United States Patent [19]

Ross, Sr.

[11] 3,877,447

[45] Apr. 15, 1975

[54] EXHAUST SUPERCHARGER

[76] Inventor: **Paul Lawrence Ross, Sr.**, Denver, Colo. 80287

[22] Filed: **Mar. 1, 1973**

[21] Appl. No.: **336,938**

[52] **U.S. Cl.** ..... **123/119 A**

[51] **Int. Cl.** **F02m 25/06**

[58] **Field of Search** ..... 123/119 A

[56] **References Cited**

UNITED STATES PATENTS

2,017,481	10/1935	Von Opel	123/119 A
3,035,561	5/1962	Siegler	123/119 A
3,166,060	1/1965	Falzone	123/119 A
3,559,402	2/1971	Stone et al.	123/119 A
3,702,110	11/1972	Hoffman et al.	123/119 A
3,786,635	1/1974	Kates et al.	123/119 A

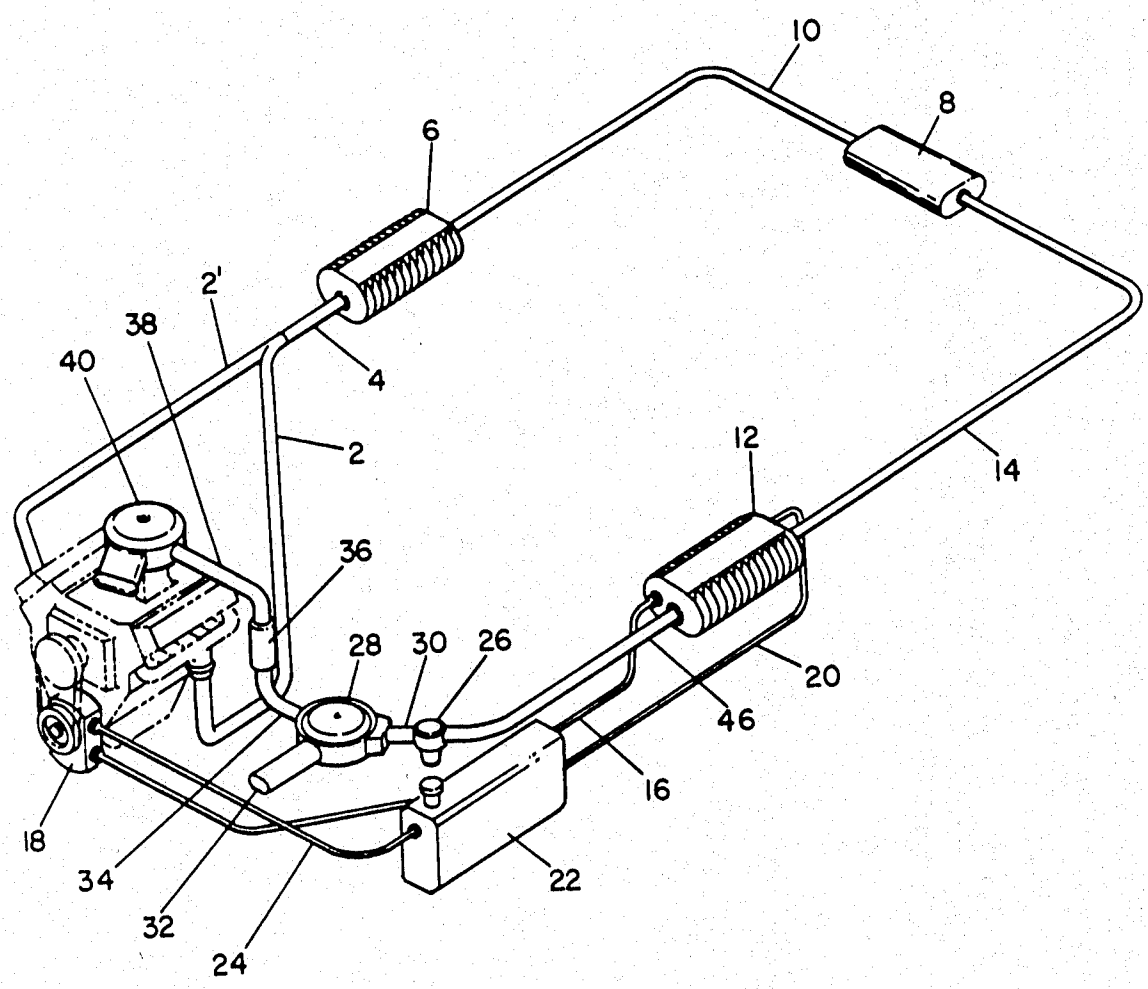
Primary Examiner—Wendell E. Burns

[57] **ABSTRACT**

A novel and unique method of the control and re-use of exhaust emissions from automobile internal-combustion engines is herein disclosed.

By means of a series of water and air-cooled mufflers, filters, vapor traps and a special air-exhaust mixing chamber, the exhaust mixture is cooled, cleaned, de-vaporized and combined with fresh air before it is re-cycled thru the engine carburetor, thus utilizing the un-burned fuel portion of exhaust emission, which normally escapes into the air, and providing a "sealed" system, whereby no exhaust gases, vapors, or hydrocarbon residue is permitted to escape into the atmosphere.

