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BOOSTER DEVICE FOR INCLUSION IN THE EXHAUST SYSTEM OF AN INTERNAL COMBUSTION ENGINE

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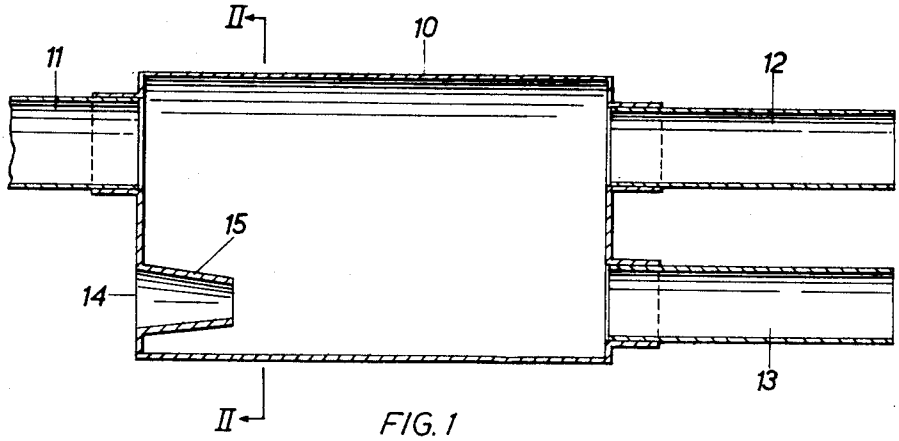


FIG. 1

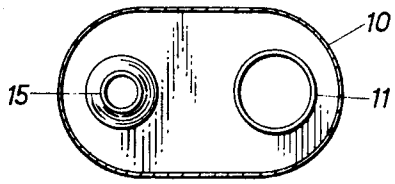


FIG. 2

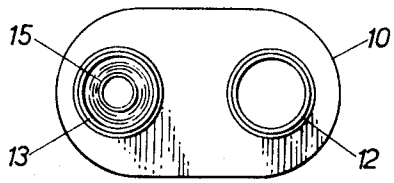


FIG. 3

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BOOSTER DEVICE FOR INCLUSION IN THE EXHAUST SYSTEM OF AN INTERNAL COMBUSTION ENGINE

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1 Claim. (Cl. 181—43)

This invention is for improvements in or relating to a silencer accessory or a silencer for incorporation in the exhaust system of an internal combustion engine.

It is an object of the invention to provide a silencer accessory or a silencer for an exhaust system which is adapted to reduce the back pressure effect on the engine, that is to say will prevent or reduce the momentary back pressure effect by tending to prevent substantially back flow surge effects from the atmospheric end of the exhaust pipe up to the port itself. It is a further object of the invention to provide a silencer accessory or silencer which will give a positive extraction effect and cooling effect upon the exhaust system.

Conventional straight-through exhaust systems, whilst apparently giving a low mean back pressure, do not help the porting characteristics of the engine. In the conventional straight-through silencer system the high pressure peak of the exhaust gas wave-form, corresponding to the period of opening of the exhaust valve, is followed by a partial vacuum which causes the outside air to form a momentary back pressure effect at the exhaust valve or port against the free exit of the next high pressure peak. This can have a most serious effect on engine performance and efficiency and necessitates careful design of the exhaust pipe system if this adverse effect is to be reduced.

According to the present invention there is provided an accessory for incorporation in a gas exhaust system of an internal combustion engine comprising a casing having an inlet at one end for the exhaust gases, at least two outlets at the other end, and an inlet for the passage into the casing of external air, said casing providing a substantially unobstructed passage for the flow of exhaust gases and air from said inlets to said outlets and the inlet for exhaust gases being in alignment with one of said outlets and said inlet for external air being positioned so that air is directed into and through the casing towards the other outlet in substantially the same direction as the exhaust gases are directed into and through said casing. In preferred embodiments of the invention the inlet for exhaust gases is in alignment with one outlet and the inlet for air is in alignment with the other outlet.

By the arrangement just described air entering the casing "fills up" the spaces between the exhaust pulses so that pulsation effects are eliminated. By providing separate outlets excess air not required for the purpose just set forth is carried away completely separate from the exhaust and does not interfere therewith.

