Oct. 23, 1962 C. W. WHITE 3,059,422

CARBON MONOXIDE ELIMINATOR WITH AUTOMATIC GAS BURNER AND VOLATILIZER

Filed May 12, 1960 2 Sheets-Sheet 1

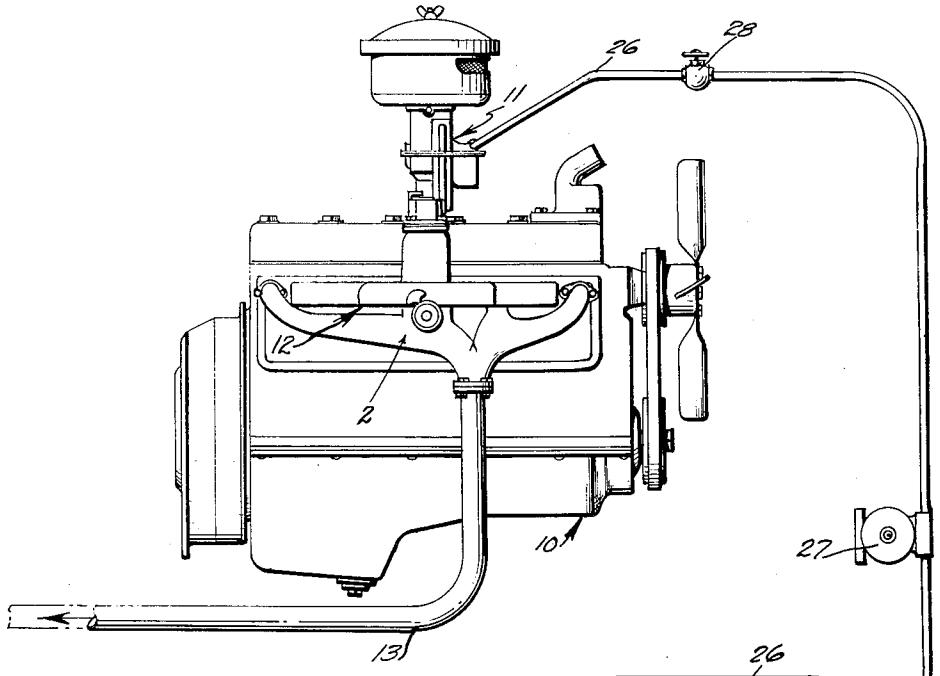
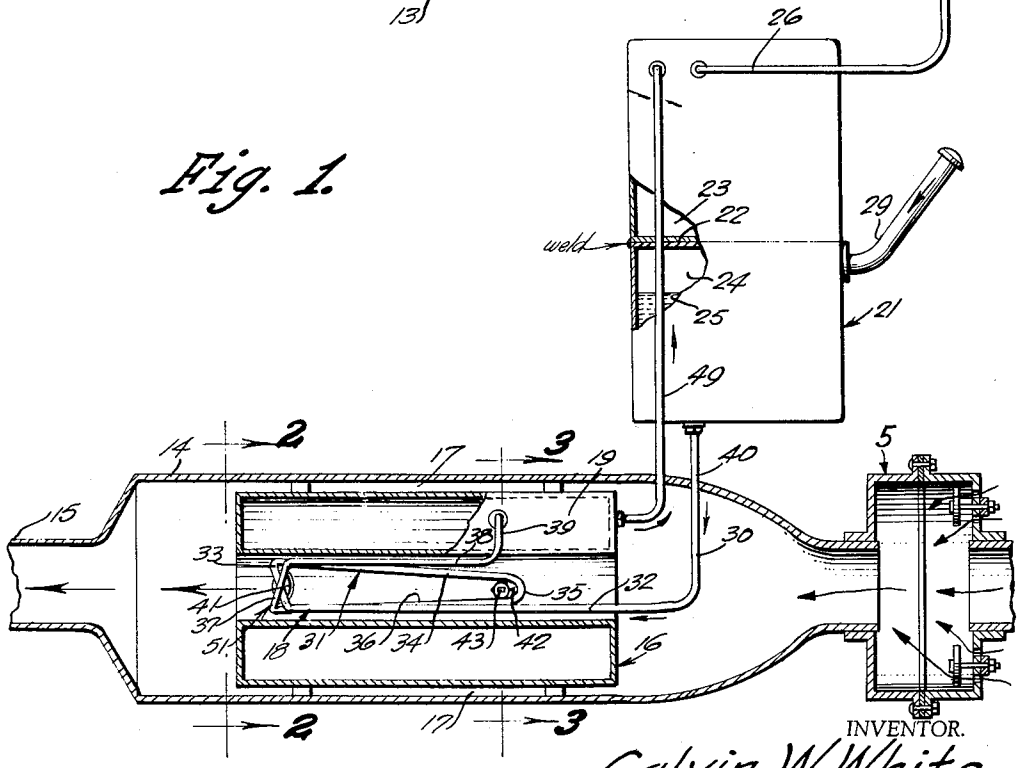


