C. V. STEVENSON.

FUEL VAPORIZING AND ECONOMIZING APPARATUS.

APPLICATION FILED FEB. 28, 1921.

1,421,606. Patented July 4, 1922.

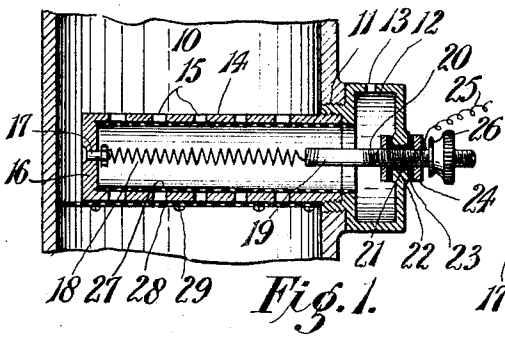


Fig. 1.

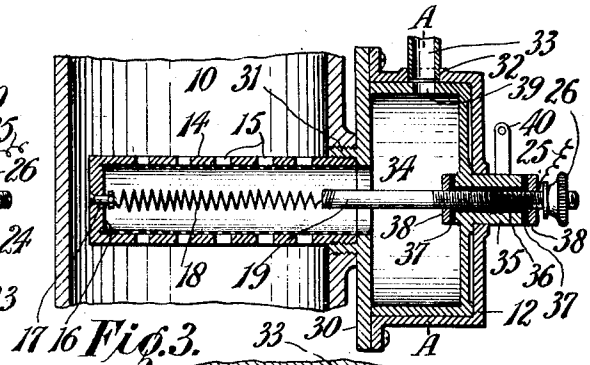


Fig. 3.

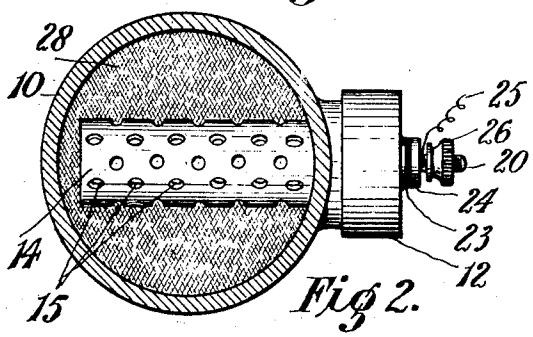


Fig. 2.

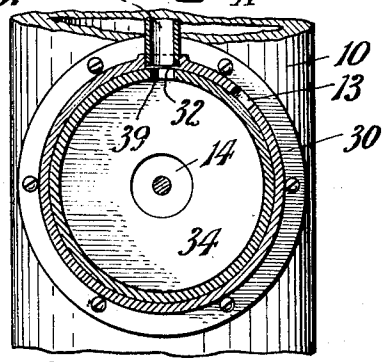


Fig. 4.

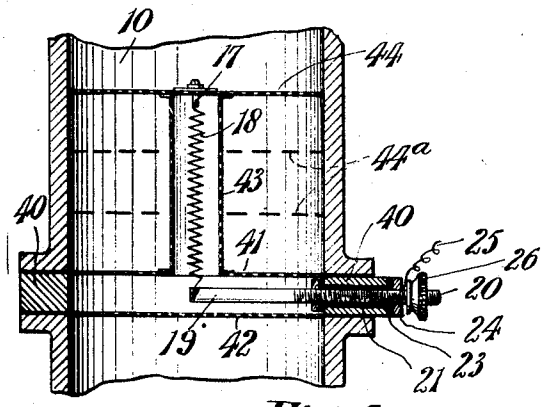


Fig. 5.

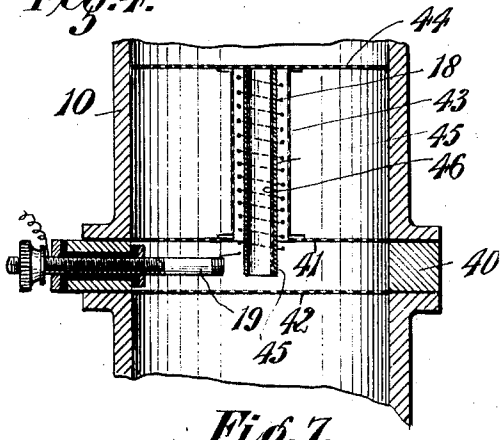


Fig. 7.

