Nov. 24, 1959 G. E. LASHLEY 2,913,870

EXHAUST SYSTEM

Filed Jan. 19, 1955

Fig. 1

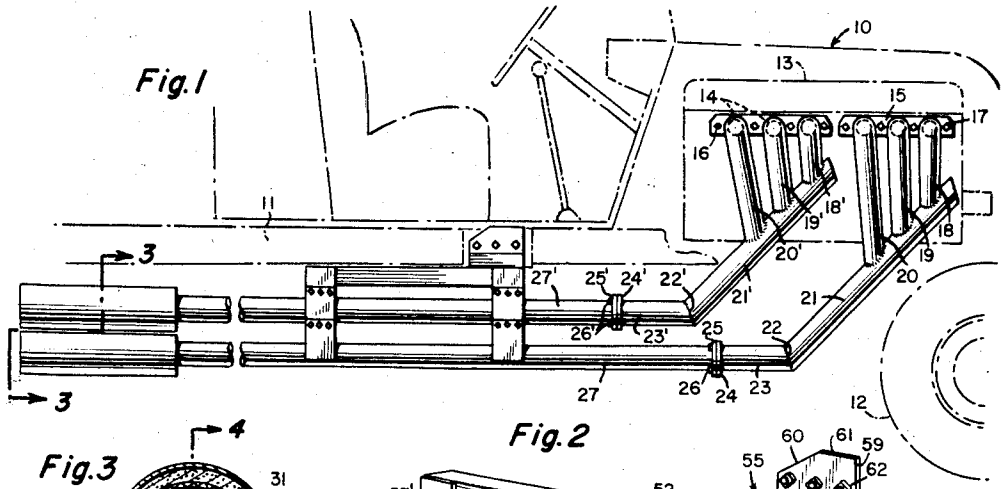


Fig. 2

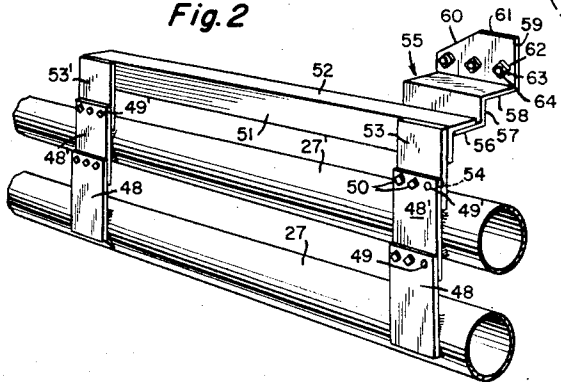


Fig. 3

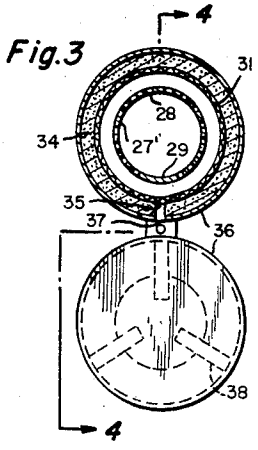
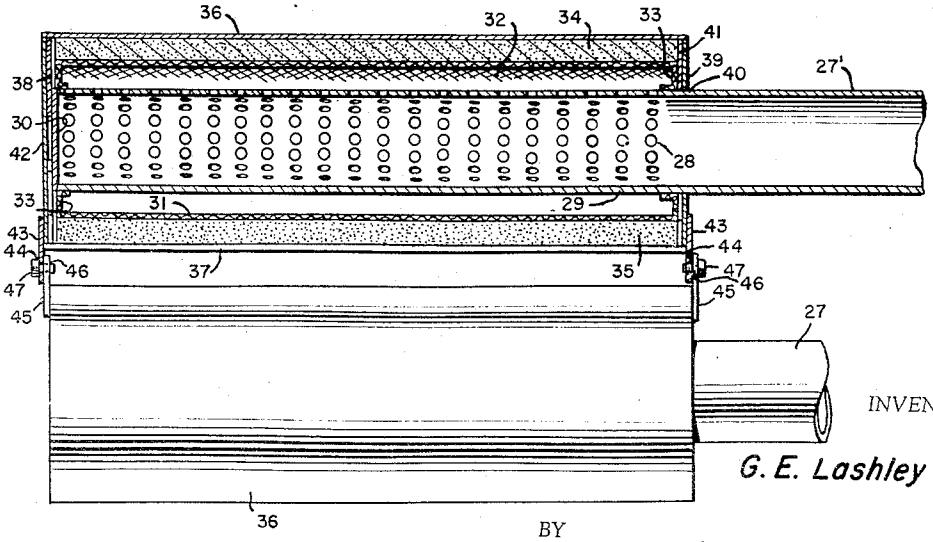


