H. M. PATCH.

MUFFLER.

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1,357,079. Patented Oct. 26, 1920.

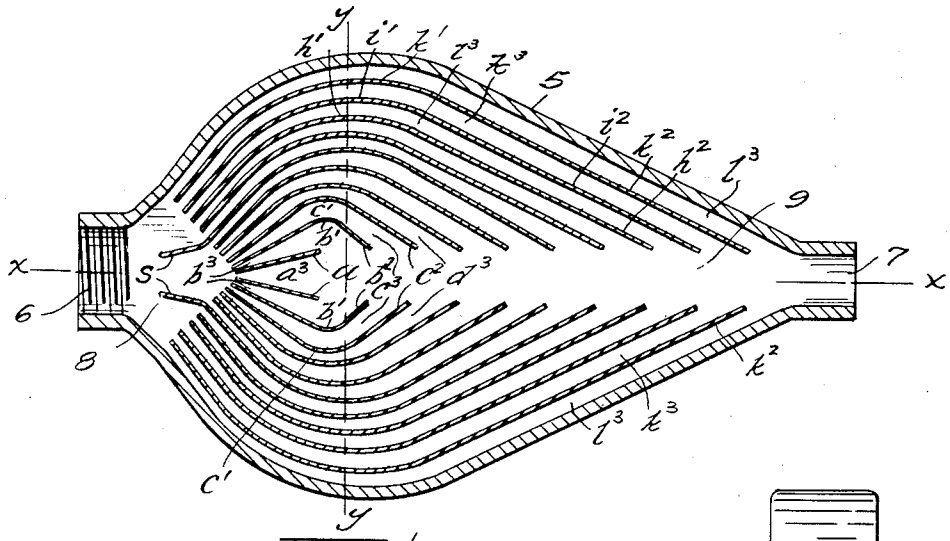


FIG. 1

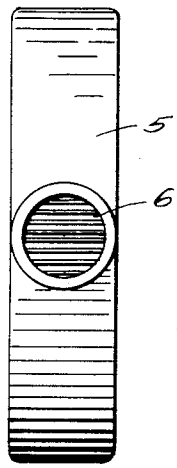


FIG. 2

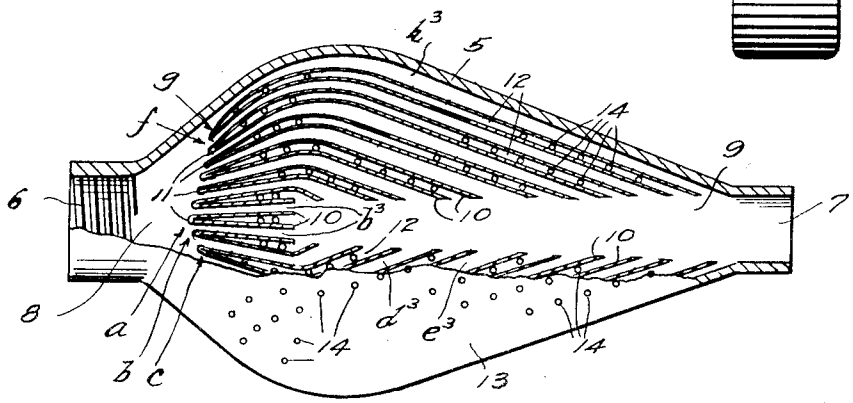


FIG. 3

INVENTOR:
Harry M. Patch
BY
Pierre Barnes
ATTORNEY

UNITED STATES PATENT OFFICE.

HARRY M. PATCH, OF SEATTLE, WASHINGTON.

MUFFLER.

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To all whom it may concern:

Be it known that I, HARRY M. PATCH, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Mufflers, of which the following is a specification.

This invention relates to mufflers for the exhaust gases of internal combustion engines such as are used, more especially, on automobiles and other power driven vehicles.

The object of my invention is the provision of a muffler which will serve to silently discharge the engine exhaust gases and with substantially no back pressure to lessen the efficiency of the engine.

A further object of the invention is to provide a muffler in which is employed a plurality of unobstructed channels through which the gas travels in such a manner as to maintain the interior of the muffler practically free from carbon deposits.

With the above and other objects in view, the invention consists in the novel construction, arrangement and combination of parts as will be hereinafter described and claimed.

In the accompanying drawings, wherein like reference characters designate corresponding parts in all the views, Figure 1 is a horizontal longitudinal section of a muffler embodying my invention in the form now preferred by me. Fig. 2 is an end elevational view of the same. Fig. 3 is a view partly in plan and partly in longitudinal section showing a modified form of the muffler structure.

In said drawings, and referring first to Figs. 1 and 2, the numeral 5 represents a shell or casing which is, by preference, substantially of a pear shape in horizontal section and is provided at one end with an inlet opening 6 which in practice communicates with the exhaust pipe leading from an explosion engine.

At its opposite end, the casing is provided with an outlet opening 7 arranged in axial alinement with the inlet opening and also with the major axis x—x of the casing.

