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Weber

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[54] **EXHAUST GAS MUFFLER FOR INTERNAL COMBUSTION ENGINES OF VEHICLES**

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[52] **U.S. Cl.** **181/38**, 181/60

[51] **Int. Cl.** **F01m 7/00**

[58] **Field of Search** 181/38, 44–46, 181/60, 72

[56] **References Cited**

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[57] **ABSTRACT**

An exhaust gas muffler for internal combustion engines of vehicles, especially for internal combustion engines of sports vehicles, which participate both in traffic on public roads as also in closed sporting events; the exhaust gas muffler which is provided with silencing means is constructed as combination muffler having several exhaust pipes, in which the conduction of the exhaust gases from the internal combustion engine to the exhaust pipes takes place selectively by way of the silencing means of the muffler or in by-passing relationship to the silencing means into the atmosphere.

8 Claims, 4 Drawing Figures

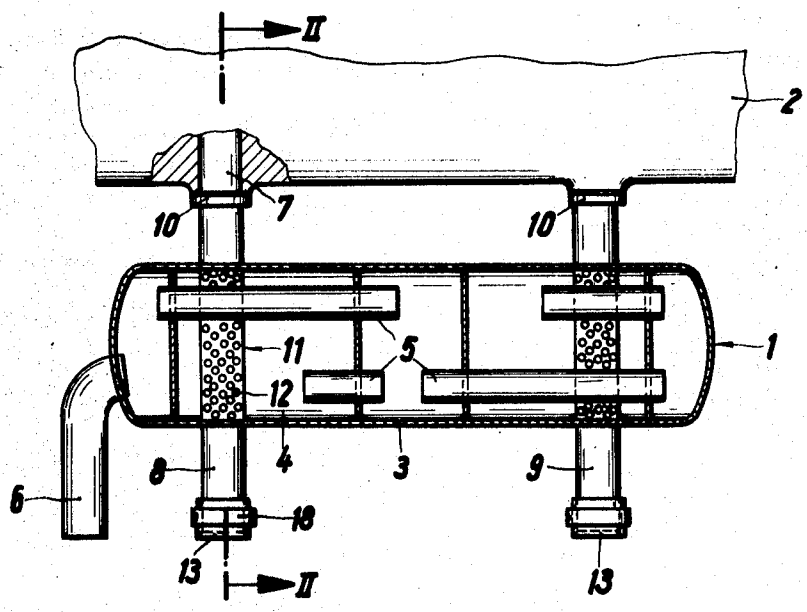


Fig.1

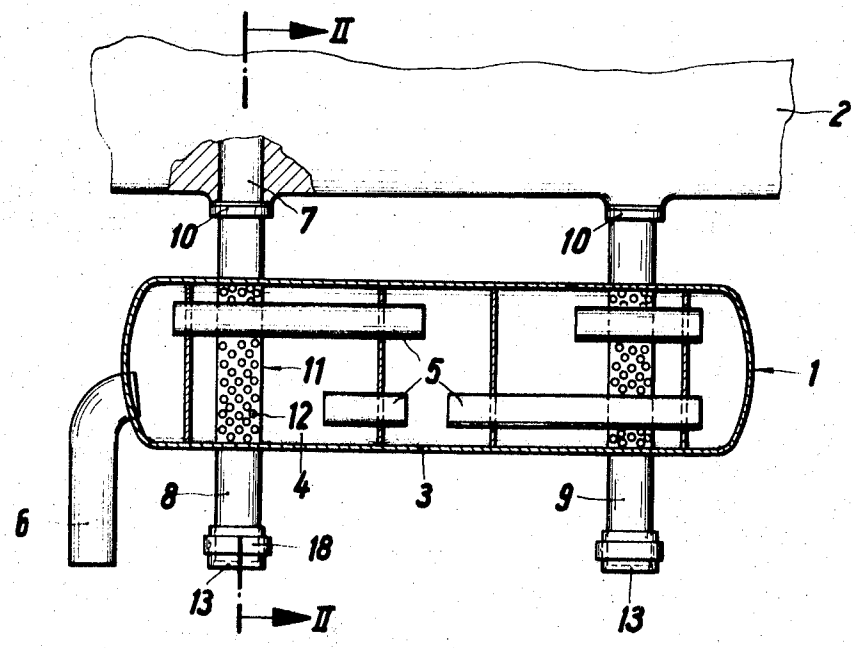


Fig.2

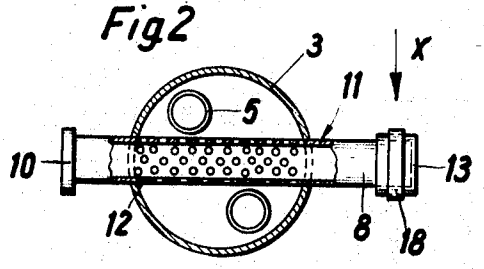
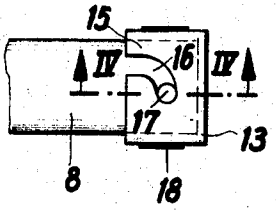


Fig.3



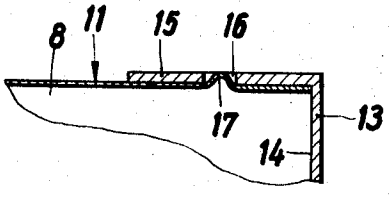


Fig.4

EXHAUST GAS MUFFLER FOR INTERNAL COMBUSTION ENGINES OF VEHICLES

The present invention relates to an exhaust gas muffler for internal combustion engines of vehicles, especially for internal combustion engines of sports vehicles, which participate both in the traffic on public roads as well as in closed sporting events and whose exhaust gas mufflers are provided with silencing means.

Exhaust gas mufflers for vehicles, especially for sports vehicles, must be so constructed that they lie within the legally permissive noise development during the operation in traffic on roads that are generally open to the public.

Exhaust gas mufflers for vehicles, which participate in public road traffic, are provided with silencing means on the inside of the muffler which limit the noise development of the exhaust gases to a legally permissive decibel level. Necessarily, however, also the output of the internal combustion engine is reduced by these silencing or noise-preventing means. If such vehicles are now used for rallies or racing events, in addition to the various changes in the vehicle required for such purposes, also