Fig. 4



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United States Patent Office 2,913,870
Patented Nov. 24, 1959

2,913,870

EXHAUST SYSTEM

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Application January 19, 1955, Serial No. 482,787

2 Claims. (Cl. 60—29)

This invention relates to internal combustion engines in which fuel is consumed and the products of combustion are discharged into the atmosphere through an exhaust system designed among other things to reduce noise. The invention is directed particularly to the exhaust system of such engines including the mufflers employed in suppressing the noise and the dissipation of the products of combustion.

The exhaust systems of internal combustion engines for many years have included various types of manifolds, exhaust pipes, and mufflers, designed to meet requirements, but which have been subject to criticism because they interfered with the operation of the engine, including the efficiency, have caused increased consumption of fuel, produced back pressure, were short lived, and increased backfiring and noise.

It is an object of the present invention to provide a relatively simple, inexpensive, and efficient exhaust system, which will not produce appreciable back pressure regardless of the size of the load, will promote maximum mileage from the fuel, and will satisfactorily remove the products of combustion and dissipate the gases without objectionable noise or backfiring.

Another object of the invention is to provide an exhaust system which will permit operation of the engine at the lowest temperature with consequent minimum temperature in the exhaust system and without danger of leakage of the products of combustion, including carbon monoxide, but which will cause discharge from the exhaust pipe or exhaust system.

Another object of the invention is to provide an exhaust system of maximum durability which will provide for the even discharge of gases and in which rupturing stresses due to changes in temperature will be avoided.

A further object of the invention is to provide an exhaust system which can be readily applied and removed and which is capable of being adapted to internal combustion engines already in use and with the change-over enhancing or improving the operation of the engine to which it is applied from the viewpoint of power and increased trouble-free operation.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing wherein:

Fig. 1 is a side elevation illustrating one application of the invention;

Fig. 2, a fragmentary detail illustrating the manner of suspending the exhaust pipes;

Fig. 3, a section on line 3—3 of Fig. 1; and

Fig. 4, a section on line 4—4 of Fig. 3.

Briefly stated, the invention provides an exhaust system for internal combustion engines and particularly those employed in motor vehicles, and it comprises manifold castings with openings for registration with the exhaust passages of an internal combustion engine and with such castings having separate tubes which combine into exhaust pipes of larger size capable of handling the discharge from the tubes without back pressure. One or more couplings are disposed between the castings and the main body of the exhaust pipe, with a muffler on the perforated rear end of the exhaust pipe, such mufflers comprising cylinders of heavy screen wire about the perforated portion of the exhaust pipe and with a wrapping of fibrous glass the ends of which terminate in spaced relation providing a slot along the lower portion of its length through which the exhaust gases may be discharged. A sheet metal casing encloses the whole and a pair of such exhaust pipes and mufflers being suspended by suitable brackets beneath an automobile, the number of pipes and mufflers preferably being in proportion to the size of the engine.

With continued reference to the drawing, a conventional truck **10** has a frame **11** supported by wheels **12** and powered by an internal combustion engine **13**. The engine has the usual exhaust ports **14**, one for each cylinder, six being shown. Exhaust from the ports is received within exhaust headers including plates **15** and **15'** having openings **16** and **16'** for fastening bolts **17** and **17'**.

