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2,658,580

SILENCER FOR INTERNAL-COMBUSTION ENGINES

Filed Sept. 26, 1949

2 Sheets-Sheet 1

Fig. 1

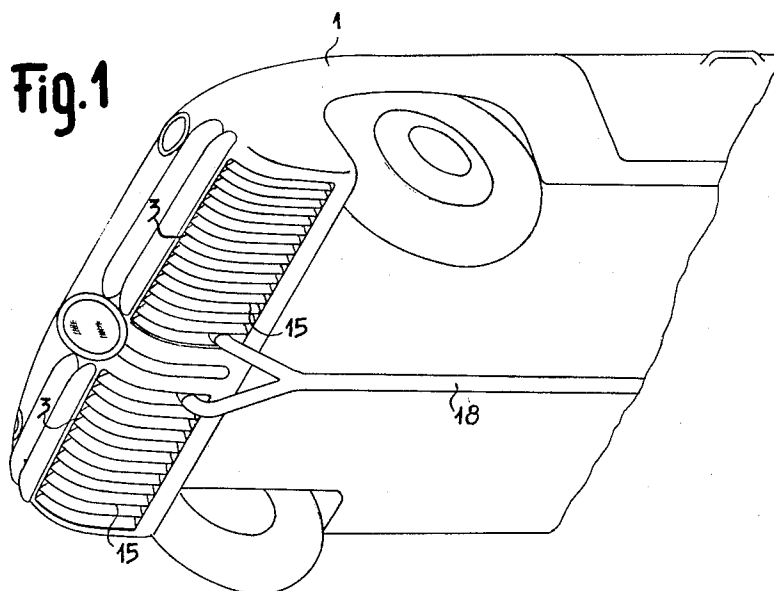
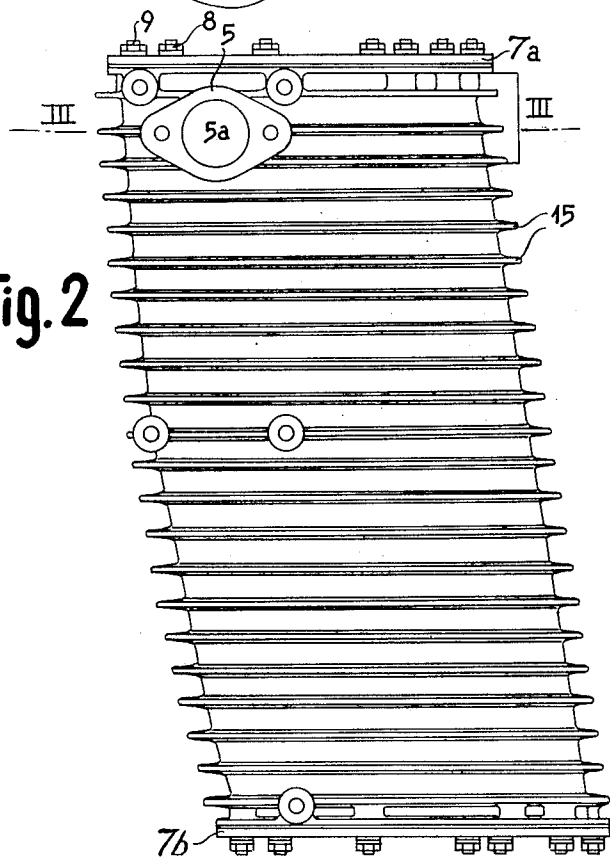


