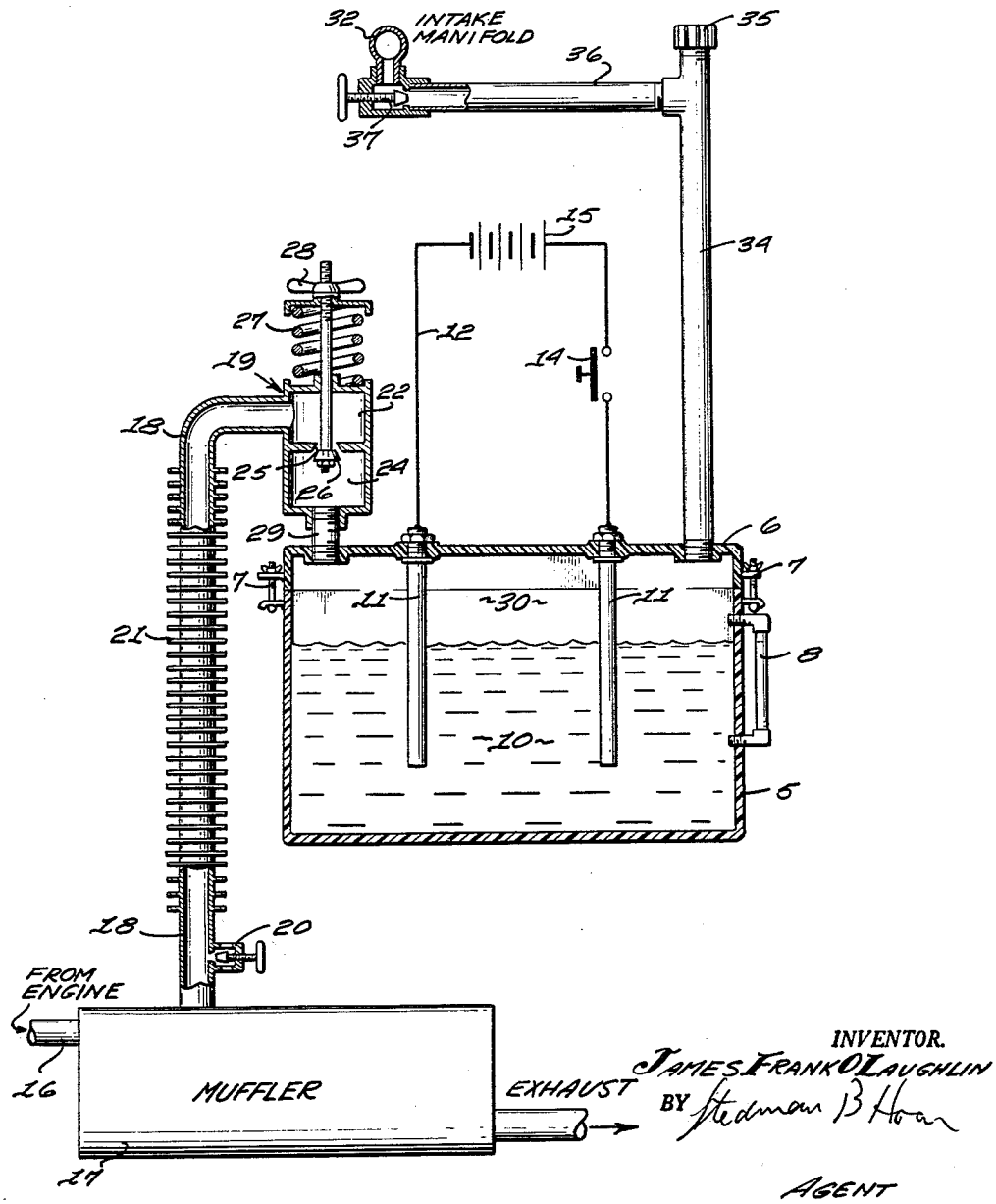
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FUEL ECONOMIZER FOR INTERNAL COMBUSTION ENGINES

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FUEL ECONOMIZER FOR INTERNAL COMBUSTION ENGINES

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My invention relates to apparatus for economizing in the consumption of fuel used in internal combustion engines, and for reducing the amount of unburned or partially burned fuel fractions emitted to the atmosphere by such engines.