The engine of the present invention is provided with six cylinders and the exhaust for these includes two sets of tubes **18**, **19**, **20** and **18'**, **19'** and **20'** the tubes of each set or group being of progressively increased length with the tubes of the first group welded to a larger pipe **21** and those of the second group to a larger pipe **21'**. Angular joints **22** and **22'** connect the pipes **21** and **21'** with the horizontal pipes **23** and **23'** having enlarged flanges **24** and **24'** adapted to be fastened to similar flanges **25** and **25'** by means of bolts **26**.

In practice the tubes **18**, **19** and **20** have been 9½", 12½" and 15¾" in length and those of the second group 4", 6½" and 9¼" in length. The pipes **21** and **21'** have been made 24½" in length, the pipes **23** and **23'** have been made 12" in length, and the pipes **27** and **27'** have been made 72" and 56" in length respectively in their unperforated portions and with 20" portions provided with ¼" openings around their sides and upper portions with a 1½" unperforated portion along their bottoms. Further, the tubes **18**, **19**, **20** and **18'**, **19'** and **20'** have been 2½" in diameter ,the pipes **21**, **21'**, **23**, **23'**, **27** and **27'**, 3½" in diameter. The pipe **27** is 72" in length and the pipe **27'** 56" in length. The above accommodates the exhaust from the forward and rear banks of cylinders.

The pipes **27** and **27'** are provided with ¼" openings **28** distributed around the sides and top over the rear 20" portion and leaving unperforated bottom portions **29** and **29'** of approximately 1½" in width. The discharge end of the pipes **27** and **27'** are provided with solid closure disks **30** and **30'** secured in position by welding or the like. About the rear 20" portion of each exhaust pipe is disposed a 20" cylinder **31** of heavy wire mesh with large diamond-shaped openings **32**. Since this pipe is 3½" in diameter this mesh cylinder is 5½" in diameter providing a 1" clearance between it and the exhaust pipe. This mesh cylinder **31** has its ends **33** turned inwardly to provide a 3½" opening to snugly receive the exhaust pipe.

About this heavy wire mesh screen **31** is wrapped an inch of sheet fiber glass **34**, the ends of which terminate in spaced relation along the bottom providing a slot **35** disposed lengthwise along the unperforated portion **29** of the exhaust pipe but spaced from the pipe by the screen **31**.

About the fiber glass is disposed a casing **36** of sheet metal, the lower edges of which are disposed in spaced relation ½" apart and provide a slot **37** along the bottom of the exhaust pipe through which fluid, either in vaporous or liquid state, can be discharged into the atmosphere.

Supporting straps **38**, approximately 120° apart, are

applied to the sheet metal casing 36 at the rear end of the same, such straps being welded to the disks 30 and 30' which forms a closure for the end of the exhaust pipe.

At the front end of the muffler a disk 39 is located having a maximum diameter of 7½" so that it will fit within the outer metal casing 36. This disk is provided with a central opening 40, 3½" in diameter, so that it will fit snugly on the exhaust pipe. In assembling the device this disk is first applied to the exhaust pipe and slipped forwardly thereon after which mesh screen 31, sheet fiber glass jacket 34, and sheet metal casing 36 are applied. Three straps 41 are then applied to the front end of the muffler 120° apart and are welded in place to assist in maintaining the mesh cylinder, jacket, and sheet metal casing in proper spaced relation, the brackets being connected to the exhaust pipe at each side and at the top. Thereafter the front end of the muffler 39 is moved rearwardly into position and welded. A disk 42 is employed to form a closure for the rear end of the casing and is sealed annularly by welds around the center opening as well as around the periphery of the closure member, the members at the front and the rear thus secured providing an air-tight casing except for the slot along the bottom thereof.