Fig. 1.



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Fig. 2.

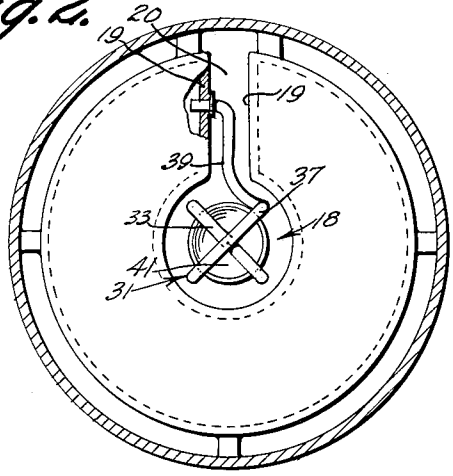


Fig. 6.

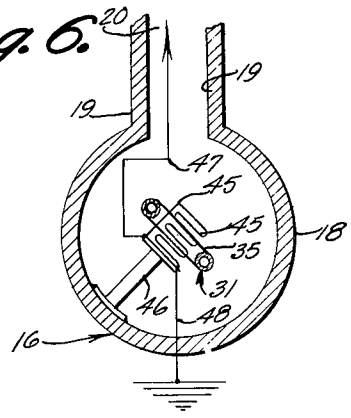
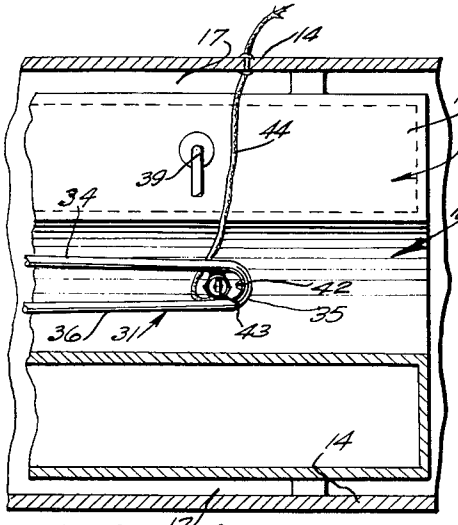


Fig. 3.



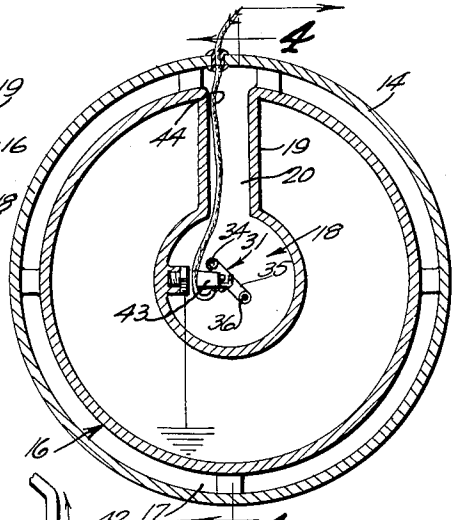


Fig. 4.

