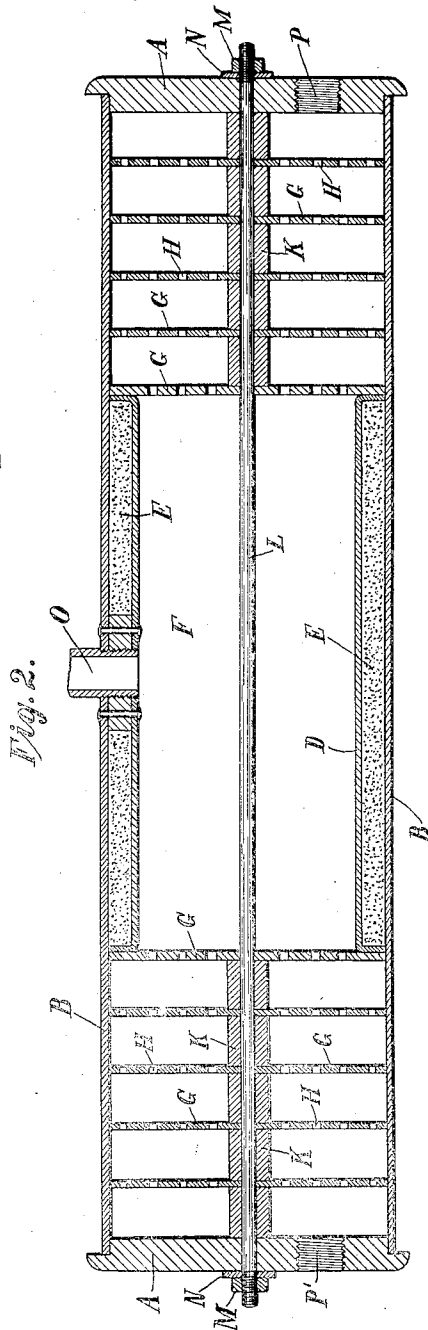
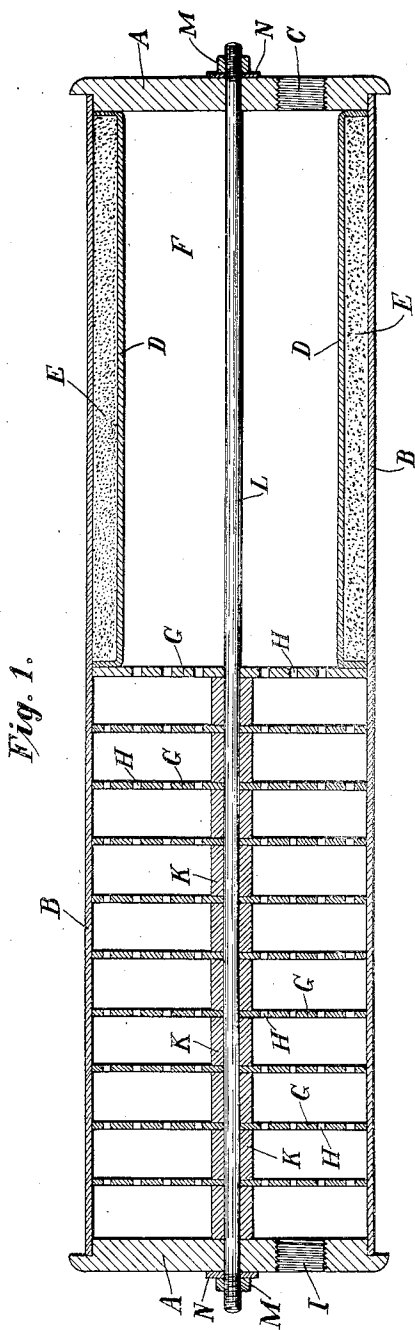


No. 844,669.

PATENTED FEB. 19, 1907.

J. E. FAIRCHILD.
MUFFLER.

APPLICATION FILED FEB. 17, 1906.



WITNESSES:

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JAMES E. FAIRCHILD, OF MAMARONECK, NEW YORK.

MUFFLER.

No. 844,669.

Specification of Letters Patent.

Patented Feb. 19, 1907.

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To all whom it may concern:

Be it known that I, JAMES E. FAIRCHILD, a citizen of the United States, and a resident in the village of Mamaroneck, county of Westchester, State of New York, have invented certain new and useful Improvements in Mufflers, of which the following is a specification, reference being had to the accompanying drawings, in which—

10 Figure 1 illustrates a longitudinal vertical section of one form of muffler embodying the invention. Fig. 2 illustrates a similar view of a modified construction.

The object of this invention is to provide
15 a muffler which shall be of light weight, compact, low cost, noiseless, or nearly so, and cool. The above advantages are realized in mufflers constructed according to this invention to a remarkable degree.

20 One form in which the invention may be embodied is shown in Fig. 1, and a modified form in Fig. 2; but the invention is not at all limited to the specific forms shown, as will be obvious to those familiar with this
25 art.

The essential features may be embodied in mechanical constructions quite different from those illustrated, which I have shown as examples merely.