3 Claims, 4 Drawing Figures



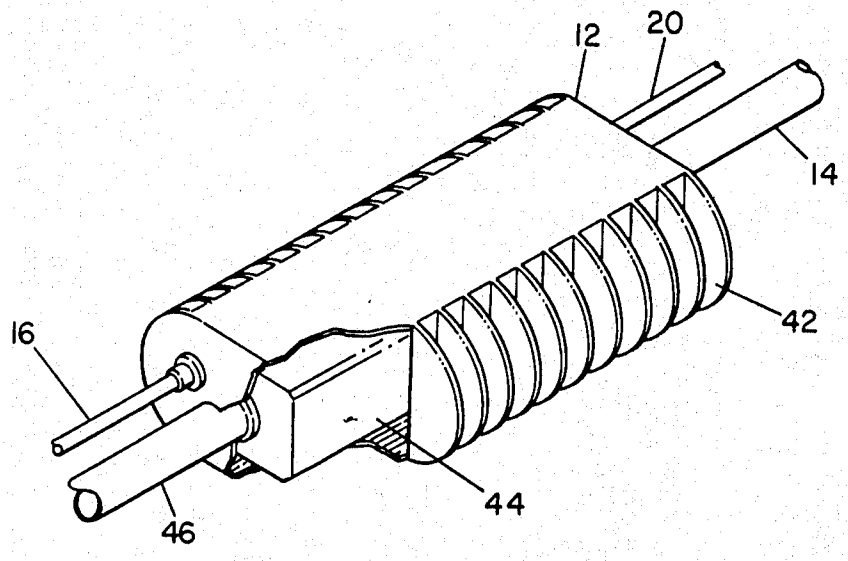

12
20
14
16
42
44
46

FIG. 3

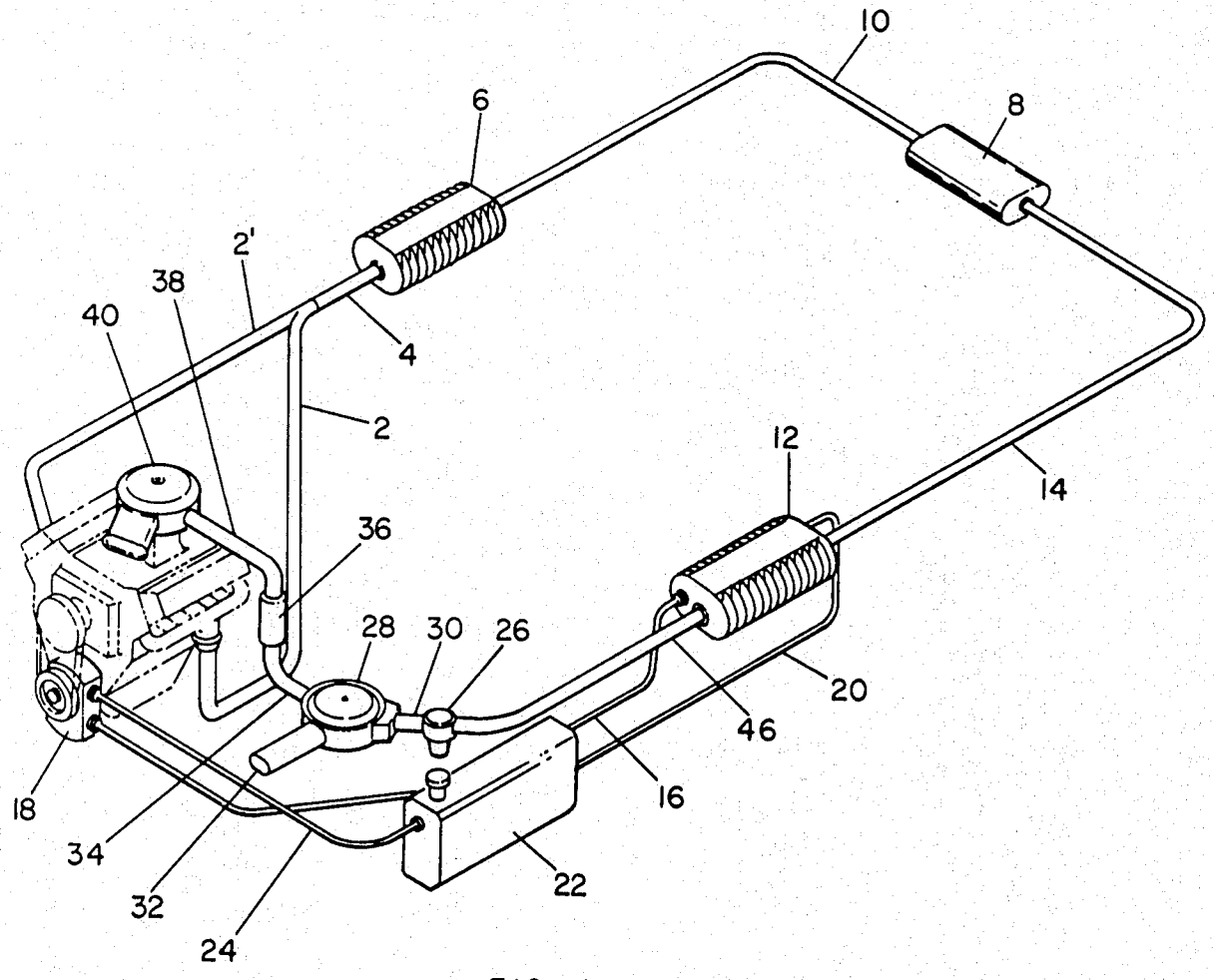

10
6
8
2'
38
40
4
2
12
14
36
28
30
26
20
46
16
18
34
32
24
22

FIG. 1

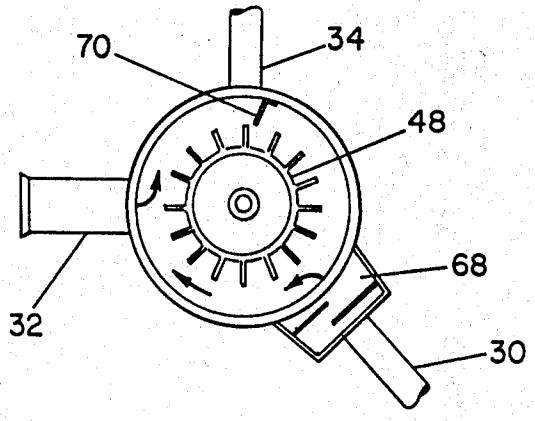


FIG. 4

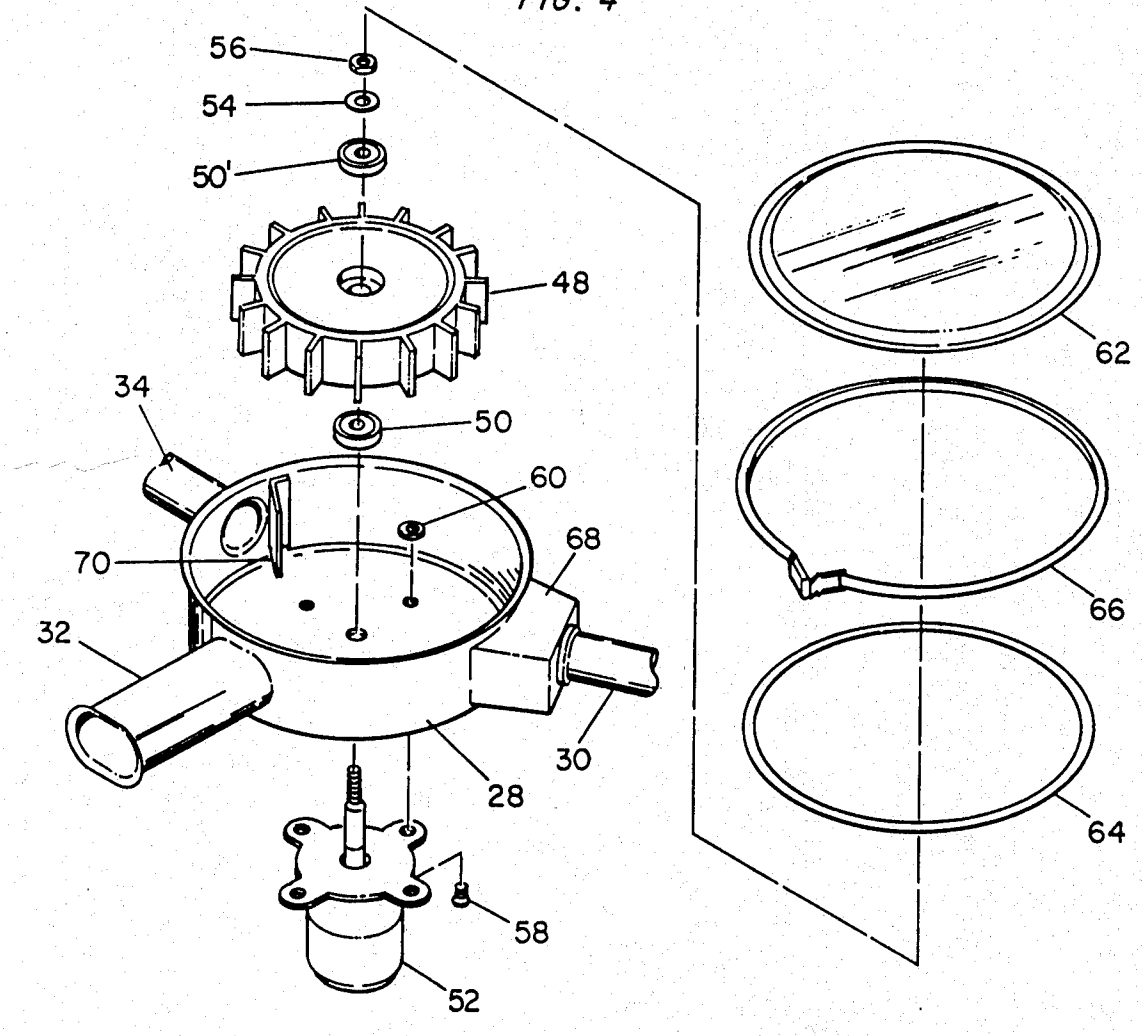


FIG. 2

EXHAUST SUPERCHARGER

1. Background of the Invention

The present invention was developed as the result of the need for a new method of controlling exhaust emission in the present-day automobile — however, by taking this control a step further, the current invention provides a means for re-cycling the exhaust mixture thru the engine, allowing a cooler blend of air and combustible gases to be introduced thru the carburetor, while eliminating the escape of any exhaust emission into the atmosphere, thus contributing to the control of air pollution.

2. Objects of the Present Invention

In accord with the aims and design of the current invention, the primary object is to provide the exhaust system of an automobile with a means of recycling the exhaust emissions, after being treated and mixed with fresh air, thru the engine so that they may be re-used.