Fig. 8.

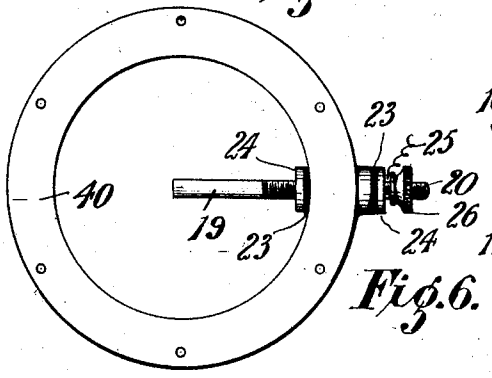
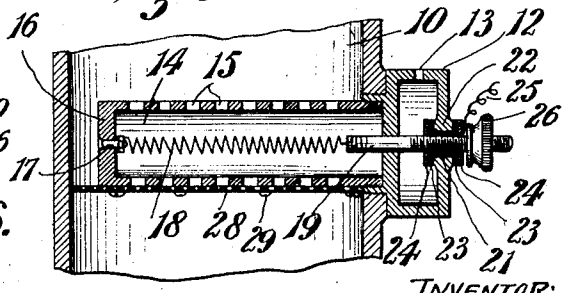


Fig. 6.



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UNITED STATES PATENT OFFICE.

CECIL VINCENT STEVENSON, OF SYDNEY, NEW SOUTH WALES, AUSTRALIA, ASSIGNOR OF FIVE-EIGHTHS TO THOMAS ERNEST ROFE, OF SYDNEY, NEW SOUTH WALES, AUSTRALIA, AND THREE-EIGHTHS TO SIDNEY LE FEVRE VARVEL, OF WAHROONGA, NEAR SYDNEY, NEW SOUTH WALES, AUSTRALIA.

FUEL VAPORIZING AND ECONOMIZING APPARATUS.

1,421,606. Specification of Letters Patent. Patented July 4, 1922.

Application filed February 28, 1921. Serial No. 448,542.

To all whom it may concern:

Be it known that I, CECIL VINCENT STEVENSON, a subject of the King of Great Britain, residing at Sydney, in the State of New South Wales, Commonwealth of Australia, have invented new and useful Improvements in Fuel Vaporizing and Economizing Apparatus, of which the following is a specification.

This invention relates to an improved fuel vaporizing and economizing apparatus which may be fitted to a carburettor below the throttle or to the induction manifold of an internal combustion engine between the throttle and the inlet valve.

The object of the invention is to provide an improved vaporizing apparatus of simple construction which will effect a thorough amalgamation of the hydrocarbon and air particles, whereby considerable economy in fuel consumption is obtained.

The improved apparatus is characterized by the provision of an electrical heating element, and a gauze screen co-acting with the heating element and functioning to radiate heat from the heating element, to gasify the fuel particles and to prevent pre-ignition of the combustible fuel mixture.

According to one embodiment of the invention the apparatus is also provided with means for admitting additional air to the mixing chamber of the carburettor or to the induction manifold, according to the location of apparatus, while in another embodiment there are provided means, furnished with an approved control, for admitting to the engine additional air to afford a braking resistance and water vapor or steam to improve the combustion of the fuel mixture thereby minimizing carbon deposits within the engine cylinders.

With these and other objects in view the invention consists of the features of construction, combination and arrangement hereinafter fully described, reference being had to the accompanying drawings wherein:

Figure 1 is a view in sectional elevation illustrating the application of the apparatus to the induction manifold with means for admitting additional air.

Figure 2 is a part sectional plan of Figure 1.

Figure 3 is a view in sectional elevation illustrating the application of the apparatus to the induction manifold with means for admitting air and water vapour or steam.