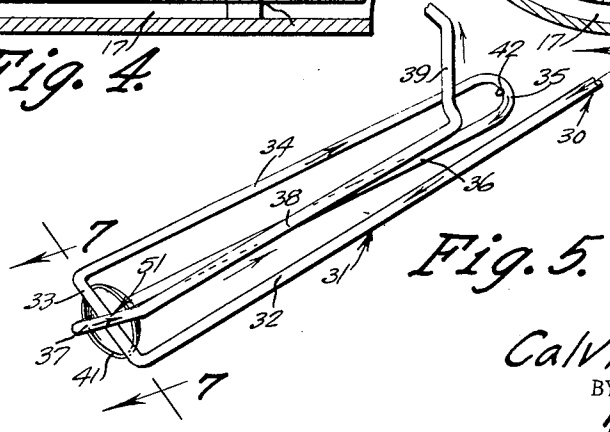


Fig. 5.

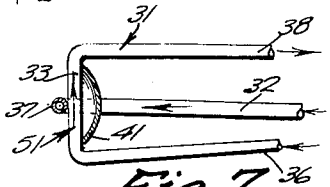


Fig. 7.

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CARBON MONOXIDE ELIMINATOR WITH AUTOMATIC GAS BURNER AND VOLATILIZER

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Filed May 12, 1960, Ser. No. 28,688
7 Claims. (Cl. 60—30)

This invention relates to an internal combustion engine, and more particularly to an internal combustion engine for a vehicle, and whereby according to the present invention there is provided an improved exhaust system for the vehicle engine as well as an improved means for feeding fuel to the engine to support combustion.

This invention is an improvement over my prior patents such as prior Patents No. 1,843,999, No. 1,847,506 and No. 2,035,185.

The object of this invention is to provide an exhaust system and fuel feeding means wherein carbon monoxide is burned to provide carbon dioxide, so that harmful or noxious fumes or exhaust gases will be minimized or prevented, and wherein at the same time the fuel for supporting combustion in the engine is vaporized or volatilized so as to permit the engine to operate in a manner that there will be less likelihood of noxious exhaust gases or fumes resulting from the operation of the engine.

A further object of the invention is to provide a means for eliminating carbon monoxide in a vehicle exhaust system, and wherein there is provided a burner which has a target or deflector as well as an orifice, and wherein there is also provided a means for igniting or burning carbon monoxide in the vicinity of the orifice so that carbon monoxide will be eliminated from the exhaust of internal combustion engines and fuel burners.

A still further object of the invention is to provide a mechanism which will volatilize the fuel to a higher octane so as to provide a savings in the cost of fuel, and wherein the carbon monoxide will be burned to carbon dioxide, the carbon dioxide being a harmless gas, and wherein the amount of carbon monoxide in the exhaust of the engine will be decreased since the gas which is fed into the engine is hot and highly volatile, so that the carbon monoxide eliminator of the present invention will not only permit the engine to be operated more conveniently and safely and efficiently but will also provide a means of economical operation.

A further object of the invention is to provide an exhaust system and fuel feeding means for internal combustion engines which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent in the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same.

FIGURE 1 is a fragmentary elevational view illustrating schematically the present invention, and with parts broken away and in section.

FIGURE 2 is a sectional view taken on the line 2—2 of FIGURE 1.

FIGURE 3 is a sectional view taken on the line 3—3 of FIGURE 1.

FIGURE 4 is a sectional view taken on the line 4—4 of FIGURE 3.

FIGURE 5 is a fragmentary perspective view illustrating the burner.

FIGURE 6 is a sectional view illustrating a modification.

FIGURE 7 is a fragmentary elevational view illustrating an end portion of the burner which has the deflector therein.