Fig. 2



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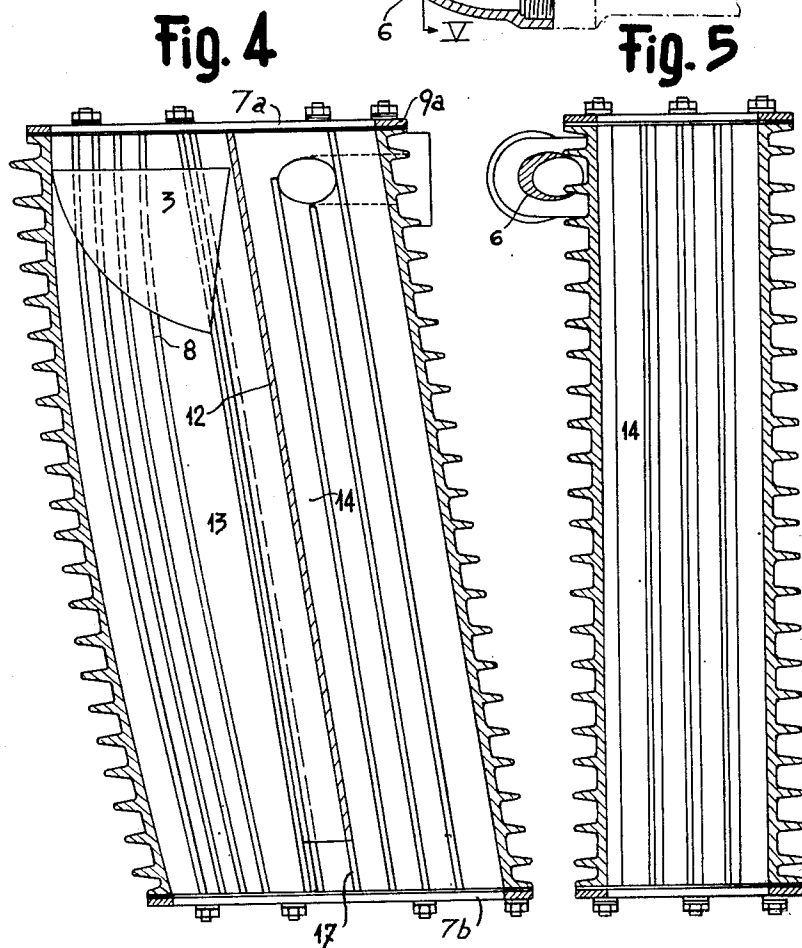
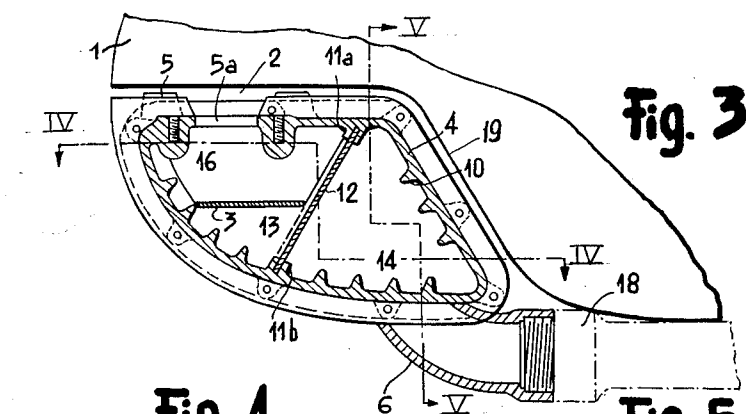
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## UNITED STATES PATENT OFFICE

2,658,580

SILENCER FOR INTERNAL-COMBUSTION  
ENGINES

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3 Claims. (Cl. 181-49)

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The present invention relates to silencers for internal combustion engines particularly for automobile vehicles. The object of these silencers is to obtain a rapid and complete cooling of the exhaust gases without opposing any obstacle to their flow. It is known that the essential condition for obtaining silent operation of an engine is the cooling of the burnt gases.

It has for its subject more particularly a silencer of novel construction and the combination of this silencer with the engine elements and the body work of the land, air or sea vehicle on which it is mounted. The silencer, of the present invention, for an internal combustion engine mounted on a land, air or sea vehicle, is formed by a thick casing of a metal which is a good conductor of heat through which the exhaust gases pass in the direction of its greatest length and provided internally, with fins parallel to the direction of flow of the exhaust gases and, externally, with fins parallel to the direction of flow of a stream of air resulting from the movement of the vehicle.