The invention will be further described by way of example with reference to the accompanying drawings, wherein:

Figure 1 is a sectional plan view of a silencer accessory in accordance with the invention,

Figure 2 is a cross-section on the line II—II of Figure 1, and

Figure 3 is an end elevation.

The accessory shown in Figures 1, 2 and 3 of the drawing comprises a casing **10** of oval or like cross-

section although it could be round or of other section if desired. One end of the casing is provided with a short length of pipe **11** by which it can be connected to the exhaust end of the somewhat shortened normal silencer outlet pipe of a motor vehicle. At its opposite end the casing **10** is provided with twin outlet pipes **12** and **13**. The outlet pipe **12** is in axial alignment with the inlet pipe **11**. At the inlet end of the casing **10** an opening **14** is provided which is fitted with a convergent nozzle or jet **15** and serves for the introduction into the casing **10** of atmospheric air, the motion of the vehicle promoting this flow of air. It will be noted that the jet **15** is in axial alignment with the outlet pipe **13**.

In the corrector unit or accessory above described, which corrector unit forms an auxiliary or accessory to the normal exhaust system of the motor vehicle, the air flow, due to the motion of the vehicle and controlled by the nozzle structure, prevents or reduces the partial vacuum effect, the inertia of the air in the casing and constant cold air flow tending substantially to prevent the back flow surge effect from the atmospheric end of the exhaust pipe back to the exhaust port itself.

Given appropriate physical dimensions and speed of vehicle or air flow, the accessory or corrector unit can be extended so as to act as an extractor unit for the exhaust gases which of course further extends its function and promotes its efficiency.

Although designed principally for use with a straight-through type of silencer the accessory above described is also of benefit in other types of silencer where it smooths out remaining pulsations and minimises standing wave effects thus giving the absolute minimum of back pressure in the whole system.

Apart from increasing engine performance and efficiency the accessory according to the present invention increases the efficiency of the silencer system and gives the pleasing and desirable appearance of a partial twin exhaust system without the cost and difficulty of fitting and manufacturing the conventional type of twin exhaust system.

In some cases if a high frequency absorber section is added the accessory according to the present invention may be located before, instead of behind, the normal silencer of the exhaust system.

For some applications a blower may be provided to supply external air to the casing of the accessory.

An accessory such as previously described can be adapted to constitute a main silencer by virtue of the fact that the cold air substantially cools the exhaust gas and reduces its pressure and amplitude of wave form by its mixing and yet under appropriate conditions of speed and jet design will assist in the evacuation of the exhaust gas and thus produce silencing substantially equivalent to that of a conventional silencer but with reduced size and reduced blockaging troubles and above all very much reduced static back pressure and substantial elimination of pulsating effects of standing waves tending to upset the porting characteristics of the engine.

A silencer according to the present invention is applicable to any vehicle (e.g. a motor car or ship) or in fact any form of engine wherein gas flow may be assisted by utilisation of the movement of an outside air stream relative to the silencer, such air flow being promoted by the motion of a vehicle on which the silencer is fitted, by the provision of an air pump or blower or by the flow or "chimney" effect of the exhaust gases themselves.

I claim:

An accessory for reducing pulsation effects and consequent back pressure in the exhaust gas system of an internal combustion engine comprising an elongate casing having an inlet at one end for connection to the exhaust system of an internal combustion engine and through

which inlet exhaust gases are discharged into the casing, said inlet discharging exhaust gases directly into the casing adjacent said one end of the same, an exhaust gas outlet at the opposite end of the casing in axial alignment with said inlet, the openings of said inlet and outlet being spaced apart a distance substantially equal to the length of the casing and the interior of the casing being free and unobstructed therebetween, an air inlet at said one end of the casing spaced to one side of said exhaust gas inlet, a second outlet at said opposite end of the casing in axial alignment with said air inlet, the openings of the air inlet and second outlet being spaced apart a substantial distance and the interior of the casing being free and unobstructed therebetween and with the portion of the casing between the exhaust gas inlet and exhaust gas outlet being freely communicated with the portion of the casing between the air inlet and the second outlet, whereby pulsations effected by the cyclic and periodic discharge of exhaust gases into the casing through said

gas inlet will be smoothed out by alternate inflow of air through said air inlet to obviate back pressure within the casing and within the exhaust system of the associated internal combustion engine.

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