Figure 4 is an end sectional elevation of Figure 3 taken on line A—A.

Figure 5 is a view in sectional elevation of a modified construction having a supporting ring for application to the induction manifold where junctioned to the piping leading from the carburettor.

Figure 6 is a view in plan of the supporting ring shown in Figure 5.

Figure 7 is a sectional elevation of a modification of the apparatus shown by Figure 5.

Figure 8 is a sectional elevation illustrating a modification of the apparatus illustrated in Figures 1 and 2.

Reference being had to the construction of apparatus illustrated by Figures 1 and 2, the intake pipe or induction manifold 10 of an internal combustion engine has a hole tapped therein to receive the externally threaded neck 11 of a cylindrical chamber 12 which latter has an air inlet port 13.

A metal tube 14 constructed with perforations as 15 has its inner end threaded and screwed into the neck 11. Said perforated tube is arranged transversely of the manifold 10 and has a closed outer end 16 in which is revolvably mounted a turn pin or screwed stud 17. An electrical resistance wire 18 suitably coiled, is affixed at one end to said pin 17 and has its opposite end fastened to the end of a metallic rod 19. This rod is screw-threaded at 20 and passes through a bush 21 of insulating material fitted into a boss 22 formed on the outer wall of said chamber 12. Washers 23 of insulating material are arranged on opposite sides of said boss 22 and are maintained in position against said bush 21 by nuts 24 on the threaded portion of the rod 19.

An electric supply wire 25 leading from a

convenient source of supply of electrical energy is wound around the end of the rod 19 and is held in position by a binding terminal nut 26.

A cylindrical lining 27 of fine mesh metal gauze is disposed within the perforated metal tube 14, but alternatively this gauze may be arranged around the outer surface of the tube, or the latter may be provided with both an inner lining and an outer covering of gauze.

A flat circular-shaped screen 28 of fine mesh metal gauze is fitted to the under surface of the perforated tube 14 by means such as screws 29. This screen has a diameter corresponding to the bore of the intake pipe or manifold 10 and it is so arranged in relation to the tube 14 that when the apparatus is fitted to the manifold said screen forms a partition extending completely across the intake pipe or manifold 10.

According to the construction illustrated by Figures 1 and 2, the flat circular gauze screen 28 is employed in addition to a cylindrical gauze lining 27 encircling the electrical heating element 18 in the perforated tube 14, but in the construction illustrated by Figure 8 the screen 28 affixed to the under surface of the perforated metal tube is used in substitution for the cylindrical gauze lining 27 disposed within said tube.

Upon operating a switch (not shown) controlling the supply of current, the coil of resistance wire 18 instantly becomes heated and the heat given off quickly heats the gauze lining 27, the tube 14 and gauze screen 28. Heat being radiated from said gauze lining and said screen, the fuel mixture in its passage through the intake pipe or manifold 10 is heated and atomized simultaneously, resulting in a thorough amalgamation and the production of a homogeneous mixture of hydrocarbon and air particles. The cylindrical gauze lining 27 and/or the gauze disc 28 furthermore function to protect the fuel charge against direct contact with the glowing hot resistance wire, thereby effectively safeguarding the fuel charge against pre-ignition in its passage to the engine cylinders.

Additional air is induced into the chamber 12 through the port 13 by the suction of the engine and the passage of the fuel charge along the intake pipe or manifold 10. This additional air, so admitted, is drawn from said chamber through the tube 14 and in its passage it is being constantly heated. Finally escaping through the gauze lining 27 and the perforations 15 of the metal tube 14, the additional air in its heated condition is readily absorbed by the previously atomized fuel mixture.

In the form of the apparatus illustrated by Figures 3 and 4, the chamber 12 is enlarged and secured by means of screwed studs to a plate 30 of disc-like form having an apertured boss 31 externally threaded to screw into the manifold 10 and internally threaded to receive the end of the perforated metal tube 14.