The hollow body formed by the thick casing may be separated longitudinally by a central partition provided with at least one orifice placing the two internal chambers of the silencer in communication, the inlet pipe for the exhaust gases leading into one of these chambers and the exhaust pipe placing the other of these chambers into communication with the outside.

In order to ensure the effective skimming of the air over the part of the silencer which is located in the zone of aerodynamic depression, a sheet, forming a deflector, may partly surround the silencer at least at this part.

The silencer may be placed transversely to the longitudinal axis of the vehicle in a cell in the bottom of the front part of the said vehicle, the wall of the cell surrounding the upper and rear parts of the silencer and forming the deflector sheet above and the front and lower parts being exposed to the stream of direct air.

The longitudinal partition may be substantially vertical, the pipe for the exhaust gases leading into the front chamber and the exhaust pipe leaving the rear chamber.

A plate forming deflector may be located in the cavity of the silencer so as to deviate the flow of the exhaust gases and the exhaust pipe may pass along the body of the vehicle and opens at the rear of this in a zone of aerodynamic depression.

The accompanying drawings show by way of example a form of construction of the device

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of the invention for a vehicle with a V-engine with two twin silencers, each receiving the exhaust gases from one of the groups of cylinders. In these drawings:

Fig. 1 is a view from the front and underneath the vehicle.

Fig. 2 is a view of the top of the silencer.

Fig. 3 is a section on the line III—III of Fig. 2.

Fig. 4 is a section on the line IV—IV of Fig. 3.

Fig. 5 is a section on the line V—V of Fig. 3.

The body 1 of the vehicle has on opposite sides of a central plane, two cells 2 in which are located two silencers 3 each receiving the exhaust gases from one of the groups of cylinders of a V-engine. The silencer 3 is formed by a hollow body 4 formed by a thick casing of a metal which is a good conductor of heat, having in the neighborhood of its end near the central plane of the vehicle, at its upper part, an opening 5a surrounded by a collar 5 for the attachment of an exhaust pipe supplying the exhaust gases of the engine and, at its lower portion, an exhaust pipe fitting 6. The two ends of the hollow body 4 are closed by a plate 7a, 7b, respectively, held in position by nuts 8 co-operating with screwed studs 9. Joints 9a ensure fluidtightness between the hollow body and the plates 7a and 7b.

The interior of the hollow body 4 has longitudinal fins 10 and two groups of fins 11a, 11b arranged closely together forming mortices for retaining a central partition 12. The central partition 12 is interrupted adjacent the plate 7b and at a predetermined distance from this so as to establish communication between the two chambers 13 and 14 formed thereby in the interior of the hollow body 4. This arrangement causes the gases to sweep over the external plate 7b.

The outside of the hollow body is provided with transverse fins 15 parallel to the longitudinal plane of the vehicle.

In the chamber 13, underneath the inlet 5a for the exhaust gases, a plate 16 cast integral with the plate 7b, forms a deflector and deflects the exhaust gases entering perpendicularly into the axial direction of the silencer.

The exhaust gases entering at 5a are deviated by the plate and pass longitudinally through the chamber 13 whilst transferring their heat to the fins 10 which line the chamber. They then pass through the gap 17 provided between the partition 12 and the plate 7b into the chamber 14 through which they also pass longitudinally in the opposite direction so as to escape through the exhaust pipe 6, which is connected to the pipe 18 located

in the lower part of the body 1 of the vehicle and discharging at the rear of the latter in a zone of aerodynamic depression. The stream of air produced by the movement of the vehicle impinges directly on the front and lower part of the silencer, the transverse fins 15 provided on this portion facilitating the heat exchange between the mass of the hollow body and the stream of air. A second stream of air circulates over the outer and rear plates of the silencer between the fins 15 provided on this part, the outer wall of the hollow body and the wall 19 of the body forming the cell 2.