the output of the internal combustion engine is increased. A special exhaust gas muffler is therby used also to exploit the full output of the internal combustion engine, which does not possess any silencing means so that the exhaust gases can be conducted into the atmosphere without any significant resistance. If after the racing or rallying event the vehicle is utilized again in traffic on public roads, then at least the exhaust gas muffler has to be interchanged for an exhaust gas muffler provided with a silencing section which limits the exhaust gas noises to the legally prescribed extent. A not inconsiderable expenditure involving significant costs is achieved thereby which in addition to the continuing installation and dissassemblies of the exhaust gas mufflers and the increased wear conditioned thereby of the securing parts as well as of the sealing flanges at the internal combustion engine requires also a considerable expenditure in time. Furthermore, with such vehicles the interchange of the respectively required exhaust gas muffler can be undertaken only at the location of actual use, for example, during races only at the closed off racing course which has proved extraordinarily complicated in addition to the other racing preparations. Also in case of rallying events which lead partially through city sections, an exhaust gas muffler without any silencing installations cannot be provided always since such mufflers for the most part are not permitted due to the large noise development. In order to avoid these impairments and nonetheless to obtain an approximately good output of the internal combustion, for the most part larger mufflers are utilized with a smaller exhaust gas internal resistance whose noise development lies at the upper limit of the still permissive value. However, the full output of the internal combustion engine necessarily cannot be attained thereby which has an effect on the entire rally event. On road sections closed off to public traffic, it would be advantageous to utilize an exhaust gas muffler which does not utilize any silencing parts so that the internal combustion engine can produce its full output.

The aim of the present invention essentially consists in contradistinction thereto to provide an exhaust gas muffler which can be adapted within the shortest possible time to the corresponding utilization conditions and can be manufactured in a cost-saving manner.