Referring in detail to the drawings, the numeral 10

designates an internal combustion engine such as the engine for a vehicle, and the numeral 11 indicates the carburetor, and the numeral 12 indicates the intake manifold, FIGURE 1. The numeral 13 indicates an exhaust pipe or conduit which is connected to the exhaust manifold 2, and the exhaust pipe 13 has an enlarged portion 14, and the portion 15 of the exhaust pipe is adapted to lead or extend to the usual tail pipe of the vehicle. A conventional air intake coupling or unit as indicated by the numeral 5 in FIGURE 1, can be connected to the pipe or conduit 13, and a detailed description and illustration of a unit such as the unit 5, is indicated by the numeral 22 in my prior Patent No. 1,843,999 and the unit 5 is adapted to be used for providing a means for admitting additional air into the afterburner.

Arranged within the enlarged portion 14 of the tail pipe is a hollow casing or tank which is indicated generally by the numeral 16, and the outer portions of the casing 16 are spaced inwardly from the walls of the portion 14 so as to define or provide clearance spaces 17. The casing 16 is provided with a longitudinally extending centrally disposed bore or passageway 18, for a purpose to be later described. As shown in FIGURE 3 the upper portions 19 of the casing 16 are separated so as to define therebetween a clearance space 20.

The numeral 21 indicates a tank which is provided with a horizontally disposed partition 22 therein and this partition provides or defines in the tank upper and lower compartments 23 and 24, FIGURE 1. The lower compartment 24 is adapted to hold liquid fuel as indicated by the numeral 25. The numeral 26 indicates a line or conduit which serves to connect the upper compartment 23 to the carburetor 11, and a pump 27 may be operatively connected to the line 26 for helping to pump the fuel from the compartment 23 through the line 26 to the carburetor 11. The line 26 is also provided with a regulating valve or regulator as indicated by the numeral 28. The numeral 29 indicates a fuel inlet which communicates with the lower compartment 24.

The numeral 30 indicates a conduit which has a section or portion 40 connected to the lower compartment 24. Portions of the conduit 30 are shaped to define or provide a burner which is indicated generally by the numeral 31, and the burner 31 is positioned in the space 18 centrally within the casing 16. Thus, the burner includes a first portion 32 of the conduit 30, and arranged angularly with respect to the first portion 32 is a second portion 33 which terminates in an angularly third portion 34, and a curved end portion or fourth portion 35 serves to connect the third portion 34 to a fifth portion 36. The numeral 37 indicates a sixth portion which is arranged angularly with respect to the fifth portion 36, and the sixth portion 37 terminates in a seventh portion 38, and the numeral 39 indicates an eighth portion which is connected to the upper portion of the casing 16. As shown in the drawings such as in FIGURE 1, the second and sixth portions 33 and 37 are arranged in criss-cross relation with respect to each other, and an arcuate or curved baffle or deflector 41 is arranged contiguous to the portions 33 and 37 and is secured thereto in any suitable manner, FIGURE 5.

The curved fourth portion 35 of the burner 31 is provided with an orifice or aperture 42, and arranged contiguous to the orifice 42 is a spark plug 43 which is adapted to be connected to the vehicle ignition circuit by means of a wire or electrical conductor 44.

In a modification, attention is directed to FIGURE 6 wherein instead of using a spark plug such as the spark plug 43, an electric grid 45 is used, and the grid 45 may be supported by a member 46, and the grid 45 is adapted to be connected to the electrical circuit of the vehicle by means of a wire or conductor 47, and the grid 45 is adapted to be grounded as at 48.

