

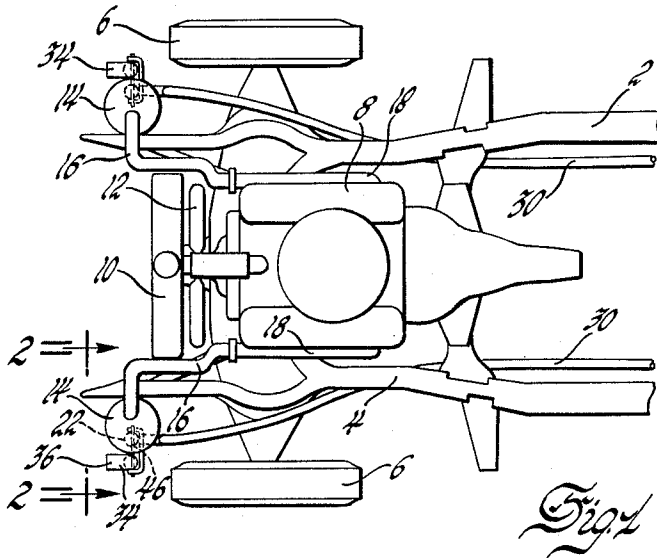
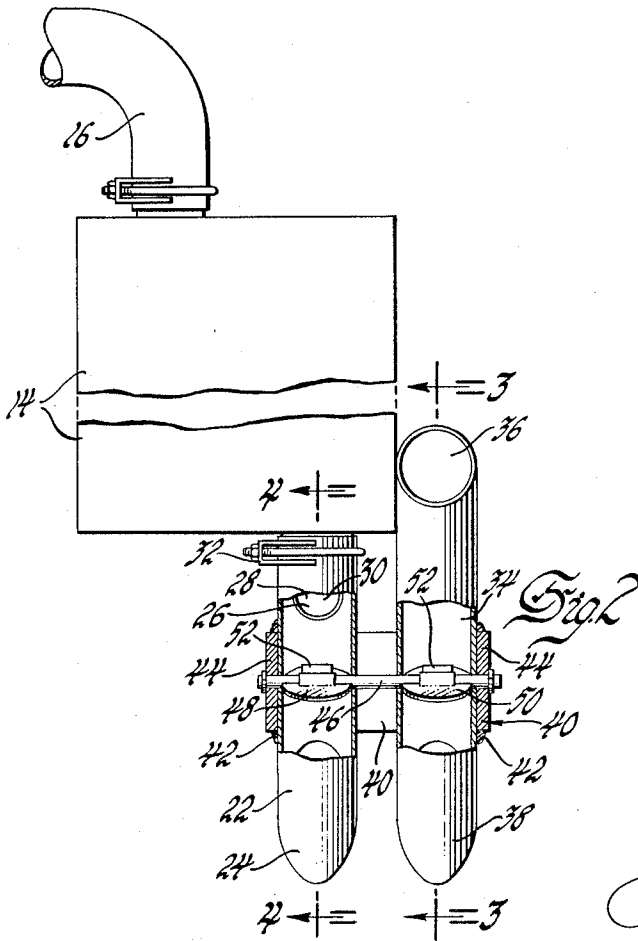
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J. Z. DE LOREAN
ENGINE EXHAUST SYSTEM