The underlying problem of the present invention is solved in that the exhaust gas muffler is constructed as combination muffler with several exhaust pipes, in which the exhaust gas conduction from the internal combustion engine to the exhaust pipes takes place selectively by way of silencing means of the muffler or in by-passing of the silencing means into the atmosphere. It is advantageous that the exhaust gas muffler includes three exhaust pipes of which one exhaust pipe leads into the atmosphere by way of the silencing means of the muffler. A further advantage resides in that the walls of the exhaust pipes connected directly with the exhaust gas channels of the internal combustion engine are provided with several openings on the inside of the muffler. Preferably the walls of the exhaust pipes are provided with at least one outwardly curved cam or bead and the discharge openings of the exhaust pipes connected directly to the internal combustion engine are closed off by covers. It is of particular advantage that the covers are constructed pot-shaped and consists of a heat-resistant material and the edge portion of the covers is provided with at least one groove in the manner of a bayonet connection which engages in the cams of the exhaust pipes. Appropriately the covers are secured on the exhaust pipes by a clamping band.

The advantages achieved with the present invention reside in that owing to the described construction of an exhaust gas muffler, a simple and cost-saving manufacture thereof is made possible, with which the continuous disassembly necessary for the respective application purpose is obviated and which once installed in the vehicle, can be left thereat. By the arrangement of several exhaust pipes which conduct the exhaust gases partially by way of the silencing means of the exhaust gas muffler and partially directly into the atmosphere, a combination of a racing muffler and of a series muffler is achieved, in which depending on use thereof a part of the exhaust pipes can be closed by covers adapted to be mounted thereon or can be opened. As a result thereof the exhaust gas muffler according to the present invention can be converted with a short period of time, for example, on closed-off road sections, by removal of the covers from the exhaust pipes in such a manner that the exhaust gases are conducted into the atmosphere in by-passing the silencing means, whereby the internal combustion engine can be brought to its full output. The covers can be rapidly mounted or removed at any time by the construction of the covers and of the exhaust pipes in accordance with the present invention. For longer drives on public roads, the covers are additionally secured by means of a clamping band which contributes to the increase of the safety in road traffic.

These and further objects, features and advantages of the present invention will become more apparent from the following description when taken in connection with the accompanying drawing which shows, for purposes of illustration only, one embodiment in accordance with the present invention, and wherein

FIG. 1 is a longitudinal cross-sectional view through an exhaust gas muffler in accordance with the present invention for an internal combustion engine of vehicles,

FIG. 2 is a cross-sectional view through the exhaust gas muffler along line II—II of FIG. 1,

FIG. 3 is a plan view in the direction of arrow X of FIG. 2 on one of the end pipes with installed cover, on an enlarged scale, and

FIG. 4 is a partial cross-sectional view through one of the exhaust pipes taken along line IV—IV of FIG. 3, on an enlarged scale.

Referring now to the drawing wherein like reference numerals are used throughout the various views to designate like parts, the exhaust gas muffler generally designated by reference numeral 1 for an internal combustion engine 2 consists essentially of a muffler 3 which is subdivided into several chambers 4. The chambers 4 of the muffler 3 are provided with a soundproofing or silencing means 5 that is constituted by individual pipe lines which extend through the individual chambers 4. An exhaust pipe 6 mounted laterally on the muffler pot 3 serves for the discharge of the exhaust gases from the internal combustion engine through the exhaust gas channels 7 by way of the silencing meand 5 into the atmosphere. The mounting of the muffler pot 3 at the internal combustion engine 2 takes place by way of two exhaust pipes 8, 9 which are connected by way of flanges 10 with the exhaust gas channels 7 of the internal combustion engine 2. The exhaust pipes 8 and 9 extend through the muffler pot 3 and on the side of the muffler 3 opposite the fastening thereof also lead into the atmosphere. The walls generally designated by reference numeral 11 of the exhaust pipes 8 and 9 are provided within the area that lies on the inside of the muffler 3 with a large number of apertures 12. The discharge openings 14 (FIG. 4) of the exhaust pipes 8 and 9 are adapted to be closed by covers 13. For that purpose, the covers 13 are constructed pot-shaped and consist selectively either of aluminum or sheet metal. Tbe pot-shaped edge 15 (FIG. 3) of the cover 13 is provided with a groove 16 which is constructed in a manner of a bayonet connection. For this purpose, an outwardly directed cam 17 is provided in the walls 11 of the exhaust pipes 8 and 9 within the area of the discharge apertures 14, which upon emplacement of the covers 13 engages into the groove 16 and retains the covers 13 in their assembled position. For securing against an unintentional removal during the drive, the covers 13 are retained by means of a clamping band 18 surrounding the pot-shaped edge 15.