The internal combustion engine, as now employed to drive motor vehicles, may be called a relatively inefficient mechanism when judged by many standards. That is because such engines, at least for many makes of automobiles, are designed to produce momentarily much more power than they usually use. Get-a-way and pick-up are demanded by the motoring public, according to engine designers. It can be shown that an engine designed to run steadily at a constant power-output and speed can run with far greater economy than its counterpart in modern automobiles.

It is well known, particularly in those communities troubled with the phenomenon called "smog," that modern motor vehicles, stopping, starting, accelerating, and decelerating in city traffic, emit a very considerable amount of unburned or partially burned fuel to the atmosphere. Many devices have been placed upon the market intended to counter-act this waste, but for the most part such devices have a poor effect upon engine performance. Afterburners simply consume wasted gas and create a back-pressure which lessens the power out-put. By the time air-heaters and air-feeders have been adjusted to engine needs, the needs are often long gone. In burning the otherwise wasted exhausts, the particular nature of these gases must be considered. Too often this nature, or chemical composition, has been considered as being the same as, or equivalent of, the gases originally fed from carburetor to cylinder.

It is an object of my invention to provide a simple yet effective apparatus for rendering the unburned or partially burned exhaust gases inflammable and conducting them in an inflammable condition back to the cylinders where their combustion potential may be utilized to produce power.

Another object of my invention is to provide an apparatus for the purpose set forth which causes no extra back-pressure upon the engine.

Still another object of my invention is to provide a chemically balanced fuel supply which is obtained from the gases ordinarily permitted to go to waste and from an ordinary storage battery and which is supplied to the engine and mixed with the regular fuel supply according to the demands of the moment upon the engine for power.

In the accompanying drawing illustrative of a presently preferred embodiment of my invention but not intended as a limitation thereon, the only FIGURE of the drawing is an elevational view, largely schematic and partly in vertical section, showing my improved economizer inserted between standard parts of an internal combustion engine, not otherwise shown.

Having reference now to the details of the drawing, I have shown at 5 a container such as an ordinary wet storage battery box, having a removable lid 6 held on by any suitable means 7. The box, intended for the storage of liquid may be provided with a gauge glass 8 for ascertaining the depth of the liquid therein. The liquid 10 within the box is a suitable medium for the electrolysis of water into its components oxygen and hydrogen. It may be a simple solution of sodium chloride, or it may be weak

battery acid such as sulphuric acid. From the lid 6 of the box 5 there extend down into the liquid 10 two electrodes 11, for which I have found platinum to be a suitable material. The electrodes 11 are connected by a circuit 12 containing a switch 14 to a source of electric power 15 which may be the main battery of the automobile. The main battery is, of course, being charged whenever the automobile engine is running.

From a suitable point in the exhaust line 16 of the automobile engine, which may be at the muffler 17, a conduit 18 extends to a valve 19 situated adjacent the box 5. The conduit 18 contains a needle-valve 20 by which fresh air may be bled into the conduit. The conduit 18 also is provided with heat-transfer mechanism, shown diagrammatically as cooling fins 21, by which the temperature of the hot exhaust gases from the muffler 17 may be reduced to a degree not injurious to the box 5 or to the contents thereof. The valve 19 has two chambers 22 and 24 divided by a valve seat 25. A valve head 26 floats in the valve seat 25, being biased to a closed position by a spring 27 controlled by a wing nut 28. From the chamber 24 a conduit 29 connects to the air space 30 above the liquid 10 in the box 5.

The box 5 is also connected to the intake manifold 32. A riser pipe 34 connects into the air-space 30 and has at its upper end a removable closure 35, through which additional liquid may be added to the liquid 10 as needed. The riser pipe 34 is connected to the intake manifold 32 by a conduit 36 in which there is a valve 37. The opening of the valves 37 and 19, by regulating the vacuum in the air space 30, control the influx of gases from the air space 30 to the intake manifold 32 and also in part govern the composition ratio of these gases as divided between exhaust gases entering through the valve 19 and electrolytically produced gases generated in the box 5.