30 Referring first to Fig. 1, A A are two head-pieces or disks, which may be circular or any other outline and preferably made of aluminium for the sake of lightness. B is an exterior shell extending between the heads
35 A A. C is the inlet from the exhaust-port of the engine. D is an interior or lining shell. E is asbestos, mineral wool, or similar packing to reduce heat. F is the expansion-chamber. G G are a series of baffle-plates provided
40 with openings H H H, &c., the total area of which equals and is preferably somewhat greater than the area of the exhaust-inlet C. I is the delivery-port of the muffler. It likewise at least equals, if it does not exceed, the area of the inlet C. K K K are a series of tubular sections or bushings which surround the clamping-rod L, which is provided with clamping-nuts M upon each end, which are preferably provided with washers
50 N N. The bushings K serve to space and also support the baffle-plates. The first baffle-plate next the expansion-chamber F, I prefer to make additionally thick, hence strong, as illustrated, in order to withstand
55 the pressure in the expansion-chamber.

It may be additionally supported in such manner as desired.

The operation is as follows: The products of combustion passing from the exhaust of the cylinder or cylinders enters the muffler at C and expands in the expansion-chamber F. In order to reduce the heat thus generated, the interior lining D and the non-conducting packing E are supplied. From the expansion-chamber the products of the exhaust pass through the holes H in the first baffle-plate G into the chamber between it and the next succeeding baffle-plate, and thence in turn through the perforations in each of the succeeding baffle-plates and chambers between them. Although their is no prescribed number of perforations necessary per horse-power, I prefer that the perforations should be many and relatively small in each plate. Their total area, however, should at least equal and preferably exceed the area of the inlet C, so that there shall be free exit of the gases, thus avoiding back pressure. Similarly, there is no prescribed number of baffle-plates required; but I have found that the number illustrated in the drawings—that is to say, ten—secures very good results.

My muffler is characterized by the following:

85 First. Although the motor may be run with sufficient speed to make the exhaust-pipe connecting the engine-cylinder and muffler very hot, approaching red heat, nevertheless the muffler, except at the front head, will be relatively cool, so that it may be touched by the hand without injury thereto.

Second. The hand may be passed through the exhaust at the tail of the muffler without scorching. This I attribute to the employment of the non-conducting jacket at the expansion-chamber and to the succession of baffle-plates with intervening chambers, in each of which, as is well understood, the charge is successively cooled by reason of its additional expansion.

In Fig. 2 I show a construction practically the same as that above described and illustrated in Fig. 1, except that the exhaust of the engine enters at Q and escapes from the expansion-chamber F to the right and left, as illustrated, and passes out through the exhaust-ports P P', the construction otherwise being, as stated, the same as described in FIG.

connection with Fig. 1. The same number of baffle-plates are also shown; but they are divided and arranged at the right and left of the expansion-chamber F.

5 I prefer that the expansion chamber or cylinder should have at least twice the area of the engine-cylinder and where compactness is not requisite it may beneficially be even larger than this. The non-conducting
10 jacket of asbestos or mineral wool not only reduces the heat, but likewise the noise.

The exterior shell B and the interior casing D and the baffle-plates and spacing-bushings K may all, if preferred, be made of alu-
15 minium, as well as the heads, for the sake of lightness; but sheet steel, brass, or galvanized iron may beneficially be used for these parts of the apparatus.

I do not show any exterior appliances
20 whereby the muffler may be supported or held in proper position relative to the motor or engine because, as is well understood, such means will be varied in different constructions, and many suitable appliances for this
25 purpose are now well known and in extensive use.

I claim—

1. A muffler embodying a casing closed at each end by a head substantially one half
30 longitudinally of which constitutes an open expansion-chamber with which the exhaust from the engine-cylinder connects and a series of transverse chambers in the remaining half of the casing which extend across the
35 cylinder from side to side and are separated from each other by baffle-plates, each provided with a series of holes the total area of which at least equals that of the engine-exhaust, the end wall of the last of the series of
40 transverse chambers being one of the heads of the casing, which is provided with an exhaust-port.

2. A muffler embodying a closed casing substantially one half longitudinally of
45 which constitutes an open expansion-chamber with which the exhaust from the engine-cylinder connects, a non-conducting cover-

ing or jacket for the expansion-chamber and a series of transverse chambers in the remain-
ing half of the casing which extend across the 50 cylinder from side to side, the dividing-walls of which are baffle-plates, each provided with a series of holes the total area of which at least equals that of the engine-exhaust, the last of the series of transverse chambers be-
55 ing provided with an exhaust-port.

3. A muffler embodying a closed casing made in the form of a cylinder one end of which constitutes an open expansion-cham-
ber with which the exhaust from the engine 60 connects and a series of transverse chambers arranged side by side longitudinally of the cylinder beyond the expansion-chamber and separated from each other by baffle-plates, each provided with a series of holes, the total
65 area of which at least equals that of the engine-exhaust, said baffle-plates being held in proper position by a longitudinally-extending rod and intervening spacing blocks or bushings, the last of the series of transverse
70 chambers having an exhaust-port.

4. A muffler embodying an exterior casing each end of which is closed by a substan-
tial head, substantially one half of the inter- 75 rior of the casing constituting an open expansion-chamber with which the exhaust from the engine-cylinder connects and substantially the other half being divided into a series of transverse chambers, the dividing-walls of which are baffle-plates provided with
80 holes, the area of which is at least equal to that of the engine-exhaust, and a rod provided with spacing blocks or bushings, thus binding the entire structure together, the last of the transverse chambers having an ex-
85 haust-port.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES E. FAIRCHILD.

Witnesses:

CHAS. SAPORITO,
ANDREW S. COLES.