2,960,178

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2 Sheets-Sheet 1



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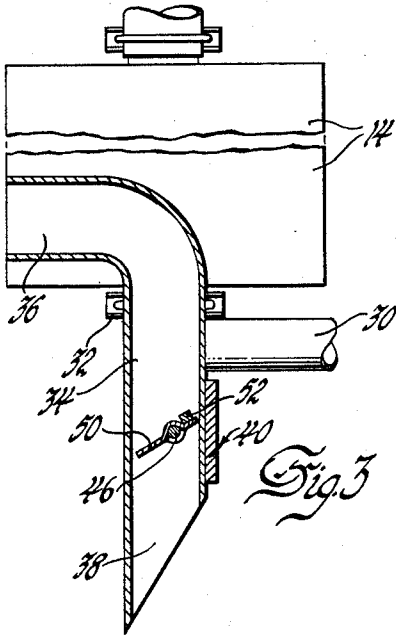
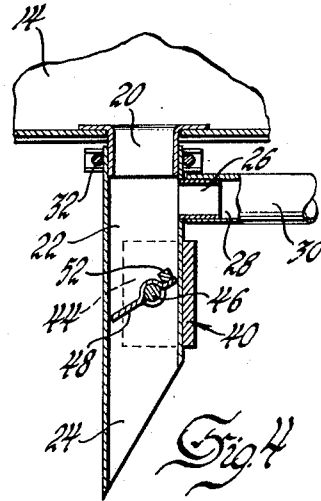
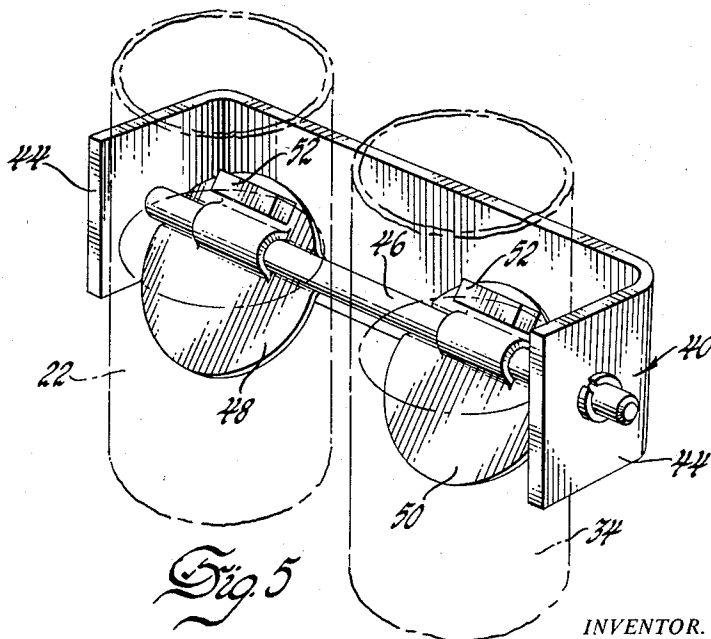
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ENGINE EXHAUST SYSTEM

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5 Claims. (Cl. 181—36)

This invention relates generally to exhaust systems for internal combustion engines and is particularly concerned with such exhaust systems when installed on passenger vehicles such as automobiles.

Automobiles are continually being built lower so that the clearance between the bottom of the vehicle and the roadway is also becoming less. This is resulting in less room for various accessories and components normally located in such areas and particularly many of the components in most exhaust systems such as mufflers, resonance chambers, exhaust and tail pipes, etc.

The present invention has been proposed to obviate certain of the difficulties arising from this loss of room while at the same time cutting down on the size and number of such components by making it possible to install such equipment at the front end of the vehicle in places such as the front wheel housings, fenders, etc.

It is well known that one of the main reasons compelling the elimination of exhaust gases at the rear of the vehicle results from the fact that such gases at low or idling speeds otherwise will permeate the passenger compartments of such vehicle. Such gases when present in the passenger compartment cause not only a considerable degree of unpleasantness in the form of burning sensations of the eyes, nose and throat of the vehicle occupants, but, far more important and dangerous, may lead to their asphyxiation. When a vehicle is moving at a relatively rapid rate of speed, however, any gases which might be eliminated toward the front or intermediate the ends of the vehicle are carried to the rear by the wind pressure created by the velocity of the vehicle.

The present invention enables most of the components of a conventional exhaust system to be located at the front of the vehicle where there is more room by eliminating the exhaust gases at the rear of the vehicle at engine idle or low speeds of the vehicle but at the front end of the vehicle at intermediate or high speeds. This has been accomplished by having a small capacity tail pipe extending from the system at the front of the vehicle to the rear of the vehicle to eliminate the gases at the rear of the vehicle at idle and at low speeds and by having a normally closed exhaust port at the front end of the vehicle which is opened in response to certain speeds of the vehicle. Although the valve shown and described herein is operated by wind pressure, it is emphasized that the valve could also be solenoid operated or operated by a manifold vacuum diaphragm without departing from the spirit of the invention.