In operation, the box 5 being filled with suitable electrolyte liquid and the switch 14 being closed to direct a current through the electrodes 11, the valve 37 is set to create a desired maximum vacuum when the engine is under load, in the conduits 36 and 34, the air space 30 and the valve chamber 24. As the engine fluctuates between idling and full load, this vacuum also fluctuates, and its effect is felt in the valve chamber 24 of the valve 19. When the vacuum is sufficient—that is, when the loaded engine is sending a large quantity of exhaust gases through the muffler 17—the spring-loaded valve 19 opens and permits some of the exhaust gases to enter the air-space 30.

It will be noted that these exhaust gases are reduced in temperature by the heat-transfer mechanism 21 and also by induction of bleeder air through the needle valve 20, which air has also enriched their oxygen content. Nevertheless they retain sufficient heat upon entering the air-space 30 to increase the rate of electrolytic action. The rate of action is also increased by the concomitant increase in vacuum, both the heat and the vacuum tending to increase the rate of vaporization of the electrolyte and consequently the rate at which it decomposes into its elements of oxygen and hydrogen.

Once the various valves 19, 20, and 35 have been adjusted the only care that my improved economizer requires—except for replacement of the electrodes 11 at long intervals—is the occasional refilling of the electrolyte 10.

I have found that an automobile equipped with my improved economizer not only has more power, more pick-up and get-away, and performs with a most noticeable economy of gasoline; it does it with a great reduction in the noxiousness and toxicity of the exhaust fumes. These fumes, at the instant when they are normally at their worst, are not just diluted; their unburned and partially burned fuel fractions become very nearly totally burned,

to the great improvement of performance and the reduction of smog-forming vapors.

It is to be understood that the foregoing description is not to be taken as a limitation upon my invention, the scope of which is deemed to include any constructive modifications which may fairly be considered as included in the following claims.

I claim:

1. A fuel economizer for an internal combustion engine comprising: a box for containing an electrolyte and having an air-space; electrodes extending through said air-space into the space occupied by said electrolyte; a source of electric power connected to said electrodes; means connecting said air-space to the exhaust system of said engine; and means connecting said air-space to the intake system of said engine.

2. A fuel economizer as set forth in claim 1 in which said first-mentioned means include valve means for bleeding air into said first-mentioned means.

3. A fuel economizer as set forth in claim 1 in which said first mentioned means include heat-transfer mechanism for cooling exhaust gases passing through said means to said air-space.

4. A fuel economizer as set forth in claim 1 in which said first-mentioned means include spring-biased valve means for controlling the flow of exhaust gases through said first-mentioned means, said valve means being adapted to regulate said flow according to the existence of lower pressure on the outlet side of said valve means in contrast to the pressure on the inlet side of said valve means.

5. A fuel economizer as set forth in claim 1, in which said second mentioned means include valve means for regulating the flow from said air-space to said intake system.

6. A fuel economizer for internal combustion engines comprising: a container for a liquid electrolyte and having an air-space above said electrolyte; electrodes, and a source of power connected to said electrodes, said electrodes extending into the space in said container containing said electrolyte; intake and outlet conduits connected to said air-space, said inlet conduit being connected to the exhaust system of said engine and including a valve biased to open in response to lower pressure on its outlet side than on its inlet side; and said outlet conduit being connected to the inlet system of said engine and including a valve regulating the vacuum which said inlet system may impose upon the outlet side of said first-mentioned valve.

7. A fuel economizer for an internal combustion engine comprising: a container for holding an aqueous electrolyte; electrodes, and a source of electric current connected thereto for electrolytically converting said electrolyte into component gases; means connecting said container to the intake system of said engine for the transmissoin thereto of said component gases at reduced pressure; means connecting said container to the exhaust system of said engine for the input of exhaust gases from said exhaust system to said container; and means connected to said last mentioned means for lowering the temperature of said input exhaust gases.

8. A fuel economizer and reducer of unburned components of exhaust fumes for an internal combustion engine comprising: a container for an electrolyte and said container having electrodes immersed in said electrolyte; a source of electric power connected to said electrodes; an air space in said container immediately above said electrolyte; means connecting said air space to the exhaust system of said engine for introducing a mixture of exhaust fumes and other gaseous medium into said air space; and means connecting said air space to the intake system of said engine.

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