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EXHAUST AUXILIARY FOR INTERNAL-COMBUSTION ENGINES

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6 Claims. (Cl. 60—30)

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This invention relates to exhaust auxiliaries for internal combustion engines, and has for its primary object increasing the efficiency of the engine by aiding in the removal of burnt gases from the engine and relieving back pressure in the exhaust manifold and associated parts.

Another object of this invention is the provision of means for utilizing a whirling column of air under pressure for entraining the spent gases from the exhaust manifold and joining with such spent gases enroute to the muffler and/or exhaust pipe outlet of the engine.

A further object of this invention is the arrangement of outlet flow pipes of comparatively small diameter between the respective end portions of the exhaust manifold and two of the auxiliary conduits conveying the air under pressure to the exhaust pipe for entraining exhaust gases from the central portion of the manifold, whereby gas pockets in the ends of the exhaust manifold are prevented and back pressure in the manifold is relieved.

Other objects and advantages of this invention will be apparent from the following description wherein reference is made to the accompanying drawing illustrating a presently preferred embodiment of the invention.

In the drawing:

Fig. 1 is a side elevation, with parts broken away, of an internal combustion engine equipped with my improved exhaust auxiliary mechanism.

Fig. 2 is a front elevation thereof.

Fig. 3 is a horizontal detail section, taken substantially on the line 3—3 of Fig. 1, and

Fig. 4 is a vertical detail section, taken substantially on the line 4—4 of Fig. 1.

Referring now to the drawing, the numeral 10 designates a conventional internal combustion engine wherein a cooling fan 11 is driven from the crankshaft 12 by means of a belt 13. It is assumed that the usual pistons are operatively connected to the crankshaft 12 and the usual intake and exhaust valves of a four-cycle engine are suitably arranged within engine 10 and need not be illustrated herein. During the scavenging stroke of each cycle each piston pushes the hot spent gases from its cylinder through its exhaust valve into the exhaust manifold 14, whence an exhaust pipe conveys the gases to a suitable muffler or directly into the atmosphere. In the conventional engine the action of the pistons is relied upon to force the exhaust gases from the cylinders and through the valves, manifold, exhaust pipe and muffler, and the resistance of the exhaust gases to this movement sets

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up a back pressure and lowers the efficiency of the engine. There is a tendency for the burnt gases when under back pressure to pocket in the end portions of the exhaust manifold, diminishing the effective area of the manifold and unduly heating portions thereof.

The present invention aims at the elimination of such defects in the conventional exhaust portion of an engine. I provide a blower 15 in position to be rotated by the engine, as, for example, by mounting it on the same shaft as the fan 11 so that it will be turned by belt 13 from crankshaft 12. Air is admitted to blower 15 through a mouth 15^a and is forced out under pressure through a plurality of conduits 16 extending in tortuous paths to positions adjacent and circumferentially spaced around the main exit neck 14^a extending from the central portion of exhaust manifold 14. As herein shown, a pair of air conduits 16^a and 16^b of flexible metal or other suitable material are twisted around each other intermediate their ends and terminate with their rear extremities respectively above and below the end portion of the manifold exit neck 14^a, which extends substantially horizontally within the forward portion of the exhaust pipe 17. The air under pressure emitted through conduits 16^a and 16^b will set up whirling currents within exhaust pipe 17, and to aid in this the rear portions of conduits 16^a and 16^b may be angled to point toward the center line of the exhaust pipe 17 slightly rearwardly of the horizontal terminus of the manifold exit neck 14^a, whereby an effective entraining action is set up to draw the spent gases from the exhaust manifold into exhaust pipe 17. While this arrangement materially aids in reducing back pressures and quickly exhausting the burnt gases, I have shown herein additional connections for drawing burnt gases from the end portions of the exhaust manifold. Between the forward end portion of exhaust manifold 14 and one of the intertwined air conduits, as 16^a, I connect a small diameter tube, as 18^a, and between the rear end portion of manifold 14 and another air conduit, as 16^b, I connect a small diameter tube, as 18^b. These tubes 18^a and 18^b are tapped into the air conduits in advance of the rear termini of the latter, and the air rushing through the conduits will set up an entraining action tending to draw off burnt gases then contained in the end portions of the exhaust manifold, and so eliminating undesirable pocketing of such gases.

The exhaust pipe 17 is preferably elongated

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on one axis and reduced by flattening on its other axis adjacent its forward extremity, and the rear extremities of the main exhaust exit neck 14^a and the air conduits 16^a and 16^b are located within such flattened portion, whereby a sloping wall portion is provided in exhaust pipe 17 rearwardly of such air conduits and gas exhaust neck to aid in producing a whirling, turbulent stream of mixed air and gas within the exhaust pipe, and probably creating additional suction by Venturi action to facilitate the flow of burnt gases from the exhaust neck 14^a. Exhaust pipe 17 may lead to a muffler or into the atmosphere as desired.

The operation of my improved exhaust auxiliary is believed to be apparent. The whirling air currents produced by the blower create an entraining action or suction in the neck 14^a of the exhaust manifold while also withdrawing small quantities of burnt gases from the ends of the manifold through tubes 18^a and 18^b. The combined action supplements the usual piston action in forcing the burnt gases from the engine, and aids in quickly removing all burnt gases that ordinarily create back pressures from the engine, thus relieving the engine pistons and exhaust valves and allowing the exhaust valves to operate at lower temperatures.

While the illustrated embodiment is believed to adequately fulfill the objects and advantages hereinabove stated, it is to be understood that modification and variation may readily be made within the spirit of the invention and scope of the subjoined claims.

Having described my invention, I claim:

1. The combination with an internal combustion engine having an exhaust pipe and an exhaust manifold provided with a neck terminating in an open-ended portion extending into the exhaust pipe, of auxiliary exhaust mechanism comprising a blower driven by the engine and an air conduit extending generally parallel to and into the interior of said exhaust pipe for conveying air from the blower to a position inside the exhaust pipe and adjacent the open end of the neck of said manifold, whereby an entraining action is set up within the exhaust pipe to draw the burnt gases from the exhaust manifold.

2. The invention described in claim 1 wherein there are a plurality of air conduits intertwined between the blower and exhaust pipe and their rear termini arranged to produce whirling currents of air within the exhaust pipe adjacent the manifold neck.

3. The invention described in claim 1 wherein tubes of small diameter are arranged between the end portions of the exhaust manifold and said air conduit to aid in evacuating the burnt gases from the ends of the exhaust manifold.

4. The invention described in claim 1 wherein there are a plurality of air conduits between the blower and the exhaust pipe and a tube is arranged between one end portion of the exhaust manifold and an intermediate portion of one of said air conduits, and a second tube is arranged between the other end portion of the exhaust manifold and an intermediate portion of another of said air conduits, whereby burnt gases from the end portions of the exhaust manifold will be drawn into said air conduits.

5. The combination with an internal combustion engine having an exhaust pipe and an exhaust manifold provided with a neck terminating rearwardly in an open-ended portion extending into the exhaust pipe, said exhaust pipe having an open forward end, of auxiliary exhaust mechanism comprising a blower driven by the engine and an air conduit extending generally parallel to and into the interior of said exhaust pipe and conveying air from the blower to a position inside the exhaust pipe and adjacent the open end of the neck of said manifold, whereby an entraining action is set up within the exhaust pipe to draw the burnt gases from the exhaust manifold.

6. The arrangement set forth in claim 5 wherein the exhaust pipe is tapered inwardly and rearwardly adjacent and around the open end of the exhaust manifold.

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