From the foregoing, it is apparent that there has been provided an improved exhaust system for a vehicle which is an improvement over prior devices of this nature such as those shown in my prior patents. With the parts arranged as shown in the drawings, it will be seen that fuel from a suitable source of supply is adapted to be conveyed to the lower compartment **24** of the tank **21**, and this liquid fuel is indicated by the numeral **25** in FIGURE 1. The fuel **25** will flow downwardly through the section **40** of the conduit **30** and subsequently as later described in this application, the fuel will be vaporized and this vapor will pass upwardly through the conduit or line **49** from the upper end of the casing **16** to the upper compartment **23**. The vapor will then leave the compartment or chamber **23** and pass through the conduit **26**, and this vapor may be pumped through the line **26** by means of a suitable vapor fuel pump **27**. The chamber **23** functions as a storage chamber for the vapor so as to insure that there will be an ample available supply of vapor that can flow or pass through the conduit **26**. The valve **28** is adapted to be used for regulating the flow of vapor through the line **26** to the carburetor **11**.

As the engine operates, the exhaust gases or exhaust products will pass out through the manifold **12** and then enter the adjacent portion of the exhaust pipe **13**, and these hot exhaust gases will then pass through the enlarged portion **14** and then out through the portion **15** of the exhaust pipe and then to the usual tail pipe of the vehicle. As the hot exhaust products which contain carbon monoxide arrive at a point contiguous to the orifice **42**, the carbon monoxide will be burned or ignited so that it will become carbon dioxide so that carbon monoxide will be eliminated in the exhaust gases and wherein the carbon dioxide which passes out through section **15** will not be harmful to the surrounding area. The spark plug **43** is electrically connected to the vehicle ignition circuit by means of a conductor **44**, and the space **20** between the portions **19** of the casing provides clearance for the conductor **44** to extend therethrough. Instead of using the spark plug **43**, the electric grid **45** may be used as shown in FIGURE 6.

It is to be noted that the fuel **25** in liquid condition first passes through the portion **40** of the conduit **30**, and then passes through the burner **31** and enters the upper end of the casing or tank **16** through the portion **39**. Thus, it will be seen that the liquid fuel will pass first through the portion **40** of the conduit **30**, and then through the portion **32** and then through the portion **33**, and then through the portion **34** and then through the portion **35**, and this fuel will then pass through the portion **36** and then through the portion **37**, and then through the portion **38** and then into the casing **16** through the portion **39**. It is to be noted that the burner of conduit portions are arranged in the space **18** and this arrangement insures that the most effective and most efficient heat exchange can take place between the desired constituents.

The parts can be made of any suitable material and in different shapes or sizes.

The present invention will function as an effective anti-smog device for use on automobiles, trucks or the like, so that the present invention will provide an effective aid against the eye smarting pall of air pollution. Thus, a means is provided for helping reduce or minimize smog in the air and for helping to suppress smog and the equipment can be installed on new cars or it can be readily mounted on used cars.

As shown in FIGURE 6, a hot point of electricity or an electric grid can be used instead of the spark plug. The deflector **41** in front of the target may be made of a suitable material such as copper and serves to deflect the blaze or heat back on the tubes which form the target and contain the fuel which is volatilized. Furthermore, the deflector **41** prevents the blaze from coming out of the end of the exhaust pipe.

Thus, it will be seen that according to the present invention there has been provided a carbon monoxide eliminator with a volatilizer, and the present invention is an improvement over prior devices such as prior Patent No. 1,843,999. The deflector **41** is attached in front of the target of the burner. The ignition or firing means adjacent the orifice may consist of a hot spot, electric grid or electric plugs and these members may be connected to the vehicle battery through the medium of suitable conductors.

It will be noted that the casing or tank **16** has a divided construction so as to provide the space **20**, FIGURE 2, and this casing **16** surrounds the automatic burner **31**. The burner tubes may be made of a suitable material such as copper, and on one end of the burner is the orifice **42** while the target reflector **41** is at the other end. The present invention is constructed so that carbon monoxide will be eliminated and wherein there is also provided an automatic gas burner and volatilizer.