In the present instance where two exhaust pipes are employed, one for each group of cylinders, means is provided for fastening them in fixed relation, said means including a depending bracket 43 at each of the front and rear ends of the muffler, each bracket having a bolt receiving opening 44 and the lower muffler having upstanding brackets 45 with bolt receiving openings 46 so that the brackets at the corresponding ends of the mufflers may be tapped and a bolt 47 being employed to connect and maintain them in fixed relation.

The exhaust system just described is particularly applicable for certain six cylinder trucks including that known in the trade as the "White" although it is only a matter of arranging the exhaust tubes and the brackets to make them apply to other makes of trucks.

In the embodiment disclosed the horizontal portions of the exhaust pipes are disposed one above the other and each exhaust pipe is provided with a pair of spaced bracket plates welded to the sides of the same, the exhaust pipe 27 having bracket plates 48 attached thereto and provided with bolt receiving openings 49. Similarly, exhaust pipe 27' is provided with bracket plates 48' attached thereto and provided with bolt receiving openings 49'.

A supporting bracket in the form of a channel member L-shaped in cross section and about 30" in length is utilized. This channel member has a vertical flange 51 and a horizontal flange 52. At each end of the vertical flange is welded or otherwise attached a depending bracket plate 53, each approximately 4" in width with three horizontally disposed openings 54 made with a ⅜" drill to snugly receive ⅜" bolts 50.

At its front end the channel member is supported by a single bracket 55 approximately 6" long. This bracket has a horizontal flange 56 which extends beneath the horizontal flange of the 30" strip. It has an upright portion 57, a second horizontal portion 58, and a second upright portion 59 which has an inclined edge 60 about ½" in length and a horizontal upper edge 61 with horizontally disposed openings 62 made by a ⅝" drill to snugly receive ⅝" bolts 63. This bracket fits directly on the studs 64 of the emergency brake band bracket which are already in the casing of the vehicle.

In attaching the two exhaust pipes the main bracket 55 with the channel member having the depending bracket plates 53 is first applied, then the upper exhaust pipe 27' is attached, and thereafter, the lower exhaust pipe 27 is secured in place.

From the above it will be apparent that the exhaust system of the present invention includes multiple exhaust tubes combining into a single pipe from the rear end of which the exhaust is discharged, the discharge being through a muffler made by providing openings along the sides and top of the last 20 inches of the exhaust pipe with a wire mesh screen and a jacket of sheet fiber glass with an outer casing, and with a slot along the bottom of said jacket and casing providing for discharge from the interior of the muffler. Due to the construction and arrangement of parts muffling is accomplished while permitting the gases to escape practically unimpeded and, therefore, not creating any back pressure and resulting in maximum efficiency of the motor. Further, the structure provides for the maximum life of the muffler as rupturing forces, occasioned by backfiring and temperature changes, are eliminated.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and, therefore, the invention is not limited by that which is illustrated in the drawing and described in the specification, but only as indicated in the accompanying claims.

What is claimed is:

1. A low pressure exhaust system comprising a pair of exhaust pipes for connection of one end of each exhaust pipe to an internal combustion engine, said exhaust pipes having means to mount the exhaust pipes with the other end portion of said one exhaust pipe directly above and spaced from the other end portion of the other exhaust pipe, each of said exhaust pipes having a plurality of apertures extending through the wall of said other end portion above the bottom thereof and the wall being substantially unperforated at the bottom, a smoothly curved closed casing surrounding each of said other end portions of said exhaust pipes and forming therewith a surrounding chamber, the casing of the said one exhaust pipe being spaced from and directly above the casing of the other exhaust pipe and each casing having an elongated slot extending through the bottom portion thereof whereby exhaust gases passing through the elongated slot in the bottom of said upper casing will follow the outline of the lower casing and the exhaust passing through the elongated slot in the bottom of the lower casing will induce the exhaust gases from said upper casing to continue downwardly thereby facilitating effective quiet discharge of the exhaust gases.

2. The invention according to claim 1 in which the casings are substantially cylindrical.

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