For a further understanding of this invention and the objects thereof, reference may be made to the accompanying detailed description and the drawings in which:

Figure 1 is a plan view of the front end of a vehicle including portions of the frame, the vehicle engine, the front wheels and the novel exhaust system superimposed thereon.

Figure 2 is a front end view in elevation taken substantially on the line 2—2 of Figure 1 with the parts enlarged

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to illustrate certain of the details of the system on the left side of the vehicle.

Figure 3 is a view with parts in section taken substantially on the line 3—3 of Figure 2 and shows the tubular member and its mounting which is used to sense the wind velocity or pressure created by movement of the vehicle in a forward direction.

Figure 4 is a view in elevation taken substantially on the line 4—4 of Figure 2 showing parts in section and illustrating the normally closed exhaust port at the front end of the vehicle.

Figure 5 is a perspective view with the exhaust port and tubular member shown in phantom and the bracket mounting for the flapper valves located in the port and tubular member.

Referring now to the drawings, a vehicle indicated by the numeral 2 is shown having a chassis or frame 4 which includes the usual front wheels 6. Mounted on the chassis 4 is an internal combustion engine 8 having a cooling system in the form of radiator 10 and fan 12. Located on either side of the engine forward thereof are two examples of the unique exhaust system forming the subject of this invention. Only the exhaust system on the left-hand side of the vehicle will be described inasmuch as the systems are identical with the exception of reversal of certain of the parts.

Referring now to all of the figures shown, it will be observed that mounted on the frame 4 forward of the wheels 6 in a location where generally exists an excess of unused space is a muffler 14. The muffler 14 and the engine 8 are connected together by means of an exhaust pipe 16 and an exhaust manifold 18 in order for exhaust gases to be conducted from the engine to the muffler 14. The muffler 14 may be of conventional construction; and since the details thereof form no part of this invention, they are not shown or described here. The outlet 20 of the muffler in the present showing faces the roadway (see particularly Figures 2 and 4) and communicates with a downwardly extending pipe 22 which is cut on a bias at its lower end 24 so as to open essentially toward the rear of the vehicle. The pipe 22 includes a T-section 26 which has secured thereabout an end 28 of a longitudinally extending tail pipe 30. The tail pipe 30 may be of relatively small capacity and extends from the forward end of the vehicle to the rear thereof. Connections of the ends of the various pipes may be accomplished in the conventional manner by the use of items such as clamping devices 32.

Immediately adjacent the pipe 22 is a vertically positioned tubular member 34 having an upper end curved or bent as shown in Figures 2 and 3 so that its intake end 36 faces toward the front end of the vehicle. The lower end of the tubular member 34 is cut on a bias so that its lower end 38 is similar in appearance to the end 24 of pipe 22 and also faces toward the rear of the vehicle. Embracing both the pipe 22 and the tubular member 34 is a bracket 40 which is securely fastened to both the pipe and the tubular member as by welds 42 or some other suitable means. The bracket as indicated particularly in Figures 2 and 5 is U-shaped and the legs 44 thereof journal a shaft 46 extending through the tubular member 34 and the pipe 22. Mounted on the shaft in pipe 22 is a flapper valve 48. A similar flapper valve 50 is mounted on the shaft in the tubular member 34. Both valves are provided with small weights 52 which tend to bias the valves in a closing direction. It will be noted, however, that the mounting of both valves is such that there is a greater area of the valve on one side of the shaft than on the other.