In addition to the air inlet port 13, the chamber 12 according to this construction is provided with a port 32 for the admission of water vapour or steam communicating by means of a pipe 33 with a suitable steam or water supply, as the radiator of a motor-vehicle.

A rotary valve 34 is revolvably mounted in the chamber 12 having a sleeve 35 loosely fitted on a bush 36 of insulating material mounted on the threaded portion 20 of the metal rod 19. Washers 37 of insulating material abut against the opposite ends of the bush 36 and are retained in position by means of nuts 38.

A port 39 is formed in the valve 34 and designed to register with the ports 13 and 32 formed in said chamber.

The valve 34 may be connected to the dashboard or other part of the motor-vehicle convenient of access to the driver through a lever 40 attached to said sleeve 35 and furnished with a Bowden wire attachment or like actuating means.

When the valve 34 is operated so that the port 39 therein is in register with the port 13 of the chamber 12 additional air is admitted for the purpose of diluting the fuel mixture or to be used for braking purposes, and when said valve is rotated so that its port registers with the port 32 of said chamber the air admission port 13 is closed while water vapor or steam may be admitted to the fuel mixture for the purpose of improving combustion and minimizing carbon deposits in the cylinders of the engine. It is common practice to connect the manifold 10 to the pipe leading from the carburettor by means of junctioning flanges and bolts. According to the modification illustrated by Figures 5 and 6 a metal supporting ring 40 is interposed and secured between these junctioning flanges. Flat circular sheets 41 and 42 of fine mesh metal gauze are secured to the upper and to the lower surfaces of said ring 40.

A tube 43 of fine mesh metal gauze is mounted on the upper sheet 41 so as to be disposed vertically and approximately centrally in the intake pipe or manifold 10. A disc 44 of fine mesh metal gauze is mounted upon and supported by the gauze tube 43. Centrally mounted in said gauze tube is a coil of electric resistance wire 18 having its upper end secured to a metal turn pin 17 and its lower end fastened to the metal rod 18 which extends through said ring 40 and is secured in position by means of a bush 21,

washers 23 and nuts 24 in a manner similar to that hereinbefore described with reference to Figures 1 to 4.

There may be a series of superimposed gauze screens 44[a] positioned between the gauze sheets 41 and 44, as indicated by broken lines in Figure 5, and adapted to thoroughly atomize the hydrocarbon and air particles and effect a homogeneous combustible mixture in the passage of the fuel charge through the manifold to the engine.

Figure 7 of the drawings illustrates a modification of the apparatus shown in Figures 5 and 6, and embodies a supporting ring 40, horizontal gauze screens 41, 42 and 44 and a vertically disposed gauze tube 43.

Concentrically supported in the gauze tube 43 is a plain tube 45 formed of thin metal around the periphery of which is wound the electric resistance wire 18. This wire is connected to the metal rod 19 which is fitted to and supported by the ring 40 in the manner hereinbefore described.

The windings of resistance wire are protected by the encircled gauze tube 43, and the thin metal tube 45 may be furnished with an internal lining 46 or packing of fine mesh metal gauze. This construction provides increased heating surfaces adapted to effect a ready volatilization of heavy hydrocarbon liquids to procure a uniformly correct explosive mixture giving required engine efficiency.

What I do claim is:—

1. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, an electrical resistance heating coil disposed in the path of the fuel charge, a gauze screen co-acting with said coil to radiate heat and further functioning to atomize the fuel and protect the vaporized fuel against contact with said coil, and means for admitting additional air and directing same over said coil to the fuel charge.

2. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, an electrical resistance heating coil disposed in the path of the fuel charge, a gauze screen co-acting with said coil to radiate heat and further functioning to atomize the fuel and protect the vaporized fuel against contact with said coil, and means for admitting additional air and/or water vapour or steam to the fuel charge.

3. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, an electrical resistance heating coil disposed in the path of the fuel charge, a cylindrical gauze screen encircling said coil, and a flat gauze screen disposed beneath said cylindrical screen.

4. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, a perforated metal tube disposed in the path of the fuel charge, an electrical resistance heating coil mounted in said tube, a cylindrical lining of metal gauze in said tube encircling said coil, and means supplying electrical energy to said coil.

5. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, a perforated metal tube disposed in the path of the fuel charge, an electrical resistance heating coil mounted in said tube, means for supplying electrical energy to said coil, a cylindrical covering of gauze mounted in or on said tube, and a flat gauze screen fitted to the under surface of said tube.

6. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, a chamber, an air inlet port in said chamber, a perforated metal tube fitted to said chamber and disposed in the path of the fuel charge, a metal rod carried by and insulated from said chamber, an electrical resistance heating coil disposed within said tube, means fastening said coil at one end to the outer end of said tube and at its other end to said rod, a cylindrical gauze lining supported by said tube, and an electrical current supply wire connected to said rod.

7. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, a chamber, an air inlet port in said chamber, a boss in said chamber, an insulating bush in said boss, a threaded metal rod passing through said bush, insulating washers abutting against said bush, nuts on said rod maintaining said washers in position, a perforated tube secured to said chamber and disposed in the path of the fuel charge, a turn pin revolvably mounted at the outer end of said tube, an electrical resistance heating coil connected at its opposite ends to said pin and to said rod, a cylindrical gauze screen in said tube encircling said coil, a flat gauze screen affixed to the under surface of said tube, an electrical supply wire connected to said rod, and a terminal binding nut on said rod.

8. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, a chamber, an air inlet port in said chamber, a second port in said chamber, a pipe fitted to the second port and communicating with a source of supply of water vapour or steam, a rotatable valve in said chamber, a port in said valve, means for rotating said valve so that the port therein registers with either of the ports in said chamber, a perforated metal tube communicating with said chamber and disposed in the path of the fuel charge, an electrical resistance heating coil mounted in said tube, means for supplying electrical energy to said coil, and a cylindrical gauze screen

disposed in said tube and encircling said coil.

9. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, a supporting ring, gauze screens fitted to said ring and disposed in the path of the fuel charge, a vertically disposed gauze tube on the upper of said screens, a gauze partition superimposed on said tube, a metal rod supported by and insulated from said ring, an electrical resistance heating coil connected at its lower end to said metal rod and at its upper end to said partition, and an electrical supply wire connected to said rod.

10. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, a supporting ring, horizontal gauze screens fitted to said ring and disposed in the path of the fuel charge, a vertically disposed gauze tube on the upper of said screens, a gauze partition at the upper end of said tube, a series of superimposed gauze partitioning screens fitted to said tube, a metal rod supported by and insulated from said ring, an electrical resistance heating coil vertically disposed in said tube, means connecting the opposite ends of said coil to the uppermost of said partitioning screens and to said metal rod, an electrical supply wire connected to said rod, and a binding terminal nut on said rod.

11. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, a supporting ring, horizontal gauze screens fitted to said ring and disposed in the path of the fuel charge, a metal rod supported by and insulated from said ring, a metal tube vertically disposed and supported by said screens, a gauze partition supported at the upper end of said tube, an electrical resistance coil wound around said metal tube, means connecting the opposite ends of said coil to the uppermost of said screens and to said metal rod, a gauze tube encircling the windings of said coil, and an electrical supply wire connected to said rod.

12. A vaporizing and fuel economizing apparatus for internal combustion engines comprising, a supporting ring, horizontal gauze screens fitted to said ring and disposed in the path of the fuel charge, a metal rod supported by and insulated from said ring, a metal tube vertically disposed and supported by said screens, a gauze partition supported at the upper end of said vertical tube, an electrical resistance coil wound around said tube, means connecting the opposite ends of said coil to the uppermost of said screens and to said metal rod, a gauze tube encircling the windings of said coil, gauze lining or packing in said metal tube, an electrical supply wire connected to said rod, and a terminal binding nut on said rod.

In testimony whereof I affix my signature in presence of two witnesses.

CECIL VINCENT STEVENSON.

Witnesses:
R. L. BOULTON,
A. J. CALLINAN.