A second object is to reduce the pressure rate of the exhaust mixture, thru a combinatiotn of mufflers and a pressure reducing chamber.

A third object of the invention is that of cleaning and cooling the exhaust by means of filters and air and water cooling devices, before the mixture is re-cycled thru the engine.

A fourth object is to remove the excess condensed vapor from the exhaust mixture.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a three-dimensional overall view of the exhaust supercharger, and its associated components.

FIG. 2 is a three-dimensional disassembled view of the air/exhaust mixing chamber.

FIG. 3 is a three-dimensional view of the water-cooled muffler, and

FIG. 4 is an orthographic plan view of the air/exhaust mixing chamber.

DETAILED DESCRIPTION

FIG. 1 shows the components of the basic device as assembled in conjunction with a conventional internal combustion engine, which is referenced in a broken-line outline, the components identified as follows:

The exhaust pipes (reference numerals 2 and 2') attach to the engine exhaust headers, and feed into a single inlet pipe (reference numeral 4), and thence into the air-cooled muffler (reference numeral 6). The sound reducing muffler 8 is connected to the air-cooled muffler 6 by an exhaust pipe 10 and to the water-cooled muffler 12 by an exhaust pipe 14.

Water circulation is supplied to the water-cooled muffler 12 by an inlet line 16 from the water pump 18 and an outlet line 20 which returns to the water reservoir 22, which in turn is connected to the water pump 18 by a feeder line 24. Note: to insure proper cooling water circulation, the water pump 18 is to be a separate unit from the one normally employed for circulating the coolant thru the radiating/engine cooling system.

The water-cooled muffler 12 is connected by a pipe 46 to the vapor trap 26 which connects to the air/exhaust mixing chamber 28 by a connector sleeve 30. Fresh air is introduced into the mixing chamber thru a ram tube 32, and the air/exhaust mixture from the mixing chamber 28 is next routed thru an elbow 34 into the filter 36 thru the inlet tube 38 to the air cleaner 40 where the routing cycle of exhaust gases is completed, as it is re-introduced into the engine carburetor.

FIG. 3 illustrates the water-cooled muffler 12 showing the cooling fins 42 and the inner muffler 44, which is enveloped by the circulating water.

FIG. 2 shows the component parts of the air/exhaust mixing chamber 28 as follows: The vane impeller 48 is mounted inside the chamber housing with bearings 50 and 50' and secured to the shaft of the electric motor 52 by a nut 56 and washer 54. The electric motor is attached to the base of the housing by four screws 58 and nuts 60, and the cover 62 with its seal ring 64 is held in place by the clamp ring 66.

The pressure reducing chamber 68, showing the baffle design, and the diverter plate 70 are also illustrated in FIG. 4, in addition to the rotation of the vane impeller 48, the path of the exhaust gases from the pressure reducing chamber 68 to the throat of the ram tube 32, where they are combined with fresh air and directed thru the filter 36 to the engine air cleaner 40.

What is claimed for the present invention is:

1. An exhaust supercharger apparatus intended for mounting to the exhaust pipes and air cleaner and water pump of a conventional internal combusion vehicle engine, the apparatus comprising, in combination:

an air cooled muffler having an inlet pipe adapted to be connected to the exhaust pipes of said engine, and an outlet pipe;

a sound reducing muffler having an inlet port and an outlet port;

an exhaust pipe adapted to connect said outlet pipe of said air cooled muffler to said inlet port of said sound reducing muffler;

a water cooled muffler having an inlet pipe and an outlet pipe;

an exhaust pipe adapted to connect said outlet port of said sound reducing muffler to said inlet pipe of said water cooled muffler;

a vapor trap having an inlet and an outlet;

a pipe adapted to connect said outlet pipe of said water cooled muffler to said inlet of said vapor trap;

an air-exhaust mixing chamber including means for mixing fresh air with exhaust gasses, said chamber having an inlet and an outlet;

a pipe connecting said outlet of said vapor trap to said inlet of said air-exhaust mixing chamber;

an elongated cylindrically shaped filter having an inlet and an outlet;

a pipe adapted to connect said outlet of said air-exhaust mixing chamber to said inlet of said filter;

a pipe adapted to connect said outlet of said filter to an inlet tube of said air cleaner of said engine;

a water reservoir having an inlet port and an outlet port;

a water jacket formed integrally with said water cooled muffler and having an inlet and an outlet; and

water carrying tube means interconnecting said water reservoir to said water cooled muffler and to said water pump for maintaining water flowing through said water jacket.