It will be seen that according to the present invention there is provided a burner which uses the X or criss-cross portions **33** and **37** of the burner as a target and the burner is made of copper tubing which forms a target at one end and which forms the loop **35** at the other end which has the orifice **42** inserted in it facing the target. This burner is attached to a divided volatilizing tank or casing **16** which is made of a suitable material such as strip steel, copper, aluminum or the like, and one end of the tube **30** is connected as at **39** into the upper portion of the member **16**, while the end **40** is connected to the bottom of the tank **21**. Thus, liquid fuel can pass from the compartment **24** to the target **51** which is defined by the criss-crossed portions **33** and **37**, and gas can pass from the target **51** to the upper chamber **23** of the tank **21**. The lower compartment **24** of the tank **21** is adapted to be attached to the conventional gas tank for the vehicle as for example by means of the tube or fitting **29**. The upper chamber or compartment **23** is operatively connected or attached to the carburetor **11** of the engine by means of the copper conveyor tube **26** which has both ends open so that the gas can flow therethrough.

The burner is arranged in the exhaust pipe as shown in the drawings, and the burner is surrounded by the tank or casing **16**. The spark plug **43** is secured in place as shown near the orifice **42** to keep the gas lighted while the engine is running, and this also serves to ignite the gas at the orifice or fuel at the orifice since butane, benzol and the like are now used as fuel, as well as gasoline and kerosene, and since according to the present invention this fuel is volatilized before it is fed to the engine, any volatile fuel can be used.

Some of the advantages of the present invention as for example as compared to my prior patents covering chemical methods, electrical and mechanical methods for eliminating carbon monoxide from the exhausts of internal combustion engines and fuel burners are as follows. The present invention is adapted to be made more cheaply, and it volatilizes the fuel to high octane so as to provide a savings in the cost of fuel. In addition, carbon monoxide will be burned to carbon dioxide which is a harmless gas. Also, the amount of carbon monoxide in the exhaust of the engine will be decreased since the gas fed into the engine is hot and highly volatile. Thus, for these reasons the savings will exceed the the cost of the carbon monoxide eliminator.

As soon as the burner is lighted at the orifice, the fuel begins to burn, the tank or casing **16** gets hot and the fuel begins to volatilize and the burner begins to function since the blaze hits the target **51** and generates more heat which volatilizes more fuel and the blaze from the burner burns up the carbon monoxide in the exhaust pipe and converts it to a harmless gas, namely carbon dioxide.

The regulator **28** is arranged in the feed line **26** from the tank **21** and the manifold **12** so as to regulate the flow of gas and speed of the engine.

The vapor fuel pump **27** may be used in certain in-

stances, while at other times it may be omitted. The regulator **28** can be used, or if need be, the mechanism can be equipped with the necessary foot feed such as accelerators now use. Elements such as the elements **11** and **12** can also be used as shown, but the volatilizer, gas burner, and carbon monoxide eliminator may be attached to the manifold exhaust close to the engine, and present day vehicles such as automobiles have a shortage of space under the hood and is a problem.

What is claimed is:

1. An internal combustion engine including a carburetor, an exhaust pipe connected to said engine and including an enlarged portion, a hollow casing mounted in the enlarged portion of said pipe and said casing including a longitudinally extending centrally disposed passageway, portions of said casing adjacent the upper end thereof being spaced apart so as to provide a clearance space, a tank including upper and lower compartments, an inlet fuel fitting connected to the lower compartment, a line connecting the upper compartment to said carburetor, a line connecting the upper portion of the casing to said upper compartment, a conduit operatively connecting said lower compartment to said casing, said conduit being shaped to include portions which define a burner, said burner being positioned in the central passageway of said casing, and means for adding additional air to the burner to support combustion therein.

2. The structure as defined in claim 1 and further including a regulator in the line which connects the upper compartment to the carburetor.