If the vehicle participates in the traffic on public roads, then the exhaust pipes 8 and 9 of the exhaust gas muffler 1 are closed off by the covers 13 which are secured by a clamping band 18. The exhaust gases of the internal combustion engine 2 are thereby conducted by way of the exhaust channel 7 into the exhaust pipes 8 and 9. From there the exhaust gases are conducted through the apertures 12 of the end pipes 8 and 9 by way of the silencing means 5 through the individual chambers 4 of the muffler 3 to the exhaust pipe 6 and through the latter into the atmosphere. This path of the exhaust gases entails a considerable silencing of the exhaust noises so that the vehicle satisfies the legal regulations. If the vehicle is utilized during a rally, then only the clamping bands 18 are disengaged from the covers 13. Thereafter the covers 13 can be removed by a rotation whereby the groove 16 of the exhaust pipes 8 and 9 comes out of engagement with the cam 17. In this condition the exhaust gases are conducted from the internal combustion engine 2 directly into the atmosphere by way of the exhaust pipes 8 and 9 whereby a considerable increased output of the internal combustion engine 2 is obtained. Individual road sections of a rally course which are not specially closed off and therefore are considered as public roads and are subjected to the legal regulations as regards noise development of exhaust gas systems, can thus be travelled over with the same exhaust gas muffler 1 in that only the covers 13 are mounted on the exhaust pipes 8 and 9 for such a road section. After termination of such a road section, the covers 13 are again removed and the full engine output is available.

While I have shown and described only one embodiment in accordance with the present invention, it is understood that the invention is not limited thereto but is susceptible of numerous changes and modifications as known to those skilled in the art. For example, any series produced muffler can be constructed in accordance with the present invention regardless of whether it includes one or several exhaust pipes. Hence, I do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

I claim:

1. An exhaust muffler for internal combustion engines comprising a muffler pot having a plurality of internal chambers, said chambers being provided with means for soundproofing, a plurality of exhaust pipes securedly extending through said muffler pot, each said exhaust pipe of said plurality having a first end connected to the internal combustion engine exhaust manifold and a second end being a discharge opening, an additional exhaust pipe having a first end secured to said muffler pot and having a second end being a discharge opening, and means for selectively covering said discharge openings of said plurality of exhaust pipes.

2. An exhaust muffler according to claim 1, wherein said means for soundproofing are pipe-lines extending between said plurality of chambers.

3. An exhaust muffler according to claim 1, wherein said plurality of exhaust pipes include at least two pipes.

4. An exhaust muffler according to claim 1, wherein each said exhaust pipe of said plurality extending through said muffler pot is provided with a plurality of apertures opening into said muffler pot.

5. An exhaust muffler according to claim 1, wherein the discharge opening end of each said exhaust pipe of said plurality is provided with at least one outwardly curved cam means.

6. An exhaust muffler according to claim 1, wherein said means for covering are pot-shaped and consist of a heat-resistant material.

7. An exhaust muffler according to claim 5, wherein said means for covering are pot-shaped and consist of a heat resistant material, an edge of said means for covering being provided with at least one groove in the manner of a bayonet connector which engages into said cam means.

8. An exhaust muffler according to claim 1, wherein said means for covering are secured to said discharge opening ends of each said exhaust pipe of said plurality by a clamping band means.

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