2. The exhaust supercharger apparatus as set forth in claim 1 wherein said water cooled muffler comprises an inner muffler of a rectangular cross-sectional configuration extending completely between said inlet pipe and said outlet pipe; a watertight jacket completely sur-

rounding the exterior surface of said inner muffler and spaced outwardly therefrom; a watertight compartment defined intermediate the interior of said jacket and the exterior of said inner muffler; an inlet port and an outlet port affixed to opposite ends of said water jacket and connected respectively to said water inlet pipe and said water outlet pipe for ingress and egress of water through said watertight compartment for cooling said inner muffler; and a multitude of longitudinally spaced apart outwardly transversely extending cooling fins affixed to said water jacket to assist in the cooling of said water jacket.

3. The exhaust supercharger apparatus as set forth in claim 2 wherein said air-exhaust mixing chamber is characterized by:

a cylindrical vertically extending housing having cylindrical side walls, a flat bottom surface, and an open top surface;

a chamber defined interiorly of said wall surfaces above said bottom surfaces and opening out of said top surface;

a flat disc shaped member having vertical veins extending radially outwardly from the periphery thereof disposed inwardly of said compartment concentric therewith to define a veined impeller member;

an opening centrally of said housing bottom surface in communication with said compartment;

an electric motor mounted to the exterior of said bottom surface concentric therewith and having a shaft extending vertically upwardly therefrom passing through said bottom surface central opening and affixed to said veined impeller member to effect the rotation thereof in said compartment;

a circular disc-shaped cover member adapted to restingly fit on said compartment top surface to close said compartment;

a ring shaped seal member interposed intermediate the top edge of said housing side wall surfaces and said cover member for sealing said compartment in an airtight manner;

a clamp ring member adapted to pass over the peripheral edges of said cover member and engage a top edge portion of said housing completely about the side walls thereof for removably lockingly retaining said cover member and said seal ring to said housing to close said compartment;

a horizontally disposed hollow open ended ram tube member having an oblong cross-sectional configuration and having an inlet end and an outlet end, said ram tube extending radially outwardly from the side wall of said housing with said outlet end in communication with said housing compartment for introducing fresh air thereinto;

said outlet from said chamber consisting of a cylindrically shaped outlet pipe having one end affixed to an opening in the side wall of said housing spaced about ninety degrees circumferally from said ram tube with said pipe extending radially outwardly therefrom in a horizontal disposition;

a diverter plate member affixed to an interior of the housing side wall projecting angularly into said chamber, the diverter plate being of a generally L-shaped configuration having the base thereof extending vertically and affixed to the interior of the chamber side walls in a position adjacent said outlet opening and on a side of said outlet opening spaced furthest from said ram tube, the leg portion of said diverter plate extending outwardly into the path of said outlet opening in the general direction of said ram tube;

said inlet to said chamber consisting of an opening in the side wall of the housing spaced equal distance circumferally from said outlet pipe and said ram tube on the opposite side of said veined impeller member;

a box-like hollow receptacle affixed to the exterior of said housing side walls completely surrounding said inlet opening and extending radially outwardly therefrom and having an inlet port;

a cylindrical pipe having one end affixed to said receptacle inlet port with the opposite end extending radially outwardly therefrom relative to said chamber housing;

a pair of baffle plate members extending parallel to each other into said receptacle compartment with said baffle plates being spaced from each other and with one baffle plate extending at least partially in front of said housing inlet opening and with the other baffle plate extending at least partially in front of said receptacle inlet port so as to baffle incoming exhaust gasses to reduce the pressure thereof.

* * * * *