3. An internal combustion engine including a carburetor, an exhaust pipe connected to said engine and including an enlarged portion, a hollow casing mounted in the enlarged portion of said pipe and said casing including a longitudinally extending centrally disposed passageway, portions of said casing adjacent the upper end thereof being spaced apart so as to provide a clearance space, a tank including upper and lower compartments, an inlet fuel fitting connected to the lower compartment, a line connecting the upper compartment to said carburetor, a line connecting the upper portion of the casing to said upper compartment, a conduit operatively connecting said lower compartment to said casing, said conduit being shaped to include portions which define a burner, said burner being positioned in the central passageway of said casing, and means for adding additional air to the burner to support combustion therein, a regulator in the line which connects the upper compartment to the carburetor, said burner being defined by a first portion of said conduit and said first portion extending in the said passageway, a second portion arranged angularly with respect to said first portion, a third portion arranged angularly with respect to said second portion, a curved fourth portion connecting said third portion to a fifth portion, a sixth portion arranged angularly with respect to said fifth portion, and a seventh portion arranged angularly with respect to said sixth portion, said seventh portion being connected to said casing through the medium of an eighth portion.

4. An internal combustion engine including a carburetor, an exhaust pipe connected to said engine and including an enlarged portion, a hollow casing mounted in the enlarged portion of said pipe and said casing including a longitudinally extending centrally disposed passageway, portions of said casing adjacent the upper end thereof being spaced apart so as to provide a clearance space, a tank including upper and lower compartments, an inlet fuel fitting connected to the lower compartment, a line connecting the upper compartment to said carburetor, a line connecting the upper portion of the casing to said upper compartment, a conduit operatively connecting said lower compartment to said casing, said conduit being shaped to include portions which define a burner, said burner being positioned in the central passageway of said casing, means for adding additional air to the burner to support combustion therein, a regulator in the line which connects the upper compartment to the carburetor, said burner being defined by a first portion of said conduit and said first portion extending in the said passageway, a second portion arranged angularly with respect to said first portion, a third portion arranged angularly with respect to said second portion, a curved fourth portion connecting said third portion to a fifth portion, a sixth portion arranged angularly with respect to said fifth portion, and a seventh portion arranged angularly with respect to said sixth portion, said seventh portion being connected to said casing through the medium of an eighth portion, said second and sixth portions being arranged in criss-cross relation with respect to each other so as to define a target, and an arcuate deflector arranged contiguous to the junction of said second and sixth portions.

5. An internal combustion engine including a carburetor, an exhaust pipe connected to said engine and including an enlarged portion, a hollow casing mounted in the enlarged portion of said pipe and said casing including a longitudinally extending centrally disposed passageway, portions of said casing adjacent the upper end thereof being spaced apart so as to provide a clearance space, a tank including upper and lower compartments, an inlet fuel fitting connected to the lower compartment, a line connecting the upper compartment to said carburetor, a line connecting the upper portion of the casing to said upper compartment, a conduit operatively connecting said lower compartment to said casing, said conduit being shaped to include portions which define a burner, said burner being positioned in the central passageway of said casing, means for adding additional air to the burner to support combustion therein, a regulator in the line which connects the upper compartment to the carburetor, said burner being defined by a first portion of said conduit and said first portion extending in the said passageway, a second portion arranged angularly with respect to said first portion, a third portion arranged angularly with respect to said second portion, a curved fourth portion connecting said third portion to a fifth portion, a sixth portion arranged angularly with respect to said fifth portion, and a seventh portion arranged angularly with respect to said sixth portion, said seventh portion being connected to said casing through the medium of an eighth portion, said second and sixth portions being arranged in criss-cross relation with respect to each other so as to define a target, and an arcuate deflector arranged contiguous to the junction of said second and sixth portions, said fourth portion being provided with an orifice, and firing means adjacent said orifice.

6. The structure as defined in claim 5 wherein said firing means comprises a spark plug.

7. The structure as defined in claim 5 wherein said firing means comprises an electric grid.

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