The operation of the invention is as follows: Assuming the vehicle to be standing still or moving at a relatively low speed, the exhaust gases leaving the engine and passing through the muffler will be blocked against exit

through the port of the lower end 24 of the pipe 22 by the valve 48. Thus the exhaust gases will escape through the T-section 26 and the tail pipe 30. If, however, the vehicle is moving at a sufficient speed to safely carry any gases exhausted at the front end of the vehicle so that they will not permeate the passenger compartment thereof, the air entering the inlet 36 of the tubular member 34 will act on the relatively large surface area of valve 50 on one side of shaft 46 causing the valve to open and also opening valve 48 thereby allowing the exhaust gases passing from muffler 14 to be exhausted through pipe 22 at its lower end 24 all at the front end of the vehicle. If the vehicle should subsequently slow down to a point where there might be some danger of the exhaust gases permeating the passenger compartment, the wind pressure on the valve 50 will be insufficient to maintain it open and the counterweights 52 will cause it to close thereby closing off the exhaust valve 48 and again directing the exhaust gases through the tail pipe 30.

From the foregoing it may be readily appreciated that the internal combustion engine exhaust system herein described is particularly adapted for present day automotive vehicles wherein, due to the small clearance occurring between the lower part of the vehicle and the roadway, there is insufficient room at such location for the installation of the usual components of conventional exhaust systems, and it is consequently desired to locate such components at the front of the vehicle.

By locating such components at the front end of the vehicle the exhaust pipes may be shorter, and it is not necessary to limit the mufflers to an elliptical configuration in cross-section. By exhausting most of the exhaust gases through a port at the front of the vehicle the tail pipes may be smaller and there will be less back pressure.

I claim:

1. In combination, a passenger vehicle having an internal combustion engine, an engine exhaust system located primarily at the front of the vehicle and comprising exhaust conducting means connected to the engine and including piping means extending to the rear of the vehicle, said exhaust conducting means having an exhaust port at the front of the vehicle, a closure member normally closing said port, and means connected to said closure member and responsive to certain speeds of the vehicle to open said normally closed port and thereby exhaust such gases at the front of the vehicle.

2. An elongated exhaust system for an internal combustion engine comprising exhaust gas conducting means at a front end of said system adapted to be connected to an engine and piping means connected to said conducting means and extending to a rear end of said system, said exhaust conducting means having an exhaust port at said front end, a closure member normally closing said port, and means connected to said closure member and responsive to certain speeds of said system in the direction of said front end to open said port and exhaust any such gases at said front end.

3. An elongated exhaust system for an internal combustion

engine comprising exhaust gas conducting means at a front end of said system adapted to be connected to an engine and piping means connected to said conducting means and extending to a rear end of said system, said exhaust gas conducting means having an exhaust port at said front end, a closure member normally closing said port, and means connected to said closure member and responsive to predetermined wind pressure created by movement of said system in the direction of said front end to open said port and exhaust any such gases at said front end.

4. In combination with a passenger vehicle having an internal combustion engine at the front end thereof, an engine exhaust system including a muffler supported by the vehicle in front of the front wheels thereof, an exhaust pipe connecting said muffler with said engine, a tail pipe extending from said muffler to the rear of said vehicle, a second pipe extending from said muffler and having an atmospheric port at the front end of the vehicle, valve means normally closing said port, and means connected to said valve means and responsive to certain predetermined movement of said vehicle in a forward direction to open said valve means and thereby exhaust such gases at the front of the vehicle.

5. In combination with a passenger vehicle having an internal combustion engine at the front end thereof, an engine exhaust system including a muffler supported by the vehicle in front of the front wheels thereof, an exhaust pipe connecting said muffler with said engine, a tail pipe extending from said muffler to the rear of said vehicle, a second pipe extending from said muffler and having an atmospheric port at the front end of the vehicle, valve means normally closing said port, and means connected to said valve means and responsive to certain predetermined movement of said vehicle in a forward direction to open said valve means and thereby exhaust such gases at the front of the vehicle, said latter means comprising a tubular member having an intake port facing the front of said vehicle and an outlet port opening toward the rear thereof so that movement of the vehicle in a forward direction will cause air to flow there-through, and a common shaft extending through said tubular member and said second pipe and having secured thereto in each a flapper valve yieldably biased to a normally closed position.

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