The interior of the casing is provided with a plurality of partitions a, b, c, etc., disposed in similarly arranged groups, as shown in Fig. 1, at opposite sides of the axis x—x to afford a receiving chamber 8 adjacent to said inlet and a central discharge passage 9 extending from said outlet to within a short distance of the receiving chamber. The partitions of each of said groups extend outwardly from the receiving chamber 8 into proximity of the minor axis y—y of the casing near which the inner partitions a, a terminate. The other partitions b, c, etc., continue in curved portions as b^1, c^1, etc., and terminate in inwardly directed straight portions b^2, c^2, etc., which extend to the discharge passage 9, substantially as shown. In order to insure that a proper proportion of the gas will pass through the outer or longer channels, such as k^3 and l^3, one or more of the partitions of such series are advantageously protruded, into the receiving chamber to afford directing elements s. By such configuration and arrangement of the partitions is provided a central flaring channel a^3 connecting the receiving chamber 8 with the discharge passage 9 and a series of curviform channels b^3, c^3, l^3 of progressively greater lengths.

The exhaust from an engine enters the receiving chamber 8 in rapidly recurring impulses and thence encountering the partitions is divided into a series of streams which travel through the various aforesaid channels. These streams, however, are caused to travel different distances, at different speeds and under different degrees of expansion before reaching the discharge passage 9 wherein the streams successively merge in a main stream which is substantially free from impulses and will issue from the muffler in a practically continuous and noiseless discharge.

The modification illustrated in Fig. 3 is substantially similar to the above described embodiment of the invention except with regard to a provision which is made for the admission of air into the muffler and the changes made in the partitions to accommodate the same.

For which purpose each of the partitions is formed of two plate elements 10 joined at the receiving chamber 8, as at 11, and to the rear thereof is spaced to afford a cavity 12 between the respective plate elements and which opens into the passage 9. Provided in the upper and lower walls 13 of the casing (Fig. 3) are perforations 14 opening into the wall cavities 12 for supplying cooling air into the latter whence it escapes in confluence with the branch streams into the main passage 9.

It is to be noted that in the present invention the channels through which the exhaust gases pass contain no baffling devices nor return bends but conduct such gases unobstructedly from the inlet to a discharge passage.

What I claim, is—

1. A muffler comprising a casing having inlet and outlet openings at its opposite ends, series of curviform partitions provided within the casing to divide the same into a receiving chamber at the inlet end and a discharge passage arranged axially of the casing and coextensive with the outlet opening, said partitions also affording channels whereby gas is conducted successively in divergent and confluent streams in traveling from said chamber to said discharge passage.

2. A muffler comprising a casing having inlet and outlet openings at its opposite ends, a plurality of partitions provided in the casing between said openings and affording a central passage and unobstructed channels of different lengths for the flow of gas from said inlet into said passage, said channels communicating through their respective discharge ends with said passage at different distances from said inlet, thereby eliminating the impulses from the exhaust gases and delivering the same in a substantially continuous stream from the muffler outlet.

3. A muffler comprising a casing of substantially a pear shape in transverse section and having an inlet at its oblate end and an outlet at its prolate end, said casing being provided interiorly with series of partitions arranged to afford curviform channels of greater lengths progressively from the major axis of the muffler toward the outer sides of the latter, said partitions being furthermore arranged to afford a receiving chamber adjacent to said inlet and a discharge passage common to all of said channels and communicating with said outlet.

4. A muffler comprising a casing having axially alined inlet and outlet openings at its opposite ends and a discharge passage coextensive with said outlet opening and extending from the latter to within a short distance of the inlet opening, series of partitions arranged in two groups respectively at opposite sides of said passage and affording channels of different lengths in each of said groups between the muffler inlet and said passage whereby the gas is transmitted in a plurality of streams and delivered into said passage at different distances from said inlet to eliminate gas impulses into a substantially continuous stream.

5. A muffler comprising a casing having axially disposed inlet and outlet openings at opposite ends thereof, and a discharge passage coextensive with said outlet opening and extending from the latter to within a short distance of the inlet opening, and a series of partitions dividing the interior of the casing into a plurality of curviform channels whereby the gas is compelled to travel in a plurality of divergent and confluent streams in traveling between said inlet opening and said passage and at different distances in the latter from said inlet opening to eliminate gas impulses into a substantially continuous stream.

6. A muffler comprising a casing having gas inlet and outlet openings at its opposite ends and a plurality of hollow partitions disposed between said openings to provide a central passage which communicates with the outlet opening and a plurality of channels of different lengths making communication between said inlet opening and said passage, said casing being provided in a wall thereof with perforations whereby air is admitted from the external atmosphere into the spaces within the respective hollow partitions.

Signed at Seattle, Washington, this 14th day of June, 1919.

HARRY M. PATCH.

Witnesses:
PIERRE BARNES,
ELIZABETH JOHNSON.