Instead of a single opening 17 placing the chambers 13 and 14 in communication, a number thereof may be provided.

The silencer described is preferably arranged transversely to the longitudinal axis of the vehicle in a cell at the bottom of the front portion of the vehicle.

For ensuring the effective passage of the air over the part of the silencer which is located in the zone of aerodynamic depression, a sheet, forming a deflector, partly surrounds the silencer at least at this portion. This sheet is formed by the wall 19 of the cell surrounding the upper and rear parts of the silencer. The front and lower parts are exposed to the direct air stream. The internal longitudinal partition is substantially vertical and the inlet pipe for the exhaust gases leads into the front chamber, the exhaust pipe leaving the rear chamber.

I claim:

1. A muffler for an internal combustion engine of a vehicle having a cell in its lower front portion open at the front and bottom and closed at its top and rear, comprising an elongated hollow body having thick walls of a metal which is a very good conductor of heat, said body having inlet and outlet openings for exhaust gases disposed to effect the flow of gases longitudinally through the body, a plurality of fins projecting into the hollow body from the inner surfaces of its longitudinally extending walls, said fins extending longitudinally of the hollow body and parallel to the direction of gas flow through the body, and a plurality of fins on the outer surface of the walls of the hollow body extending in a direction parallel to the direction of flow of cooling air over the outer surface of the hollow body due to travelling movement of the vehicle, the inner fins being provided to remove the greatest amount of heat possible from the exhaust gases in the hollow body for transfer to the outer fins and dissipation in the cooling air, said muffler being mounted in said cell with its internal fins extending transversely of the direction of movement of the vehicle and its external fins extending parallel to the direction of movement of the vehicle with the front and bottom portions of the muffler directly exposed and with the upper and rear portions of the muffler spaced from the upper and rear portions of the cell for the deflection of air over the upper and rear portions of the muffler by the corresponding portions of the cell.

2. A muffler for an internal combustion engine mounted on a vehicle, comprising an elongated hollow body having thick walls of a metal which is a very good conductor of heat, a partition extending from one end of the hollow body to a region spaced from the other end thereof to divide

the body into two longitudinally extending compartments communicating at said region, said body having inlet and outlet openings at said one end on opposite sides of the partition to effect longitudinal flow of gases serially through said compartments, a plurality of fins projecting into the hollow body from the inner surfaces of its longitudinally extending walls, said fins extending longitudinally of the hollow body and parallel to the direction of gas flow through the body, and a plurality of fins on the outer surface of the walls of the hollow body extending in a direction parallel to the direction of flow of cooling air over the outer surface of the hollow body due to travelling movement of the vehicle, the inner fins being provided to remove the greatest amount of heat possible from the exhaust gases in the hollow body for transfer to the outer fins and dissipation in the cooling air.

3. A muffler for an internal combustion engine mounted on a vehicle, comprising an elongated hollow body having thick walls of a metal which is a very good conductor of heat, a partition extending from one end of the hollow body to a region spaced from the other end thereof to divide the body into two longitudinally extending compartments communicating at said region, said body having inlet and outlet openings at said one end on opposite sides of the partition to effect longitudinal flow of gases serially through said compartments, a plurality of fins projecting into the hollow body from the inner surfaces of its longitudinally extending walls, said fins extending longitudinally of the hollow body and parallel to the direction of gas flow through the body, a plurality of fins on the outer surface of the walls of the hollow body extending in a direction parallel to the direction of flow of cooling air over the outer surface of the hollow body due to travelling movement of the vehicle, the inner fins being provided to remove the greatest amount of heat possible from the exhaust gases in the hollow body for transfer to the outer fins and dissipation in the cooling air, and a deflector sheet partially surrounding the portion of the muffler located in the zone of aerodynamic depression produced upon movement of the vehicle through air for effecting the flow of cooling air over the partially surrounded portion of the muffler.

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